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UNITED STATES NUCLEAR REGULATORY COMMISSION'S ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

RELIABILITY AND PRA (SAFETY CULTURE)

SUBCOMMITTEE MEETING

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WEDNESDAY

NOVEMBER 3, 2010

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 1:30 p.m., Dennis C. Bley, Chairman, presiding.

COMMITTEE MEMBERS:

DENNIS C. BLEY, Chairman

SAID ABDEL-KHALIK, Member

MARIO V. BONACA, Member

HAROLD B. RAY, Member

MICHAEL T. RYAN, Member

ALSO PRESENT:

VALERIE BARNES, Renewable Energy Systems

LEE COX, Organization of Agreement States

MICHAEL GAFFNEY, PSEG Nuclear LLC

THOMAS HOUGHTON, Nuclear Energy Institute

G. KENNETH KOVES, Institute of Nuclear Power Operations

DIANE SIERACKI, Office of Enforcement, NRC

DAVID SOLORIO, Office of Enforcement, NRC

ROY ZIMMERMAN, Office of Enforcement, NRC

NRC STAFF PRESENT:

MICHAEL CHEOK, NRR

JAMES FIRTH, FSME

DEREK WIDMAYER, Designated Federal Official

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Adjourn

P R O C E E D I N G S

1:29 p.m.

CHAIRMAN BLEY: Good afternoon. The meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards, I'm sorry, Advisory Committee on Reactor Safeguards Subcommittee on Reliability and Probabilistic Risk Assessment.

I am Dennis Bley, chairman of this Subcommittee on Safety Culture. ACRS members in attendance are Said Abdel-Khalik, I'll get it right Monday, Mike Ryan, Mario Bonaca, Harold Ray and that's all right now. We might have one or two others slip in later.

The purpose of this meeting is to examine the NRC staff proposed Commission policy statement on safety culture, and associated NRC and industry safety culture initiatives. A *Federal Register* noticed dated September 17th, 2010, contained the staff's proposed safety culture policy statement and associated trades.

The Subcommittee will gather information, analyze relevant issues and facts and formulate proposed positions and actions as appropriate for deliberation by the full committee. Derek Widmayer is the designated federal official for this meeting. The

rules for participation in today's meeting have been announced as part of the notice of this meeting, previously published in the *Federal Register* on October 6, 2010.

A transcript of the meeting is being kept and will be made available as stated in the *Federal Register* notice. It is requested that speakers first identify themselves and speak with sufficient clarity and volume that they may be readily heard.

We have not received any requests from members of the public to provide comments. We do have an open phone line, I believe, and I think we should have at least one person on the phone. Could those on the phone identify themselves please? Is anyone on the telephone line?

(No response.)

(Off mic comments.)

CHAIRMAN BLEY: Can we find out who's on and then put it back in the listen mode. Thanks.

MR. FRIES: Hello?

CHAIRMAN BLEY: Hi.

MR. FRIES: Hi, this is Eric Fries. I don't know if you heard me.

CHAIRMAN BLEY: Eric, no. We didn't hear you before. Eric Fries?

MR. FRIES: Yes.

CHAIRMAN BLEY: And is there anybody else on the line? Eric, we're going to put you on the listen-only mode, and we'll open it up at the end of the meeting once again. But if we can put the line back in the listen-only mode. We'll now proceed with the meeting.

We had a Subcommittee meeting a year ago, and that had a lot of tutorial information as well as the proposed language for the Commission policy. So we look forward to hearing where we are now and all the things that have happened in between.

I call upon Roy Zimmerman from the Office of Inspection and Enforcement to open the presentations. Roy?

MR. ZIMMERMAN: Thank you very much. Good afternoon, Mr. Chairman. Good afternoon, members. I am Roy Zimmerman. I'm the Director of the Office of Nuclear -- the Office of Enforcement.

(Laughter.)

MR. ZIMMERMAN: I left that office. But as the Director of the Office of Enforcement. To my far left is Dave Solorio. Dave is the branch chief who is responsible for the draft safety culture policy statement, which we'll look to get to the Commission

in the next couple of months and finalizing that document.

We have Commission meeting coming up in the end of January, late January time frame. To my left is Diane Sieracki who works for Dave. She's a senior safety culture policy manager and she'll be doing the bulk of the staff's presentation shortly, and both are from the Office of Enforcement.

I'd like to thank the committee for this opportunity for us to be able to update you on the progress that we've made in finalizing the draft safety culture policy statement. As the staff just mentioned, last November was our last opportunity to brief you. We look forward, as I'm sure the external stakeholders do as well, to bring you up to speed on what's transpired over the last year.

There's been a lot in our minds that had been accomplished, and you'll hear about that today. Although the Office of Enforcement has the lead for development of the safety culture policy statement, we have had great support in a very collaborative working environment with our partnering NRC offices. This has been very much a collaborative activity both internal and external to the Office of Enforcement.

We set up a steering committee and a

working group within the NRC that provided very good guidance and input to us in the development of the policy statement, and that's been very useful, and that's been comprised of nine offices that work together and commiserated in the development of the policy statement.

A number of those office representatives and some of the members from that steering committee and from the working group are here today, so if there's questions that are beyond our scope and more directly in the areas of those program offices, we have people through the audience that will be able to assist with that.

I also wanted to recognize Dr. Val Barnes from the Office of Research, who will be making part of the staff's presentation later on in this afternoon. Similar to the collaborative working relationship that we've had internally, we similarly have had that type of an environment working externally.

We've had very good input that has come in from the industry, from our partners in the Agreement States and from the public. As you know, it's a challenge when we say that, when we talk about the industry, because this activity is not at one venue.

It's not aimed at reactors or non-power reactors. It's aimed at all that we regulate, and it was that collaborative environment of bringing in representatives from the industrial side, the medical side, the reactor side together, and their ability to be able to work for an overarching goal, that we give them a lot of credit for how well they did in accomplishing that.

We received very good comments from the public. We had two public comment periods. We had a three-day workshop last February on this topic, which again the stakeholders work extremely well together, and there's been public meetings across the country that similarly provided good comments for it.

So we think we have a good base of comments that we received, for us to be able to move forward. We continue to view a strong safety culture to be a key component to good safety performance. We follow high profile events, whether they're in our venue or not.

Things like the oil spill, the coal accident in West Virginia, we're interested in being able to learn from occurrences whether they're within our sector or not, to see if there was a potential role that safety culture played in those activities.

So we have initiatives that we're working on in those areas.

At that point, let me stop with introductory comments, and let me introduce our principal presenter for this afternoon, who is Diana Sieracki. As I mentioned, she's a senior safety culture program manager in the Office of Enforcement. She has a Master's degree in Management and Organizational Behavior.

She has over 25 years of experience in the nuclear field, and for the past ten years has been working the safety-conscious work environment and safety culture fields. She came to the NRC recently. She came here in early August from Dominion's Employee Concerns Program, where she served as the corporate fleet manager, and she's definitely hit the ground running since she's been a member of the NRC staff. So with that, let me turn the presentation over to Diane.

MS. SIERACKI: Thank you, Roy. Good afternoon chairman and members of the committee. A couple of other people that I just want to introduce in the room, and then we'll get started. Last year when you met in November, Dave Solorio was the speaker on this topic, as well as June Cai.

She's in the audience as well, and a couple of other members of our external safety culture team. Maria Schwartz and Dr. Catherine Thompson are here. They've been integral in this effort as well. Thank you.

I do want to start where we left off back in November of '09, but to get to that point, just a quick refresher. This topic, safety culture, has really been at the forefront for almost three years now. It started with a directive by the Commission back in February of 2008, and at that time, the Commission wanted us to take a look at is it necessary to strengthen anything we're doing in the reactor community? How can we engage material, licensees, getting Agreement States on board and really what should we do about security and safety culture? Should we have one policy, two policies, etcetera.

With that directive, the staff put out an effort to have a workshop in February 2009, and those topics were discussed. The results of that workshop, along with staff input, resulted in a Commission paper that went up in May of '09, basically letting the Commission know that staff felt that the reactor community, the efforts made in that arena were effective for safety culture, based on the ROP,

changes that had been made in 2006 and self-assessments of the process etcetera, and also made the recommendation that we have one policy statement.

The Commission took that direction and/or took those recommendations and provided their direction in October of 2009, for us to publish one policy statement. I want to start with that basically today, so can you go to the objectives, Dave? Thank you.

I want to talk about that -- actually the one before, please. I want to talk about the November 2000 FRN and the public comments that we received after that effort, along with a number of outreach activities that we've done, which have really been instrumental in getting us from that point to where we are today and ready to put up a proposed final safety culture policy statement.

Those included the safety culture workshop that Roy alluded to, as well as numerous other outreach activities, including additional public meeting, teleconferences, an additional FRN that we put out in the *Federal Register* with a revised safety culture policy statement just this past September; an analysis of those public comments; and then how that all of that rolled into what we will be bringing up to

the Commission in January.

Next slide. So that Commission directive in October was for us to publish the one policy statement. It also asked us to consider incorporating suppliers and vendors, continuing to engage a broad range of stakeholders, and then also seeking opportunities to comport terminology, and really there, we wanted to get to a common language for the industry.

So that draft 2009 FRN had a definition, and this is one of the areas where we actually started looking at terminology and trying to see if we could get some commonalities, and we took the INSAG definition, which was really an advisory group to the IAEA, made a couple of changes to that.

They had nuclear plant safety and we took a plant, because we wanted this to be really effective with our licensees as well, and call that nuclear safety and also put in some words to capture security as being very important.

CHAIRMAN BLEY: Now a year ago, when you were with us, you were not -- I don't think you were linked to the inside definition; is that right? Is that something you added this year?

MS. SIERACKI: No. That was actually the

definition that was in the --

CHAIRMAN BLEY: Is that right? I didn't remember that.

MS. SIERACKI: Right. In the draft policy statement. The eight characteristics that we had in that policy statement came from the ROP, the 13 components, with some analysis done, really took those down to eight, and we put this out for a 90-day comment period.

Go ahead, Dave. This was the definition, and again from INSAG. You can see that we have nuclear safety in there and we've also talked about security issues. So that's what went out when you talked last November.

Next one. These were the traits, or I should call them "characteristics." At the time, they were listed as characteristics in that *Federal Register* notice, and again this was a compilation of some thought process that went through taking those 13 components down to eight.

Okay. What happened after that, while this was out for comment, because the Commission really wanted to engage a broad range of stakeholders, we decided to put together an effort where we would bring the stakeholders together and really get some

work on the ground, to see what input we could get from them.

I was actually a panel member. I represented Dominion on that panel. So I was one of 16 individuals that came together, representing all of the industries that we were looking at in the regulated community. Medical facilities, fuel, cycle, gauge folks, reactors, Agreement States, members of the public. We had 16 people basically sitting around a table.

We reached alignment. It was a three-day workshop, and we reached alignment on a high level of definition that we could all really gather around and form consensus that this works for each of our organizations. We also came up with eight traits.

Now we took the opportunity to again look at terminology within the industry, so that we could make sure that we're not really reinventing the wheel but look at the INPO eight principles, looking at NRC's 13 components, looking at the characteristics that were out in the *Federal Register* notice, as well as some other theory out there, Dr. Shein, etcetera, who had, you know, been active in the field.

So this group of 16 stakeholders took a look at all of that, and used that as our basis, and

came up with a definition.

Next one. This is the definition that the 16 members of that team came up with, and it starts with nuclear safety because that was done intentionally, and that was to give the connotation that we recognize the nuclear is unique and special, and so we wanted to call it "nuclear safety culture" not just safety culture.

CHAIRMAN BLEY: Can I ask you for some help to go through -- I know you're presenting this in historical order. If you come to things like this and they're actually where you are now, if you could just highlight that, you know, the difference between what's in process and what's -- where you've evolved to, that would be nice.

MS. SIERACKI: Will do, and actually this is -- that's a good point, good time for that, because this is the definition that has stood the test of time, and it is what you will see in our proposed final safety culture policy statement or statement of policy.

So let's go through safety culture. It's core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals, to ensure protection of

people and the environment. Along with that, these are the eight traits. Now you'll notice that they've changed from the term "characteristics" and now we call them "traits."

That was to give this a little bit of definition for itself, because we had components, we had principles, we had characteristics, all sorts of things out there, and decided since we were really working on a common language, we would call them traits.

So these were the eight traits that the team developed. How we got here was a simple, sticky exercise, if you know what I mean by that. People just kind of came together and said what's important in safety culture in your particular industry.

Went around, put those all up on the board, and then we put them into bins, if you will, things that were similar, and then we attached a name to those. They looked very familiar, and I have a chart coming up which will show you how they relate to the characteristics that went out in that first draft safety culture policy statement in the upper end.

You'll notice that I have a little caveat there that says with revisions by the staff. When Roy did his introduction, he talked about the program

office involvement, when we had a working group and a steering committee internal to the NRC.

As we're moving through all of these processes, those groups would meet to take a look at things, and after this workshop and the eight traits were put together, the program offices took a look at the wording on those traits and just revised them very slightly. It was really to provide clarity, and let me give you a couple of examples.

The words that the workshop came up with for the first trait was just simply leadership safety behaviors, and the staff, through the program offices, felt that leadership safety values and actions was a better descriptor to what we were really trying to get at. So very minor changes just in wording only, but the words you see here are with those revisions from the staff.

I also want to point out that these are the traits as they still stand today. There's a little bit of an addition, and we'll talk about that as we move through the presentation. But at this point, keep those in mind too, because those will also go into the final, into the proposed final safety culture policy statement.

Also note that these are not prioritized.

They were not prioritized by the workshop members, nor by the staff. The only thing that I can say is that the leadership trait came out on top, and that was because all of those involved felt as though really leaders need to walk the talk that comes from the top down, and that is the most important, is the leadership safety values and actions.

So that is number one. The rest are not prioritized in any order. They're all equally important.

CHAIRMAN BLEY: Is there anything you can say about -- now that's one that wasn't on the original list, but the things that dropped off of the original list, or did they all sort of slip into this group?

MS. SIERACKI: If we go on to the next slide, I'll describe how that happened.

CHAIRMAN BLEY: Okay.

MS. SIERACKI: Excuse me. A little more difficult to see on the screen, but you do have hard copies. On your left are the characteristics, the eight characteristics that were in the draft safety culture policy statement that was out in the November '09 *Federal Register* notice. On the right are the workshop safety culture traits, with the tweaks and

language that the staff had provided.

You can see that there is a very good line-up. We've got licensee decision-making and leadership safety values and actions. When the panel talked about leadership, decision-making was a key discussion that we had under there. So those line up very closely.

Personal accountability versus accountability, work processes versus work planning and control, continuous learning, continuous learning environment, program identification resolution, pretty much the same, program identification evaluation. Environment for raising concerns means the same thing as safety conscious working environment.

Now you'll notice where there's a little bit of a difference. For the workshop traits, we had effective safety communication and respectful work environment, versus work practices and resources for the characteristics in the draft safety culture policy statement.

When the draft safety culture policy statement went out in November of '09, there was short descriptions on each of the characteristics, and the characteristic under planning, work planning and control actually did describe some communication

within that. So we felt that it's kind of absorbed in the -- traces over to the effective safety communication.

Work practices were discussed by the workshop team when the work processes trait was developed, so that could be absorbed within that. Resources were also talked about by the workshop panelists and under the leadership trait, and would be absorbed in that.

The difference lies in the respectful work environment. That was a trait that really came out, especially by the workshop members who -- where this is a new concept, where safety culture is really something that they aren't as up to speed on as the reactors, for example.

It was very important that respect and trust was something that the panel members felt that this was very important for individuals to feel within an organization. Now you might say how would you inspect something like that? When the workshop put these traits together in the discussions that we had, nothing was based on being in -- being able to be inspected on that. This was really coming together with a high level definition and traits of what does it mean, what do you see in a culture that has a

positive safety culture. So respectful work environment is the one that you don't see a definite tie to.

Okay. On the next page, this just gives you a little pictorial view of how that workshop panel put this together. It was really an overarching definition that everyone could come to consensus on, with a description of high level traits, and those you will -- you saw those and you will see them in our proposed final safety culture policy statement.

The third tier is really where it becomes a real picture for each of the regulated communities. That tier has not been developed yet. You can liken it to the sticky exercise that I talked about. It's really fleshing out what does continuous learning mean in the medical arena? What does it mean to the gauge people? What does it mean in the reactor community?

That needs to be fleshed out, and we looked at that as a part of the implementation process, once this policy statement is put in place, how is that going to be implemented in those different fields, and that's where Tier 3 will come into play and need to be fully developed and bought into by the regulated entities that we regulate.

Okay. The next page. This is just an

example of some of the stickies that we came up with, when the workshop panelists talked about the first trait, which was leadership safety behavior and values. Management's in the field, so there's a visibility out there. There's a commitment to maintaining your equipment.

They won't resolve conflict. They reward safe behavior. The rewards and incentives and sanctions are used to reinforce positive behaviors. They respect differing opinions; their actions match their words, so they walk the talk.

Their schedules are realistic and they don't challenge safety standards. These are just a handful of what the group talked about, but it gives you a flavor of what we will be looking for in the implementation phase as we move forward and really flesh that out in each of the regulated communities.

So there was so much work done at this workshop that staff felt that we needed to extend the comment period.

We had originally had that November '09 FRN out for a 90-day comment period. We extended it now by another 30 days, giving people 120 days total to respond, because now we had all of this information out on a revised definition and traits, and just what

we were looking at from that perspective.

Okay, next slide. So at the end of March, the comment period ended in March, and we had public comments that came in, and they really were centered around three themes, one being we're really concerned about implementation. What is this going to look like? Are you going to tell us that we, you know, need to do procedures and do we have to do training, whatever the case may be. But there's a lot of concern out there about what is going to be required of us when you implement this policy statement. So a number of comments related to that.

So a number of comments indicating that security should not be in the definition or traits, and you may have noticed when you looked at the definition and when you looked at the traits, you didn't see the word "security."

That was actually done intentionally by the workshop members, and the reasoning behind that was, and this came a lot from some of the other regulated entities rather than the reactors, was that security is really no different than emergency preparedness or radiological safety or some of the other groupings that are out there, that are also of equal importance.

And especially in the medical arena, that the life of the patient really takes precedence. Now this would be -- you know, it's not something that's every day, we're you're going to just toss the radiation safety out the window and worry about the patient.

But there could be a time when the patient, the life of the patient takes precedence over some of the security of medical equipment, that kind of thing. So there was a definite we don't want to see security in there. Responses that we got in the public comments was we don't want to see security carved out.

The last one that was a grouping was what do you mean with policy statement versus something that's enforceable or a rulemaking? So really, there was some confusion out there by the members of the public on just what does that mean.

So the working group and the steering committee that we had inside the NRC, the program offices, took these public comments and we needed to decide what we were going to do with these. So this is what happens next. We begin to meet on a pretty routine basis, the steering committee and the working group --

CHAIRMAN BLEY: But before you leave this one, I don't know if you've talked with the Commission in between about this.

MR. ZIMMERMAN: We have.

CHAIRMAN BLEY: But I'm little curious about, what do you mean about dropping the security and how do you envision that? Do you envision that that it's actually included under this umbrella; it's just not carved out in the definition?

MS. SIERACKI: Yes, and I'm going to touch on that too. It's actually, it does end up being there, but these were the buckets that we had, and then we had to do some resolution on these, because it is very important for our agency, with the pillars that we have of safety and security, to not just toss that right out the window.

In addition to these three major areas of comments, there was also support for the workshop definition and traits, and there was support in putting the traits into the statement of policy itself. That was a question that we had in the *Federal Register*.

So we really needed to go back to the drawing board with the working group and the steering committee to talk about security, and that became a

pretty big topic, because we wanted to make sure that it was in there.

So what happened initially was the working group and the steering committee made some word changes on the traits, and wherever you see "safety," it said "safety and security," pretty much in each of the traits.

So you could -- maybe if you want to back up to the traits again. So I'm sorry on the next page. Okay. You can see there are some little -- there are small descriptors there, the issue of safety values and actions. Leaders demonstrate commitment to safety. They basically said "Leaders demonstrate commitment to safety and security."

So everywhere you see "safety" in there, we added "security." So that was something that we tried force, because we wanted to make sure that okay, let's get security in here, and then let's bounce it off of our stakeholders again. So what we did, and we're not finished yet.

But what we did is we had another public meeting, July 15th, and this was actually a public meeting/teleconference, where we got those 16 stakeholders together again, along with other members of the public who got onto the call, and we reviewed

the results of public comments we got from the November 2009 FRN, the three bins, the implementation, the confusion with the policy statement and the treatment of security.

We really talked about security, because we showed them the changes that we had, where we put in safety and security in each of the traits, and what we got out of that conversation was a continuing endorsement of the workshop definition traits the way that they stood, and they really didn't want to see putting security into each of those.

Well again, this is very important to staff as well as it is to the Commission, so working group members and steering committee members met again, and we came up with a preamble that we could put in between the definition and before the traits started, kind of a definition of what a trait was, and then this is -- and we want to make sure that you consider security in all these things. So it was a preamble that we wanted to put in.

I'm going to get to that in just a minute, but that ends up also being in the final safety culture, the proposed final safety culture policy statement and you'll actually see that in a couple of slides. But I do want to point out that during the

same time frame, where we did the public meeting and the working group and steering committee is continuing to meet, we're also doing a number of outreach activities.

And your next slide shows that through May and August, t he program offices, as well as the Office of Enforcement, participated in a number of industry events, conferences, forums, panels that type of thing, to get the information out on the safety culture policy statement, as well as to get feedback.

You'll note there that one was a big workshop that we had on vendor oversight in New Orleans in June, and actually one of the panel members, Bruce Williams, who's the rep from Shaw, he did a presentation on the safety culture policy statement at that workshop. We had other NRC folks presenting as well. But we received positive feedback on that.

In fact, there were two members on the workshop that were vendors, one from Shaw and one from AREVA. So we had a little bit of that involved as well. Okay. At the same time, and I hope I'm not confusing you, because all of this happened around the same time. I'm trying to go chronologically and I promise I'll hit security again, but the INPO

validation study was going on at the same time we were doing outreach activities.

You're going to hear a presentation today from Dr. Ken Koves from INPO and Dr. Val Barnes from our Research here at the NRC on what really that entailed. But in a nutshell, it was a survey that was given to each of the utilities. So this is reactor-specific. It was a survey that was given, based around the eight traits that the workshop came up with.

So essentially they grouped questions around -- questions were based on the eight traits, and they put those out in a survey to the reactor community, and in a nutshell, it pretty much -- it supported the traits as we had them. It didn't line up completely --

CHAIRMAN BLEY: Just to see if these organizations agreed with the traits, or to see if they could evaluate the traits? What was the aim of this?

MS. SIERACKI: It was really to see if they had an validity, context validity and a number of other things, I'm sorry, that D r. Barnes and Dr. Koves can explain to you when they do their -- because they are going to get through the whole thing this

afternoon, so you can get into the technical needs --

CHAIRMAN BLEY: I'll be delighted to go through that.

MS. SIERACKI: Yes. So it did show some alignment between the traits and what they came up with, just a little bit of different wording. The one that really popped out was questioning attitude.

Although the panel talked about that, the workshop panel talked about questioning attitude and accountability as well as leadership, this came out to be something that really rose to the level where staff felt this might be something we want to add as a ninth trait.

So what we did is we had -- we had Dr. Barnes and Dr. Koves present to the steering committee, I was referring to before, so they could understand what this validation study was that happened on September 2nd. We did another public meeting/teleconference on September 16th, so that we could provide that information to the workshop panelists, as well as any other members of the public who wanted to sit in on that.

Then because we had all of this information; we had a workshop in February; we came up with new definition, new traits. We had all this

outreach activity that we had done. We did a couple of other public meetings/teleconferences; we had an INPO validation study, staff thought it might be a good idea to put out another FRN, another revised draft safety culture policy statement, to get some input on all of this new information that we had.

Along with that, we wanted to give stakeholders on the west coast an opportunity to actually attend a meeting where they could really discuss what had all happened in the past year.

So we came up with a plan to have a public meeting out in Las Vegas on September 29th, and concurrent to that, we put the revised draft safety culture policy statement in the *Federal Register* on September -- it's actually September 17th, and we had the public comment period. We were looking at the public meeting.

MR. ZIMMERMAN: Webstreamed it.

MS. SIERACKI: Webstreamed it, all kinds of good stuff. Next one, and just to show you what went into that revised draft safety culture policy statement, it included the definition and traits that I talked about. The term "security" was not included in the revised definition and traits, but we did the preamble, which I'm going to get into in a slide or

two, so you'll get to see what it actually looks like.

Next one. It really defined the trait, and remember that I said it was -- we had the definition here. This is a read into the traits and then the eight traits below. So it defined a trait as a pattern of thinking, feeling and behaving that emphasizes safety, and it also noted that although the term "security" is not expressly included in the traits, it is primary pillar of the NRC's regulatory mission and we want you to consider both.

So if you go to the next page, you'll see the exact wording on this. This was in the revised draft safety culture policy statement and it will be in the proposed final safety culture policy statement. So you can read that.

Experience has shown certain personal organizational traits are present in a positive safety culture. A trait in this case is a pattern of thinking, feeling and behaving that emphasizes safety, particularly in goal conflict situations, such as production versus safety, schedule versus safety and cost of the effort versus safety.

It should be noted that although the term "security" is not expressly included in these traits, safety and security are the primary pillars of the

NRC's regulatory function. Consequently, consideration of both safety and security issues commensurate with their significance is an underlying principle of the statement of policy.

So we had the program offices on board with putting this all together, and this would satisfy program offices and really us, the staff, the NRC, that we're putting emphasis on security, and also respecting the stakeholders in what they could gather around and feel that this is a definition of traits that we can live with.

CHAIRMAN BLEY: What's the definition and the traits? Can you say, coming out of the workshops, that was a consensus position or a majority position or can you characterize it all?

MS. SIERACKI: It was consensus. You know, there were some, and I'm not going to say that everybody said that's perfect, you know, let's leave. There were a few that we had to have some discussion on as an overriding priority that safety received.

There were some that felt leadership needed to play a bigger role in the definition. But in the end, we left that meeting with a consensus that this is something we can all live with, and especially because these traits are going to go out to that Tier

3, where we can make this really good for our own regulatory, regulated entity and customize them, yes.

Okay. Additional changes that went into that draft safety culture policy statement in September. The traits were included in the statement of policy, and that was based on the feedback that we had gotten from the November '09 draft policy statement. It is applicable to vendors and suppliers.

You will remember that when we had the direction by the Commission, they asked us to consider vendors and suppliers. When we did the first -- when we looked at the public comments from the first draft safety culture policy statement and when we reviewed those in March, there was support for putting vendors and suppliers in, but there was some concern about implementation.

We also did, we had a couple of vendors on the panel, as I mentioned, from AREVA and from Shaw. We did some outreach activities in the vendor community, in particular the NRC workshop on Vendor Oversight.

When we put out the last policy statement, the revised draft safety culture policy statement, it was in there and we asked people to take a look and give us some feedback. We didn't receive anything

real negative, although there is concern, on the part of the reactor community, as well as fuel cycle, that really --

MEMBER RYAN: The vendor community?

MS. SIERACKI: Yes. That were really talking about how are you going to implement this? Are you going to make us responsible for things that we don't have jurisdiction over, for working with somebody in Japan, for instance? How is this all going to work out?

So we'll look at that really as an issue for the implementation phase, and something that when we put the Commission paper up for the Commission, that you know, we will recommend that there is an approach that is kind of a step approach as we move through implementation, because some areas are further ahead than others such as reactors, and that when we get to the vendors and suppliers, that that's something that we really need to be concerned about, what are the expectations and how are we going to implement this.

CHAIRMAN BLEY: Have you thought far enough about that to know if it extends all the way down the supply chain?

MS. SIERACKI: That was the outcome. What

we wanted to do, considering that this is a policy statement, and everybody should have a positive safety culture, and that includes anyone who's related to the panel and the nuclear materials, and so that would therefore include our vendors and suppliers, there are ways to do this. You can put it in contract language. We've got programs in place already at the NRC where we're looking at our vendors.

So in answer to -- I think I'm answering your question. If I'm not, please ask me again. Yes, it would apply to the vendors and suppliers through our licensees basically. They would be responsible for making sure that they're working with vendors and suppliers, who have a positive safety culture.

MEMBER RYAN: How far down did you go to define safety-related components?

MS. SIERACKI: I don't think we really defined them at all.

MEMBER RYAN: Well what I'm thinking about is, you know, large bits and pieces in power plants or other facilities that really are -- if this thing breaks, we've got a real problem. It's clearly a safety-related component. But I could get down to where protective clothing is a safety-related component.

So somewhere along the line, I just wondered how you -- or did, when you say they didn't deal with that?

MR. ZIMMERMAN: I think that's going to come out more, again, in the implementation phase. This is a mind set that we're working on, because there's no requirements here. But it's a matter of training and communication about the benefits of what this would bring, if they had this as part of their way of doing business.

So we see this as a long journey. This is not like talking reactors that have been dealing with this in the short term. This is going to take a longer period of time if in fact the Commission supports doing this.

But the benefit of it again, there will be devils in the details and so forth, but what we want to try to do is get those vendors and suppliers thinking about the types of things that we've been talking about, so when they have their staff meetings and such, they're reviewing some of these activities and talking about it, what it means to them.

That's where the Tier 3 comes in, because it's tailored to their organization. Would it be tailored differently to a hospital?

MEMBER RYAN: Sure. Well, to follow up on my example, you know, of safety and quality, i could understand where a licensee would sort of specify here's what we wanted to do, here's the performance characteristics we needed to add. It's either in an air-conditioned room or it's in a high heat area or, you know, all these different things so you can pick from the catalogue what the right things are to use for those environments.

But I just think that's -- when you just said "the devils in the details," that's the right point, I think, is that you know, when you get safety-related components in there, all of the sudden that takes on almost a definition that's a term of art.

MR. ZIMMERMAN: My personal view, in this area it's a go-slow approach, and come up for air often, and talk to people that are involved and see how it's -- seeing how it's being received, because it's all about the delivery within their own organization. If they link it to something that they have to do, and they don't really take it to heart, we're really not accomplishing what we're trying to get done here.

And just to color that, while I've got the floor for a minute, that's why we did the February

workshop in 2010 the way that we did it. It was a NRC workshop, but we let them collaborate in a manner that they probably never had before, so that you know, the medical group, they were outspoken. They weren't about to let the reactors have the floor for three days.

In that interaction, you know, they came up with something that generated buy-in for them. This is all about buy-in in my mind. So that they feel they participated in building this. We had to make sure, since it's an NRC document, that it's something that we can subscribe to to bring to the Commission, because it ultimately is our document.

But if we can accomplish both, something that we feel comfortable with, they felt they had a part in buy-in, they have energy and excitement on this issue, they believe it's important, that when they go to their staff meetings to roll out these traits and talk about the definition, they're not just going through the motions, that this is just something that somebody dreamed up and, you know, we've just got to talk about it and then we'll be done and we'll get back to real work.

This is aimed at trying to get their hearts and souls to see the benefit of why this is

important. So we really went after it in a way that we feel was very important, since we're not talking about regulation, to make sure they really bought into it.

And again, I give a lot of credit to the industry, that they did a lot of heavy lifting in this and they really bought into it. There's still a lot more to be done. Implementation is a challenging hurdle in front of us.

But to this stage, I think there is energy there on the part of the industry, because they believe it's an important area, and that's why in my opening remarks, I made the comment that we're going to look at the Gulf oil and the West Virginia coal mine and what's going on with Metro, and look at reports that are done by investigative groups.

Not something that we're going to do, but we're going to look at those and try to make safety culture real, okay. We have examples in our industry. We'll clearly use them and there are some and we talked about them last November and so forth.

But it doesn't have to be in our industry. It's trying to show that this isn't just words on a piece of paper. This is what happens if potentially we don't have a good safety culture. We're not going

to rush out and say that this, this, this, didn't have an adequate safety culture.

But if the investigation results demonstrate that, then we'll bring that up for own internal training, and also in my vision, send it to out to the industry, so they have real cases to bring the points home when they talk about them at their facilities.

MEMBER RYAN: Sure. Sounds good. Thank you.

MS. SIERACKI: Okay. Other additions that you would see in the revised draft safety culture policy statement in the FRN for September, it also indicated the Commission's, and "expectations" is probably the wrong word to use here. It's really an encouragement that the Agreement States and other organizations develop and maintain a positive safety culture.

This isn't rulemaking, and it was something that, you know, we understand it's a policy statement and we are going to very much encourage our Agreement States to come on board. You are going to hear from Lee Cox from the Director of the Organization of Agreement States shortly as well.

In that FRN, we also asked whether the

INPO validation study results should be considered, and remember that I said that there were a couple of places where they weren't exactly the same, and you will hear about that. So all of that went out, and while that was out for comment, we did the other big public meeting out in Las Vegas.

We had six of our stakeholders from the workshop in February come and present about outreach activities that they had been engaged in in their own areas, as well some concerns they might have about the implementation phase.

So they came armed with some input to provide to the public as well. Both Dr. Barnes and Dr. Koves presented the INPO validation study results, so that again we could get some good information. There was a strong support again of the definition and traits from the workshop, and most of the concerns expressed were again related to implementation, and just how is that going to look.

CHAIRMAN BLEY: You mentioned the preamble. Is there consensus on that at this point or --

MS. SIERACKI: The preamble, we have not heard anything negative about the preamble.

CHAIRMAN BLEY: Or anything positive?

MS. SIERACKI: Did we get positive results? You know, actually, from a public comment standpoint, we didn't get anything.

CHAIRMAN BLEY: Any comments at all?

MS. SIERACKI: No, any comments at all as we --

MR. ZIMMERMAN: I'm sorry. We've been candid with our stakeholders, for them to understand that internally, you know, we've wrestled a bit internally with regard to security, and we thought the preamble was a way to go, so that they understood why we put it in.

If you were to do a word search in this policy statement for security, you would see it in many, many places. It's not like security doesn't show there. What we did is take it out of the definition, and consider to be under an overarching safety, with a number of other significant items like security that are underneath it.

But it really did not ring true for many of the smaller organizations, and back to the question that you asked when we had our Commission meeting last spring time. It was a little bit of an odd Commission meeting in that there were only two commissioners there, one of which was the chairman.

In that Commission meeting, the industry stakeholders went over their rationale. The way I read that meeting is that those commissioners thought what was presented was reasonable. We have new Commission now, and we'll see what occurs. But they did do their argument directly in front of them, and I thought it made sense to the commissioners that we present.

MR. SOLORIO: I wanted to add, Dave Solorio. At the September 28th public meeting, Ms. Schwartz made the presentation for the changes we made to the policy statement, and she did identify to the audience that we included the preamble and my recollection is people were aware of the change and they supported the change. There was no negative feedback on that change. They were okay with it.

CHAIRMAN BLEY: I'm also curious. At all of these workshops, but particularly this last big one out west, was most everyone there either representing licensees or vendors, or did you have any just general members of the public show up for these things?

MR. SOLORIO: We did have a few general members of the public. A lady from California drove out. She was with Johnson and Johnson, and apparently

they were interested in learning about safety culture. There was some agreement state representatives there, and there was some members of the public on the line and watching through the webstreaming. One of them happened to be a former NRC employee.

CHAIRMAN BLEY: Okay, thanks.

MS. SIERACKI: And up on the screen right now, just a little bit more about that public meeting. We actually had two locations. We had people able to be here also in Rockville. So Las Vegas, out in Rockville and, as Dave Solorio mentioned, we had webstreaming as well as being able to be on the phone.

So that was in the middle of the comment period. We closed the comment period -- closed the comment period on October 18th, and we assembled all of the public comments. They pretty much fell into two categories.

Basically, making, asking us to ensure that we understand that there should be a distinction made between the types of licensees and credit given to those with existing safety culture practices.

For example, you know, the Joint Commission does a lot of work. Some of the Agreement States, they have practice sin place, and when you go through their M, I think it's the IMPEP, the

inspection process that they do, they look at safety culture.

So there are things that are already in place out in some of these industries that aren't reactors, that are not -- they're not starting from ground zero, and they want to make sure that we're not just going to throw everything out and have them start over, but take into consideration that they do have practices and policies in place at this point. This would build on those.

Then the second was a request that we keep these stakeholders involved, and that there's outreach activities as we move through the implementation phase, really just reiterating that they want to be involved in Tier 3. They want to continue to help us as we move forward in that implementation phase.

CHAIRMAN BLEY: Have you done any planning for the implementation phase? Do you have a schedule or anything out or workshops planned?

MS. SIERACKI: We don't at this point. Each of the program offices have agreed that they will work with their constituents as they move forward. There are some very, on an overview basis and some of the program offices, you know, reps are here today if you have specific questions.

But you know, obviously the reactors are pretty far ahead with the ROP, and if this changes any kind of language of any of that sort of thing, they stand ready to do what they need to do. New reactors from NRO, they're modeling that same kind of process, the inspections that we do under the ROP.

FSME, with respect to some of their material licenses, the NUREGs and some of those procedures and policies that they had in place, to look at those as they move forward. But specifics, we'll really wait for the Commission to provide direction.

But specifics, we'll really wait for the Commission to find direction, and then get our stakeholders involved.

(Simultaneous discussion.)

MEMBER RYAN: Maybe we're going to get to this in a minute, or a little later on we'll hear from the Agreement States, but having worked in an Agreement States or several for a long time, that's where the action is in terms of the number of licensees, the number of programs, the variety of programs. We keep talking about reactors. Well that's 100, okay.

MR. ZIMMERMAN: Right.

MEMBER RYAN: Okay. Now there's 20,000 over here.

MR. ZIMMERMAN: Right.

MEMBER RYAN: So that's, I see that as two very different tasks, and I'll be curious to hear your thoughts on that now or later as we go along.

MR. ZIMMERMAN: One thing, we were pleased, based on what you said, we were pleased we were able to bring everybody together in February of this year, and reach an overarching goal that everybody felt very comfortable with.

MEMBER RYAN: Yes. Now when you say "everybody," what size sample did you get from those 20,000 Agreement States --?

MR. ZIMMERMAN: Well, we used them as a point of light, for them to be able to go out and to be able to go to other conferences and continue to talk about it. We didn't take the February outcome and say "we're done," you know.

MEMBER RYAN: Right, right. So you're expecting more feedback from that seed you planted --

MR. ZIMMERMAN: And the feedback that we've gotten through the entire year is w hat you've done thus far makes sense. However, we're concerned about the implementation phase. Now a process piece,

I spoke earlier about the collaborative working environment, both internally and externally, has been very good.

When the policy statement wraps up, where OE has lead with support from the program offices, it flip-flops. The program offices go into the lead with the materials organization, FSME. NMSS will have their lead. NRR will have their lead. We go into a support role for them.

So as they want to talk in these meetings like in Vegas about implementation, it's telling me two things. One, they don't have any real hard spots with what we've done so far, the development work. They've been giving us pretty good signs. We haven't been getting a lot of cards and letters that are negative.

The turnout in Vegas was not extreme. So I think we've exhausted pretty well getting out the steps to get the policy statement up to the Commission. But their focus is on implementation.

The program offices did a great job. They traveled with us to Vegas, and they were able to talk about some of the initial thoughts, about how they would look at rolling this out, and the key is slow and methodology. We're not trying to, you know, run

something down somebody's throat here. This is -- again, it's policy. It's not a regulation, and to work with them.

That's what the feedback to us has been, to the NRC has been, is work with us on this. Some of us are familiar, some of us are not. We're not going to do it at the same speed. Vendors are not and the small ma and pa shops are not going to do this as at the same speed as the reactors are going to do it.

The dialogue that will occur with NRR about the ROP and is there credit to be given for some of this is a completely different dialogue than what FSME will be having with the materials, going over tell me some more about safety culture so I understand it.

Because ultimately, as I was saying before, the managers and supervisors have to understand it in all these different locations, in order to become believers and to be able to pass it on their staffs.

MEMBER BONACA: IAEA has done a lot of work in this area. Have you looked at some of their work? I mean you already saw the --, but I imagine that looked at those more and that was much work.

MR. ZIMMERMAN: We've had some

interactions with international counterparts. I expect that that is going to pick up. So we do want to try to keep international partners aware of what we're doing. We're always looking for best practices. I think our main focus in what we've done in developing this plan was to try to make sure that those that going to potentially be impacted by it felt they had a say from ground zero and will feel that rather than hear it as a near-final form, do you have any comments on this document?

We brought them in extremely early in the process, and I think that that paid dividends. But we did have some involvement with the international community, and we do bilaterals and so forth to be able to talk about it.

MR. FIRTH: This is James Firth, NRC staff. I want to elaborate a little bit more on what Roy had said relating to the Agreement States.

When we went out with the draft policy statement, we asked the Agreement States to share that information with their licensees, and we had a very good response from the Agreement States in doing that. So part of that's getting the education to agreement state licensees, but we've also been trying to move things along in terms of getting the Agreement States

to buy into the process of the policy statement and where we're going.

Some of our discussions with the Agreement States is that some of what the policy statement would involve doing, in terms of looking beyond just the real large glaring errors and violations, that it's going back practices that they had done before.

So there's an endorsement there that there's value in terms of being a little more thorough, to have that dialogue with their licensees, whether it's on the entrance or exit interviews for their inspections.

There's also been a number of Agreement States that have already brought the discussion of safety culture into Enforcement, where they have had problems with their licensees. So it's even with what we've done today, some of the Agreement States are going through in terms of taking it to heart, looking at how we'll help them work with their licensees for a safer Performance.

Obviously, there's going to always be some variety in terms of -- and diversity in terms of the range of Agreement States. But what we've seen so far is very positive in terms of the direction we're trying to get in, in terms of reaching the wider

materials, set of materials licensees.

MEMBER RYAN: Is it -- am I reading that maybe the larger licensees with more complex facilities and more material on their license are the places where you see any action here at this initial stage, or are they over a range of licensee sizes and license material quantities or what?

MR. FIRTH: Well, I think the discussions, we were trying to capture in terms of awareness out to all licensees. In terms of, and that's an education component, and there's going to be a value in terms of having that dialogue even after the policy statement's out, so that it stays in the forefront so people are continuing to think about it.

As we start moving towards implementation, we are going to be looking in terms of size, risk, what are the actual activities. So you had have some larger licensees that have three different types of risks than what you have in the medical area, where because you're dealing with patients, there's a closer proximity in terms of some of the hazards.

So the way things would be handled in different types of licensees would be a little bit different. So we'll be looking at that during the implementation space.

MEMBER RYAN: Okay, thanks.

MR. SOLORIO: I just wanted to add a couple of more things on Dr. Ryan. James did a great job explaining a lot of interest, interaction with that. Also at the February workshop, we did invite the Organization of Agreement States to be in the audience. They did participate at various times.

So we had their input early on, and at the March 30th Commission meeting we had this year, the Organization of Agreement States actually spoke to the Commission and provided their endorsement in principle for what had come out of the February workshop.

So we've had an extensive -- they've been in the process. We got a lot of feedback from them, and we appreciate all their support in that area. Then also Dr. Bonaca, just to add a little bit more onto your question, you know, we started by surveying international research and information on safety culture when we started. But also as a part of the validation study, or part of the work that Val Barnes did to look at the INPO validation study, one of her earlier tasks was to also survey current literature out there on safety culture, to make sure there wasn't anything new that we needed to take advantage.

In the prior couple of years, someone from

my staff who has retired from the agency, but she was frequently visiting IAEA to work on their SCART guidance, and give comments on that. So we've tried to be as plugged in as possible to everything out there, to inform our thinking in this area. Thank you.

MS. SIERACKI: Okay. Next slide, Dave. So that brings us to the proposed final draft safety culture policy statement and the Commission paper. As you know, it is in the works right now and we are looking to have pretty close to a final version ready for you by November 16th, which we'll give to you as well as the full committee.

It will contain the definition and traits in the statement of policy, so that we include it, and they are the workshop definition and traits that you saw in your packet. Questioning attitude is added as a ninth trait.

The staff decided to do that. We wanted to talk about complacency a little bit, and questioning attitude, we felt because it came up so strongly as an area that needed to be by itself in the validation study, we looked at that and we agreed, and the definition that we have or the statement that we had in the statement of policy is that questioning attitude, in which individuals feel comfortable to

offer alternative approaches to management regarding current practices, and a questioning attitude also prevents complacency by empowering individuals to challenge given conditions, in order to identify discrepancies in the status quo that might result in error or inappropriate action.

So we feel t hat although there's not a direct causal relationship between complacency and questioning attitude, if you have a healthy questioning attitude it's going to help to get rid of complacency in an organization. So we did add that as a ninth trait. So we have the eight that you saw, as well as the addition of the ninth trait of the questioning attitude.

CHAIRMAN BLEY: I guess there's no real effort or possibility to have the traits be orthogonal in any sense. I've often heard people who advocate strongly, learning organizations and continuous learning, you know, really embed this as a key element of the learning organization.

But it doesn't hurt to have it as a separate one, and it sounds like we'll hear that it might be especially important.

MS. SIERACKI: Yes, yes, and we did, just for your information, we did discuss questioning

attitude, "we" meaning the panel members in the February workshop. That was a discussion item. Questioning attitude came out in a couple of different places, you know, in continuous learning and accountability.

So there were a number of areas where we talked about questioning attitude, but we felt as a staff that this came out as something that's important enough for us to add it as a separate trait.

CHAIRMAN BLEY: Let me ask you a question. At our last meeting, Harold, I'm going to quote from you. Harold suggested it would really be important to raise the issue of being aware of characteristics that threaten safety culture, as well as that promote it, and had some examples of where, although many good things were going on at a particular utility, there were some very bad things that went unnoticed.

Is it a hope that this is -- this particular attribute or I forget what we call them now, trait will attack that issue, or are there others, or is that something that's --

MS. SIERACKI: Well, if I'm understanding what the original question may have been or what you're looking for, when you look at these traits, each of them are aspects of a positive safety culture,

and when there are concerns in any of them.

Let's just take one that's very easy for us, because we're all really familiar with safety-conscious work environment, but that's one of them, an environment for raising concerns, if you start to see that your corrective action program isn't being used like it was, if you start to see allegations come up with the agency, there are data points that you can take that will let you know that gee, this is something that maybe we need to look at.

By itself, it doesn't mean that now your safety culture isn't where you need it to be. It's a data point. So you would need to look at each of these areas and, you know, do some measurements, make some assessments on what that means.

But really on each of these traits you could take, you know, if you did interviews and people are not willing to question the status quo because you know, "hey what my supervisor says is it," that's something that you need to look at. So rather than making a list of these are the positive and these are the negative, you really can look at those positive traits, and when something's not right about them, that's going to show you where you need to go in and take a look.

MR. ZIMMERMAN: I'm sorry. Just at a high level for a minute, the last meeting last November had a very good discussion about incentives and directives coming down from on high, and how they could potentially undermine what we're trying to accomplish with the definition of the traits and the way it ought be thinking.

We align with that, it's what we're looking at. So we very much benefitted from the meeting last time and that issue coming forward. What we're looking at is can that get rolled into the third trait, you know, with our help of indicating that this is the kind of items that we're looking for them to include.

If it looks like it can, than this issue of directives and incentives, you know, for capacity factor or whatever else, you know. If we have to come up with something higher level, because we're trying to do it overarching, we'll have to make that decision where that best goes.

But it's not our intent at this point to lose that thought. That was a ver y important thought that you all provided us, and we appreciated that. We probably have a little bit more work that we need to do with our stakeholders on that. We need that

feedback about that third trait. Does that really look like that's a good, workable way of doing this, or there are better suggestions?

But it is not our intent to lose that concept for that last meeting. That was clearly value-added.

CHAIRMAN BLEY: Let me slip in one other question, and maybe I should wait, but I'm not going to. You decided these traits should be part of the policy statement. The thing that kind of worries me about that, and you must have talked about this, is that you spent a long time working these out, the definition and these traits, and in one sense that's the easy part.

You've got a validation study that we'll learn more about in a few minutes. It strikes me when you get to implementation, is when you're going to see how well these traits work.

If during the policy statement we're kind of, I shouldn't say the word "stuck with," but in a sense stuck with them for a long time, and if the implementation phase begins to uncover that these aren't quite the right set, they're kind of embedded already in the world we're living in, and I just wonder if you can talk about that.

MS. SIERACKI: I would say that because we've had so much outreach on this and so much input into those traits, and so much emphasis that this is really the way we want to go from all of the stakeholders, all the feedback has been along those lines, that I really do think that there -- I hate to use the word "generic," but they're at a high enough level that they can resonate with any of the communities that we regulate.

In the statement of policy, we do have words to the effect that these are the eight traits, but they are not limited, that a safety culture, a positive safety culture would be -- would include these traits, but they're not all, you know, that they're not limited to that.

That means that when we get to Tier 3 and there's something else, potentially in the medical arena that really resonates with them, they can add something.

MEMBER ABDEL-KHALIK: If I may follow up on this, in the preamble, for example, you speak of personal and organizational traits, and when I saw the list of traits that you had listed that will now be embedded in whatever guidance, I was just wondering if this list provides the appropriate balance between

personal and organizational traits and/or responsibilities.

Do you believe that list provides the appropriate balance between personal and organizational traits?

MS. SIERACKI: I'm going to put them back in front of me.

DR. BARNES: Might I speak to that?

MS. SIERACKI: Oh yes, yes Val. Please do. Sorry.

(Simultaneous discussion.)

DR. BARNES: I'm Val Barnes with the Office of Research and I've done something on this safety culture activities with the NRC since about 2004.

We, the staff recognizes that, and I was going to make this comment just a second ago before you asked the question, recognizes that some of the traits that are included in the policy statement don't necessarily apply to some of our licensees or certificate holders who are individual contributors, people who work alone out of the back of their truck, for example.

So our expectation, and there are words in the final draft revised policy statement that indicate

that. We understand that concepts that rely on groups like leadership, etcetera, aren't going to apply to some of our individual contributors.

But we feel like we got a handle on a set of traits, that we're really confident at this point in time are useful and valuable in communicating about what safety culture is across the array of stakeholders and licensee, etcetera, we're dealing with.

MEMBER ABDEL-KHALIK: I think you've missed my question. I wasn't concerned about an individual contributor who would be viewed as an organization, inasmuch as he or she would contribute individually.

I was looking at individual traits within an organization, whether this list provides the appropriate balance between the traits of an individual within an organization and the collective traits of the organization.

MR. HOUGHTON: Can I --

MS. SIERACKI: Sure.

MR. HOUGHTON: I'm Tom Houghton with NEI, and I was one of the panelists, and that's a very good question, because it gets at the individual's role and the organization's role, and in looking at these

traits, I think there is a balance. If one looks at these leadership safety values and actions, we define leaders as leaders and supervisors and individual contributors who are leaders amongst their peers, as a personal trait. Personal accountability gets at an individual's activities. A respectful questioning attitude, also as an individual, can be an individual as well as an organizational trait.

A respectful work environment gets not just that safety conscious work environment, but the trust and the respect between individuals from different organizations.

So I think, and then the rest of these, work processes, continuous learning, the problem identification and resolution system, safety communication, perhaps lend themselves more to the organizational side of the trait.

So I think there is a balance there when you look at these. In addition, as these are developed in more detail, there will be subtraits or I don't know what we're going to call them, but they'll be a sublevel below these which will amplify what they mean, both in terms of the organization's role and the individual's role. I hope that's helpful.

MEMBER ABDEL-KHALIK: Great. It just

seemed to be too skewed towards organizational traits versus personal traits, the way I looked at these, and it just -- to me, it seemed unbalanced.

MR. ZIMMERMAN: I think --

MEMBER ABDEL-KHALIK: And that's why, you know, I sort of agreed with the concern, that you sort of get locked into a set of traits that may be incomplete.

MR. SOLORIO: What's not here is definitions for each one of these, which are a couple more sentences to give you a better understanding. I guess we could share that information with --

MS. SIERACKI: No, they are.

MR. SOLORIO: Oh, they're coming up? Okay. We have that.

MS. SIERACKI: If you go to the one with the two comparison.

MR. SOLORIO: Tables. Oh, okay.

MS. SIERACKI: Yes. That has --

MR. SOLORIO: Here. So we have more information, you know, respectful work environment. That's obviously an individual trait also. It's an organizational trait, it's an individual trait.

MS. SIERACKI: But I think Tom did a good job in explaining, you know, especially when we talk

about leaders, that really there are informal leaders too. They could be individuals in your organization.

MEMBER ABDEL-KHALIK: But again, I view that as an organizational trait, versus a personal trait.

MR. ZIMMERMAN: The way I look at is this provides an umbrella of pretty much all the items to keep the rain out. The entity will then look to customize this for their situation, because they may say you're not keeping all the rain for this hospital. It's a different situation.

This is very close. Again, it's got the buy-in from all those different parties. But I expect when things are done, that certain things will ring truer than others for different organizations, and for me, I'm okay with that, because this is all about communications. It's all about getting it off the paper and dialoguing it and understanding it and believing it and buying into it.

So as they work these items down, they won't look the same for the power reactors as they will for the hospital or the pickup truck, and they will have certain ones that will ring truer to them, and it will become more customized.

But you ought to be able to roll it up and

cover it with these, and not have a whole lot of open areas. It may not be perfect. Now if we miss something at this level that's way ought, we don't think we will, because we think we've vetted it well. If we do, then we may need to revisit and see if we need to make a revision based on --

MEMBER ABDEL-KHALIK: I'm just worried about groupthink.

MR. ZIMMERMAN: Huh?

MEMBER ABDEL-KHALIK: I'm just worried about groupthink, because people have been using these same terms over and over again, and whether or not in the process they have described there are gaping holes that provide that balance between personal and organizational traits and responsibilities.

MR. ZIMMERMAN: And maybe some of that may have occurred, but when they go to Tier 3 and they tailor it for their facility, I would hope that that should deal with that issue.

I mean I think Tier 3 is a significant part of this. Otherwise, you're taking a vanilla statement that applies to everybody and not bringing it down to what it means for this particular facility in this location with this personality.

AA I'm not suggesting that you push these

through a higher level of abstraction. I'm just suggesting that you need to go perhaps to more level of detail.

MR. ZIMMERMAN: And we may be talking past each other, but that's what Tier 3 is. That's what the next level is, to be done by the licensee or certificate holder. That's where they customize it by going down to that next level of detail. You can't stop here. You've got to go down further, and we can't do that for them. They have to do that and they have to believe in what they're doing.

MEMBER RYAN: Well, to maybe pick up in Professor Khalik's point, and definitely I've been in a number myself and seen a lot of other ones. They're really going to pick up in practical terms from my experience on three programs that they already have to create this.

It's going to be health physics program, their industrial safety program and their quality assurance program, because those are the people that at least have the start of the thinking process on safety culture and quality culture and, you know, and so I think my experience is that I've been in a couple of safety-conscious work environments and total quality programs, and there's different names, where

they tend to pull out the elements of those three safety-related programs that they're required to have, and begin to synthesize something like that.

So I think, to answer your question, that's where they get some characteristics that are more tangible to me, is that they begin to pull the personality from the programs they already have, and build something that augments and integrates, maybe to some extent, what they already have.

Then you know, if it's successful it takes on a character on its own and really does integrate those programs into some consistent role. So I would guess that if this begins to get successful, you'll see a lot of that integration going on among those three programs.

MR. ZIMMERMAN: I feel exactly the same way, and along with that should come the ownership, because they --

MEMBER RYAN: Well, yes. The fact that we built that with our own tools and we did it on our own. And that's why it will look different in the hospital versus an industrial facility versus and outdoor activity or remediation activities or construction types.

MR. ZIMMERMAN: It's a different approach

than a regulation, where you shall do the following, and they may not buy into it at all, but you know, they've been told they've got to go do something. This is one where they're going to carry the energy forward. We have to do the training, you know.

There's some significant steps ahead of us with regard to the roll out of this, but ultimately they should become the believers, they should be doing the training and carrying that forward.

MEMBER RYAN: And you know, I think there's a good example of where I think it can be veery helpful is a fellow named Bob Emory, who's in Texas, did a study on incidents with downhill logging sources, and they correlated it directly to new entrants into the profession.

Now as new hires go up and people come on board and there are a few incidences, and then there's training and then there's things that go to improve that, and the incident rate goes down. Then when the next layoff comes, then it starts up again, we get some more incidents. It correlated very well with the rate of hiring in the oil fields.

So you know, it's -- as much as it is a regulatory thing when something like that happens, it really is how people get culture at their job or in

their work.

MR. ZIMMERMAN: Right.

MEMBER ABDEL-KHALIK: So it makes a lot of sense to me.

MR. ZIMMERMAN: I agree with you.

CHAIRMAN BLEY: I think it's time we move on, because you've got a bit more to go th rough before we're finished, and then maybe we can have some more dialogue.

MS. SIERACKI: Okay. I think we hit on most of these, the questioning attitude; complacency was mentioned, as I said, with a questioning attitude. The final policy, the proposed final policy statement includes the preamble to address security.

Implementation is not directly addressed, and what I mean by that is we're not saying you need to do this, this and this. It simply says we're going to work with you as we move forward in implementation. There is a statement recognizing the diversity of the regulated entities, and we did include suppliers and vendors.

So next slide is again the same, this is the same workshop definition. That's the one we're going with. That's where we've gotten the support. Next page --

CHAIRMAN BLEY: As you leave that one, put it back up again, if you would. At this level, Said, the focus really is on --

MEMBER ABDEL-KHALIK: Individuals.

CHAIRMAN BLEY: On individuals. I'll just say that. Now go on. We'll talk about the other stuff later, I think.

MS. SIERACKI: And now we have the nine traits, and go to the next one, including the questioning attitude. So everything you saw there before, and we now have the nine chart. So next steps. Next one.

We will provide that proposed final statement of policy to the Commission. That's scheduled for -- a briefing with them is scheduled for January 24th. We'll look for their direction and then the implementation phase will be the stakeholder involvement with program offices, basically the Tier 3 that we've been talking about.

Then with the Office of Enforcement remaining as the focal point for coordination and as Roy had mentioned previously, the lead would be with each of those program offices, and we will be there to just kind of coordinate the activities and make sure that if we're doing some outreach over here and

somebody else too, that somebody knows what's all going on in a central location.

Key messages for today. It's a two-year effort and actually we're coming up on three, with a considerable amount of outreach. The definition of traits have had almost unanimous support from our various stakeholders, and that's what we have in the proposed final safety culture policy statement, and we will be requesting a letter of recommendation from the ACRS to the Commission.

CHAIRMAN BLEY: And when do you -- are you looking for that?

MS. SIERACKI: Your full committee meets December 2nd. We need to have packages and everything up to the Commission by the 18th, I believe, January 18th. So we would be --

CHAIRMAN BLEY: So you're looking for a letter at our December meeting, but you're not going to send us what we're going to be looking at.

MS. SIERACKI: You'll get it on the 16th of November.

MR. WIDMAYER: Yeah, we're getting it on the 16th of November.

MS. SIERACKI: You'll get it on the 16th of November.

CHAIRMAN BLEY: Two weeks, or are we getting three?

MR. WIDMAYER: About three.

CHAIRMAN BLEY: We generally insist on a month, but that's getting pretty tight for us too.

MS. SIERACKI: It is now in -- it's in the rotation phase, going through the program offices for feedback. So we've got this stuff pretty close to being finished, but it needs to go through the clearance process.

CHAIRMAN BLEY: Let me ask you a question about it, because a couple of ideas came to mind with what I had raised, what Said had raised, what Mike and others have raised. In looking at comments from people at our last meeting, we had one set of talking about these different things, the personal versus organizational things, cause versus effect.

Some of these traits are causes and others are effects. Some of them kind of attitudes and others are results. Are we ever going to get to implement this, where we're really trying to shove rounds pegs in square holes? You're pretty confident with what you've got, and until we hear more about the validation study, I won't have a good idea of how much has been tested.

But I know people have been involved who have worked in this area for many years. Maybe that's good. But is there -- it would seem to me, and maybe it's too late for this now, that in the explanation that goes with the policy statement, some of these kind of issues could have been argued out and shown how this set of traits really covers all of these different things, and of a lower level why it's the way it is.

I'm assuming there's something that gives a bit of an explanation that's attached to it. Is that true, like a white paper backing up the policy statement or is it just the policy statement?

MS. SIERACKI: Well, we -- I'm not exactly sure if I understand the question. Can you repeat it? You're looking for -- are you asking really is there some -- this is what I heard you say, that with this definition and traits, do we have some language included in the statement of policy that says these are some examples, or this is how we think this should -- is that what you're asking?

CHAIRMAN BLEY: Or an associated white paper that explains more about why it's the way it is and why that covers some of these alternative ways to look at the implementation that will be coming.

MS. SIERACKI: Well, the Commission paper has a lot of information in it itself, the --

MEMBER RYAN: One of things that would help, I think, address Dennis' question is --

MR. WIDMAYER: They'll be getting it on November 16th.

MEMBER RYAN: --is when do I know I'm doing a good job with this kind of implementation? I mean in any of these programs, any organization, bit or small, is going to say how do we know when we're hitting the ball?

CHAIRMAN BLEY: What are the criteria?

MS. SIERACKI: Pretty much you're talking measurements sort of.

MEMBER RYAN: Well not necessarily measurements. I mean to me, I'll just give you my interpretation, I think where you touched on this a bit, it's really measured by outcome at the en of the day, right. It's people and then there's an outcome.

If I invest the time and resources for my organization in this program, what am I going to get for it? That's a reasonable question to ask. If it's an improvement in safety, decreasing cost, the increase in efficiency, increase in employee satisfaction, take any one of six or a dozen measures

that are like that, that you then say oh, I'm getting better in these areas and maybe not this one so much, but oh but there we've had some successes.

I think that's something to think about, how you roll this out, because you're going to give some people a vision of what they can expect to get out of it. The requirements of the NRC is always a good goal, and having this and having it up and running in a demonstrable way that meets the inspection criteria is terrific. But that's not really where I think you'll want this to go.

CHAIRMAN BLEY: This isn't here for compliance.

MEMBER RYAN: No. It's here for improvement. So how do we, you know, and it's the fact the Office of Enforcement is involved in this sort of, you know. Sort of you know I mean enforcement carries with it all the things --

MR. ZIMMERMAN: It gives the connotation that --

MEMBER RYAN: That this is a compliance program. So I'd just offer a caution that somehow when you do all of that, that getting the idea this is a positive improvement program, at least at the beginning of it, that there's not necessarily a wrong

answer to get started and to get going. You know, that might be something that --

MR. ZIMMERMAN: That's a good point. That's a good point.

CHAIRMAN BLEY: Mario.

MEMBER BONACA: One thing that we may want to bring up is that we have met a couple of times with our peer in France, Germany and Japan. It's called the Quadripartite meeting. It takes place every four years, and four years ago, we discussed safety culture.

The interesting thing was that everybody presented pretty much these kind of attributes and traits, okay. There was an agreement that culture is so different from country to country and maybe you cannot characterize it with similar traits.

When it came down to the bottom line, everybody pulled out slides that showed that we all use all the same traits, you know. So the expectation may be different from the culture, but the traits were very similar, and that's why I would suggest that looking at what they had done.

SKI, for example, in Sweden, where they have these traits. It may be helpful in a sense because again, we all agree that it's not going to

have similar culture in different countries. It will just happen that way. But there's potential for the traits is the same, very similar.

MR. ZIMMERMAN: That's interesting.

MEMBER RAY: Let me try here for a second. Roy, you mentioned an hour and a quarter ago now, the Gulf Oil disaster. It seems to me like if the aim is, as it has been described here now, this is about the best you can do.

If on the other hand the effort is to avoid outlier events, tail events which you could say the Gulf Oil disaster was one, it's hard to not say well, I can meet all these traits and still be vulnerable to an event of that kind, TMI, Davis-Besse, whatever you want to refer to.

Because what I'm trying to prevent really isn't the sort of thing that these traits typically are going to address. Now you've talked about Trait 3, which I think is the one that's most germane to an outlier event. Maybe that's not fair.

Maybe there are other ones that are equally so, but "Processes for planning or controlling work activities are implemented such as safety is maintained." I would agree with you, that that's where the disincentives for safety probably exist.

Because if you look at the Gulf Oil event, for example, and I know, I'm going to ask you in a second what insight or what access you have to that, but I understand there's so many tensions involved there that you don't want to get too close to that whole thing, that all you know is what you read in the newspaper maybe, but maybe you've got some better insight than that. I don't know.

But if -- I would almost guarantee that I could go to any of the parties involved in that thing and say I've got lots of things that demonstrate I have implemented all of these traits having to do with safety culture, and yet we know it was deeply flawed.

Now and I think probably in part, at least as best I know, from what I read in the newspaper, this Trait 3 is the one that would be more applicable than others. After all, the CEO of BP was chosen because of his commitment to safety.

I just wonder if at some point, and I know you can't apply it to hospitals and people who make Anti-Cs (ph) and all the rest of that kind of stuff. But if you're really trying to avoid a major event, at what point do you get more explicit and say this is not acceptable?

Not just that you need to have work

processes that support the achievement of safety, because I don't know anybody that ever wouldn't be able to make an affirmative showing in that regard.

But you should not have things that can lead to these, like I say, tail events. Not just well I'll know when people are having safety concerns that aren't being adequately responded to, for example. That's a good metric and a good indicator of bad safety culture, absolutely. So I'm not diminishing that at all.

But I just wonder if we're recognizing adequately in this whole process that we really need to do is avoid those kind of events. And so that's the question I have. I don't expect you to answer it for me, but I just want you to know, that's, at least as I think about us sending a letter up to the Commission, what would I be concerned about.

It would be that well, you know, we'll make it so we land the plane right all the time, insofar as safety culture affects that. But the real question is, is there something we're going to do that on the low frequency scale results in a disaster, or allows a disaster to happen that was avoidable would be a better way to say it?

Now having said all of that, for whatever

it's worth, what -- have you done anything to match this up against what we know about the Gulf Oil disaster?

MR. ZIMMERMAN: We're at the very early stages of that. NRR has an op ed activity, operating experience activity as well as other offices may have something similar, and we're going to be starting an effort to put together, through investigative reports that are done, not news articles and things of that nature, but through investigative reports being done by Department of Interior or whoever, where we can use that information to see what can we learn?

What was it that may have been a contributor, and then we want to get that out internally, and maybe through an information notice, even if it's not our sector.

Because we've got to bring this to light. Otherwise, it's another training session, and after this one I've got to go this other training session. So we've got to capture the hearts and minds that this is really something that is worthwhile taking seriously and talking about it, and recognizing do we or don't we have a good safety culture? Do we need to make some changes here?

A way of accomplishing that, we think, is

by looking at some of these recent cases. They've been given to us in this last year. They're right there staring at us. So without saying anybody's guilty of anything, let's go look at it and see if there are learnings that can be shared.

That way, when these different entities of reactors and hospitals and everything talk with their staffs, and they're trying to explain why are we doing this, why does the policy statement come out, they're able to potentially point to a few of these cases and see here's what's happened when we didn't have the kind of safety culture, traits and attributes being carried out that we think need to be done.

MEMBER RAY: Well, I really think that's important. It's the old lessons learned thing.

(Simultaneous discussion.)

MEMBER RAY: Yes. It's just that I would urge you to be willing to identify the negatives that caused this to happen, not just the absence of a positive.

MR. ZIMMERMAN: I basically agree with that.

MEMBER RAY: That's the point, that --

MR. ZIMMERMAN: And I'm aligning. That's the incentive and the directive issue, and I'm on

board with that. Like I said, that was good value-added that you gave us last time, last session.

MEMBER RAY: Okay. I don't want go over that again. I just want to make sure that that was still --

MR. ZIMMERMAN: That's not lost. That's going to continue on. June, if that's okay.

MS. CAI: This June Cai. I just want to add a little bit on what Roy was saying about looking at these current events. We are starting this initiative to see what we can learn, and we're in the early planning stages of a RIC panel, and I think that the way that's shaping up, we're hoping to look at these traits that will be put in a policy statement and apply it to some of these events, to see how these traits, even though they were developed by the nuclear industry, really transcend, you know, these other industries.

Also, as part of some of our other activities, we're doing some outreach to other government agencies, and we had an interagency roundtable back in August, where we shared our draft traits and we heard a lot of agreement on, you know, some of these elements are definitely common across these industries, and we're doing some follow-up

activities.

For example, tomorrow we have a meeting with a couple of other agencies. So we are looking and working with other government agencies across these industries, to see how we can, you know, these concepts do apply.

MEMBER RAY: Well, that's fair. I just -- it's natural, just the way things are done, to say something in a positive form, which this Trait 3 does. It says it in a positive way, as I read it out.

But you don't really know well, what are the negatives that are in conflict with that, that people have really experienced and that have led to, you know, really big screw-ups. The Con Air, whatever the name of it, the airplane that crashed up in Rochester. I mean that's been looked at very carefully, things, and you know, you can say well, people didn't have a positive attitude. Well, but then they made dumb decisions or bad mistakes, and the things that caused them to do that sometimes have negative attributes that people need to understand. That's all I'm going to say.

MR. ZIMMERMAN: And we understood the point previously. We agree with it. There will be some places where we may take the existing traits and

add some negatives to it when we're evaluating, and then there's the cases where we talked about, with these directives and such documents that could run counter to the traits.

But we want, my message is we want to bring these alive. We don't want this to be dry. If it's dry, we may not get a lot of progress here. We may find ourselves in rulemaking and that's not where we want to go.

We have too much positive energy from the industry going on there. So if we supplement it with some of the actual cases that are going on, I mean hopefully they'll be believers, and that's going to be in the implementation phase.

MEMBER RAY: Good. Thank you.

MR. ZIMMERMAN: But your points, Harold you started last time, were well-received.

CHAIRMAN BLEY: Okay, well thank you. I think we'll -- I suppose you're ahead of schedule. We'll move on to the OAS.

MR. ZIMMERMAN: Thanks very much.

MS. SIERACKI: Thank you.

CHAIRMAN BLEY: Thank you, and we'll have wrap-up at the end and go over some things.

MR. ZIMMERMAN: We'll be here.

CHAIRMAN BLEY: I certainly hope you will, because we want to talk about the full committee meeting a little too. Right here. Right out in the middle. Front and center.

(Off mic comments.)

CHAIRMAN BLEY: You don't have slides, right?

MR. COX: I do not. I thought at this point, you'd be tired of PowerPoints.

CHAIRMAN BLEY: Well, we do have that note from you.

MR. COX: You do have my talking points?

CHAIRMAN BLEY: Yes, that's right.

MR. COX: Mr. Chairman, members of the committee, thank you for having me today. I will be presenting safety culture from the viewpoint of the Organization of Agreement States. My name is Lee Cox. I'm f rom the state of North Carolina. I started my career in the early 80's in the nuclear power industry. I've worked with Mr. Ryan on the failed low level waste disposal site in North Carolina and have been with the state ever since. So I thought I'd point that out.

(Off mic comments.)

MR. COX: Let me reminisce a little bit.

While waiting for this meeting, I was next door at the Hope Creek license renewal meeting, and I was taken back to my reactor days. I forgot how many folks in dark suits and how many three ring binders it takes to run a nuclear reactor.

If I didn't know better, I thought I'd be at an FBI convention. But I knew that it was Hope Creek's license renewal party. But it also reminds me that all of that is necessary to maintain core and fuel integrity. So that's relevant, and with that, I'd like to start my presentation.

Sitting next to me, they've spoken about the different disasters that have taken place, the Yemen terrorist plot, the BP oil spill catastrophe, the *New York Times* bombing attempt and the massive Toyota recall, have all emphasized the absolute importance of a robust safety culture. It is also pointed out where that culture is lacking.

That void magnifies the impact of the highly improbable. It goes back to what Mr. Ray was talking about earlier. Even prior to these events, I think the NRC recognized this and the importance of safety culture, and they began developing with industry, the reactor industry and OAS partners, co-regulator partners, on a new policy statement.

While being responsible for regulating over 85 percent of the nation's radioactive material licensees, the Agreement States recognized the vital role that a positive safety culture plays in the every day use of radioactive material.

It is a culture that integrates, safety, security and control in its efforts to protect the public health and safety in the environment from all hazards associated with radiation. It is important to understand that implementation of such a culture is imperative for success, but does not always guarantee it, as it was pointed out by Mr. Ray earlier.

Past Commissioner McGaffigan's statement of security is still relevant in today's safety culture, when he stated that the mission was to provide reasonable assurance of adequate protection, not absolute assurance of perfect protection.

I think that's what we struggle with with safety culture. Safety culture is always best described as a work, always as work in progress. It's a never-ending effort. These efforts have to be a priority of leadership and prevalent throughout an organization.

Last week, I was at the ICRP 103 panel discussion, and Mike Boyd of the EPA coined the phrase

"safety culture is where it's at." I would like to say that the Agreement States have modified that phrase, to say that in their belief, that safety culture is where it's always been.

Safety culture has always been the preeminent thought and foundation in Agreement States' programs and regulated community. Agreement state licensing programs have evolved into the current safety culture of vetting all policies and procedures, facilities, material, devices and even most recently vetting individuals.

The inspection process confirms and verifies compliance of commitments, orders and requirements. NMED, which is the Nuclear Materials Events Database, NSTS, National Source Tracking System, and the Sealed Source and Device Registration in the increased security controls are all valuable components of this current, existing safety culture.

With this strong foundation of safety culture, the Agreement States absolutely look forward to enhancing their programs, but we did not believe that there is a need for a huge shift in the safety pendulum. Agreement states' safety culture platform has always included health, safety, environment and security.

The proposed policy statement is clear in its intent to include those same components. "The Agreement States recognize that safety culture is not a static component in an organization, nor for personal individuals, and is in constant need of evaluation and improvement.

With this belief and experience, the states support the revised draft safety culture policy statement, and believe that the policy statement is the appropriate regulatory vehicle to convey safer operations. As a policy statement, safety culture can be implemented across all radioactive material uses in an effective and efficient manner, while allowing flexibility and encouraging buy-in from stakeholders.

All Agreement States are encouraged to support the development of the safety culture policy statement, in lieu of a formal regulation. One does not have to look very far for states with looming budget deficits. The creation of this policy as a regulation would further strain already suffering state resources, and would have no added value.

The Agreement States took a lead role as co-regulators with the NRC, in informing its licensees of the proposed safety culture policy. The states shared and continue to share information with their

licensees about the policy via numerous means such as web, emails, information notices directly to licensees, letters, phone, inspections and conferences.

Main point is licensee leadership has been given notice about the safety culture policy statement during entrance and exit meetings of all radioactive material inspections. I have personally presented the proposed policy during this year's spring and fall Health Physics Society meetings earlier this year to our Radiation Protection Commission, and it was a major topic at the OAS annual meeting in Portland.

All Agreement States stress health and safety as a routine matter throughout their daily interaction with the license community, while ensuring that regulations related to health and safety are implemented and enforced.

The Agreement States support on safety culture definition, and believes the revised workshop definition is appropriate, understanding that Agreement States do not have the luxury of nuclear-only focus and regulate other sources of regulation, the states would prefer defining radiation safety culture rather than nuclear safety culture.

This would be relevant to all sources in

the uses of radiation, rather than just nuclear or materials. An example is we regulate all X-rays, CT fluoroscopy, radon issues, all of that. The agreement state position on the proposed safety culture policy statement is very clear. The states believe that their programs already possess a strong foundation in safety culture, but are always open to improving health safety and security with regards to hazards associated with all forms of radiation exposure.

This policy statement would be one vehicle to identify such improvements for consideration. Agreement states are in favor defining safety culture improvements in the form of a policy statement. They are unanimously opposed to any rulemaking effort with regards to safety culture, due to the fact that the entire foundation of the agreement state programs rest upon a firm safety culture environment.

The NRC should be mindful of prioritization of this effort relative to other regulatory issues and work closely with the Agreement States in its implementation. The Agreement States encourages the U.S. NRC to continue to enhance its strong collegial relationships with the agreement state co-regulators, in the further development and the implementation of the always-changing safety

culture.

We believe that going forward, the Integrated Materials Performance Evaluation program, which is IMPEP, should continue to measure safety culture performance as it has since its inception. IMPEP should continue to be evaluated and modified to ensure it is adequately measuring performance with regards to the ever-changing safety culture and the traits that you've identified today.

That's all I have, and thank you for the opportunity to share our viewpoint with you, and would be happy to address any questions that you may have. Thank you.

CHAIRMAN BLEY: Thanks. I have two short ones, and then we'll see what other people have. So you were a participant in these workshops?

MR. COX: I was not.

CHAIRMAN BLEY: Some representative?

MR. COX: Yes. Shawn Seeley, who now works for the U.S. NRC, who has a very deep Maine accent, so you had to put up with my deep southern accent today. But he was a participant.

CHAIRMAN BLEY: Okay. So the consensus we heard about, you have consensus, it sounds like, on everything except the name. You would much prefer

radiation to nuclear?

MR. COX: There is a consensus, because we realize this is a policy coming out of the NRC, and they do not regulate other types of radiation.

So when the states implement this, they will not just implement radiation safety culture policy in the radioactive materials world. They will also implement it across their entire program, which encompasses X-ray and other things. So there is a consensus. We understand why it's that way.

CHAIRMAN BLEY: Thank you.

MR. COX: But I will be remiss if I didn't mention that for us, it would have been better.

CHAIRMAN BLEY: Fair enough. I understand that. But before --

MEMBER RYAN: For your benefit Lee, it might be useful to point out that from a worker exposure point of view and a member of the public exposure point of view, the medical area is where the action is. So if they were to drop one out, then having safety culture in the medical environment would probably be more beneficial than just having it in the --

MR. COX: I sure wouldn't argue with that.

CHAIRMAN BLEY: The other one is you did not mention the traits.

MR. COX: Yes sir.

CHAIRMAN BLEY: Everything's fine with those as far as you can remember?

MR. COX: Yes. I think so. I've got them listed here, not for you to see but for my reference, and I went down the MPEP process of how they audit the states, and every trait, and I've got examples of how those traits are audited against the state programs.

All of them except for the respectful work environment, and I think that that's an easy inclusion into that process. But we have no --

CHAIRMAN BLEY: You map to that already.

MR. COX: Yes, yes.

CHAIRMAN BLEY: Somebody over here was trying to say something.

MR. FIRTH: Oh, James Firth, NRC staff. I was going to add, in terms of the way the workshop was structured, in terms of coming up with the definition in the traits, the Agreement States took more of a facilitative role and weren't part of the panel that said, that made all the compromises on this is what the definition should be, and these should be

the changes.

So when each of the stakeholders that were represented on the panel said, made the evaluation "can I live with it," since the agreement state representative was not specifically on the panel in that capacity, they did not weigh in at the time.

So they didn't want to take the position of trying to influence what was coming out of it. They wanted to let the stakeholders work on developing what that definition was. So they didn't specifically weigh in, so that part of the tension was not part of the discussion that the panel had.

CHAIRMAN BLEY: Well, it sounds like it's not a point of contention.

MR. COX: Yes. I want to say there's no tension.

CHAIRMAN BLEY: Any other questions for Mr. Cox? Yes.

MEMBER RYAN: Two. The Conference of Radiation Control Program Directors is another organization that overlaps almost completely with OAS, except for the non-Agreement States, which represents a small fraction of state licensees through the NRC.

MR. COX: Just one clarification. The Agreement States are more focused on the material

side, because of the NRC and the CRCPD is probably a little bit more focused on the X-ray side of the house.

MEMBER RYAN: Fair enough, but very often, it's the same person that licenses both organizations.

MR. COX: You're right, exactly right, yeah.

MEMBER RYAN: So that's one organization that might have some additional insights, particularly into those areas where they may -- go ahead.

MR. FIRTH: James Firth, NRC staff. WE did, as part of our meetings with different organizations, we did meet with CRCPD, and we've also been keeping them engaged on periodic telephone calls. Some of the lessons specific also matches what we heard from the Agreement States, in terms of the machine-based radiation, that there are lessons learned that also applied for the medical uses of radionuclides.

So you can learn from both. What we've heard from the states is that there's some value in getting the lessons learned, but also to have what comes out of it be easily transportable to those other uses.

MEMBER RYAN: Have you also been in

contact with the agency's Advisory Committee on Medical Use of Isotopes?

MR. FIRTH: Yes, we have. We've briefed them a couple of times already, and they're going to be meeting again on the draft final policy statement by teleconference in December, similar to ACRS.

MEMBER RYAN: That's great. Thank you.

CHAIRMAN BLEY: I'd like to thank everybody for a very good presentation so far, and We're ten minutes ahead. That's great. We will recess for 15 minutes. Please be back at quarter until 4:00.

(Whereupon, a short recess was taken.)

CHAIRMAN BLEY: We're back in session. Wow, I like that little snap. Who's going to begin?

DR. BARNES: I'm going to begin.

CHAIRMAN BLEY: You're going to begin. Okay, thank you.

DR. BARNES: Okay. I'm Val Barnes with the Office of Nuclear Regulatory Research, supporting OE in the development of a safety culture policy statement, and I'm just going to set the stage a little bit for the presentation and then turn it over to Ken, and if we have time we'll get back to the presentation that I have planned, Ken Koves with INPO.

CHAIRMAN BLEY: Oh, we'll have time.

DR. BARNES: We will? All right.

CHAIRMAN BLEY: We want to hear that.

DR. BARNES: Okay. I wanted to talk about the approach that NEI and INPO took the construct validation survey, and give a little bit of introduction on, to give you an analogy that will hopefully help understand the approach that was taken and the methods that were used.

The idea of a construct validation study is based on -- is a construct validation study is a response to questions about a theoretical concept or a construct, which safety culture certainly is, and it's an effort to try to better define and understand the theoretical concept that you're working with.

And the analogy that I wanted to use here was the concept of intelligence, which everyone is fairly familiar with, and there's been research going on in that area, back to the 1940's or 50's, on how do we define intelligence and what does it, what does it tell us? How useful is it, you know? Does it predict something in the future like academic performance or success in the work world, etcetera, etcetera?

And in early days of intelligence research, people who thought about that, mostly

psychologists, Benet in particular, would pull together groups of people that were interested in the concept of intelligence and had some possible thoughts about it that were a useful place to start thinking about what intelligence is.

We're somewhat in that stage in our thinking about safety culture as well, where we pull experts together who have extreme knowledge and experience about what leads an organization or an individual to behave in what we consider a safe manner.

But as we've experienced over the years at the NRC, as has been experienced internationally, if you pull two different groups of people together, you're going to get some consistencies in what their opinions are about the correct definition of your concept, but you're going to get a lot of variability.

I mean I could imagine back in the 1950's different groups of experts getting together and saying no, it's verbal ability, and other people saying no, it's quantitative ability that defines intelligence, and then more recently we're seeing research on emotional intelligence, you know. That's what's important about intelligence and predicting are going to succeed in school or in the workplace and so

on and so forth.

So the question to bring stability to the definition of a concept is working on ways of measuring it, and you know, and in intelligence measurement, the researchers give people problems to work on, whether it's reading comprehension or mathematics problems or you know, a short essay to determine whether or not they're able to comprehend the written information, analyze it and come to conclusions on the basis of it, to assess analytical ability.

Through the kinds of research that NEI has done and the NRC independently supported, but applied to these intelligence measurement items, questions and problems that are used to assess people's ability or their intelligence is the intent, they put together tests that they then measure, they then test again.

They continue working on these tests of intelligence, to see whether or not they're reliable. That is, if the same person is given similar problems over the course of a lifetime, are their responses going to be pretty consistent, you know, barring brain injury or some other explicable reason for differences.

You know, are measures of intelligence

reliable? That's one question. Another question that you want in any measure, in any attempt to measure a psychological or sociological or anthropological construct is, is it valid? Are we measuring what it is that we think, that we want to be measuring here?

And in the social sciences, that question is answered by taking the measure of intelligence or safety culture in our case, and determining whether or not, I mean there's a number of ways to do this, but determining whether or not this measure of safety culture is correlated and relates to other measures of safety culture, that perhaps were collected independently or using a different method, and then we also want to look to see whether our measure of intelligence or safety culture has predictive validity.

For example, in the case of intelligence, we're concerned, as I mentioned, about whether we can predict academic performance or job performance. So in the case of safety culture, our fundamental hypothesis is does assessing safety culture or looking at safety culture give us information that we don't otherwise have? Is it useful information, and if we correlate it in our case with safety performance, is safety culture actually related to safety outcomes in

the ways that we expect that it would?

And so overall, those are the kinds of questions that were asked in the NEI INPO construct validation study, and while we're going to touch a little bit and Ken, Dr. Koves will be touching a little bit on the methods that we used in this first attempt to apply the methods of social science to understanding safety culture in the nuclear power industry, we're hoping that we could not spend the majority of the presentation talking about the methods and how they work, and rather talking about what the results were and how they relate to the policy statement.

Of course, I'm happy to come back and talk about methods. Dr. Koves has also volunteered to come back and talk about methods. But that's hopefully not something we'll need to spend a lot of time on today. And then before Ken starts into his presentation on what NEI and INPO did, and how it relates to the policy statement, I just wanted to talk a little bit about the relationships that were established to be able to do this work.

We're grateful that NEI came forward and offered to sponsor it and get it initiated, that INPO agreed to participate. INPO developed the survey,

which is what we use.

That's the standard for safety culture research to date anyway. INPO first developed the survey; NRC -- and then oversaw the administration of it and they did the majority of the data analysis that we're going to report today.

NRC and Office of Research and some of our other safety culture experts reviewed and commented on the survey, recommended adding items from the research literature and from international sources, and other parts of the nuclear industry, hospitals, etcetera, and we also provided comments and recommendations to INPO on the design of the study that they did.

Then we research contracted with Idaho National Lab to come in and use the data that INPO made available to INL, on-site down at INPO. INL verified INPO's analyses.

We did some additional analyses using data from the NRC, and the reason that we had INL doing this was because there were sensitivities on both sides, both on NRC and INPO's side, about wanting to ensure that any information related to specific sites was masked, so that INPO wasn't aware of, you know, which site the data the NRC was using came from, and vice-versa. So Ken.

CHAIRMAN BLEY: Now before you go on?

DR. BARNES: yes.

CHAIRMAN BLEY: If by the end of the day the committee, Subcommittee should feel we really need to see some information on the methods, we don't have a lot of time before staff wants something from the full committee.

If you can point, is there an Idaho report on what they've done, or are there some reports on methodology you could provide to the committee, just in case we need that? That would be helpful.

DR. BARNES: Sure.

CHAIRMAN BLEY: Maybe if you just give them to Derek, that would be good.

DR. BARNES: Okay, certainly. There is information. We don't have a report yet. We have been, as you might imagine, scrambling to get the survey and the data analyses done in time to be able to provide a contribution, and you know, conducting the survey across an entire industry is a challenging and time-consuming activity.

So I don't have a report to forward to you yet on the methodologies, but certainly can provide you with background information and Ken also's going to touch it briefly, to try to get some sense, yes.

CHAIRMAN BLEY: Well, let's see if we need anything. But we'll try not to push you too hard on the methodology, but I'm sure we'll get some questions.

It's better way that way and we'll try to back off. I don't know that we could have the session you two volunteered for any time before December. That seems impossible to me right now, given the rest of the committee's --.

DR. KOVES: I'm more than happy to, you know, talk about methods. It's just a function of how much time you want to spend on it, that's all really.

CHAIRMAN BLEY: We want to see the results first.

DR. KOVES: My name is Ken Koves. First of all, I want to thank the committee for the opportunity to come talk about some of the research that we did recently. My name's Ken Koves, and I've been with INPO for six and a half years now.

Prior INPO, I was with Sprint for seven and a half years, so I'm at a nuke, and also prior to that I was in grad school at Georgia Tech, got the Masters and Ph.D. in Industrial Organizational Psychology.

Next slide. So what's our purpose here

today, and/or my purpose? It is to present some research results of two studies, and these research results are primarily geared toward the question at hand, and that is what does research say and indicate in terms of what is the structure of the language around safety culture?

Also, so there will be presenting the results from the safety culture survey that was administered across the power reactor survey, and then there will also be a couple of slides, this is more recent research, of a slightly modified version of that survey that was administered within AREVA Fuels, and the analysis that we did from that survey.

CHAIRMAN BLEY: So this went in in a more general way. This isn't really hinged to the definitions and characteristics we were talking about the last two hours?

DR. BARNES: No, absolutely. It was one of the additional purposes of the study, was to see in, across the power reactor industry, the extent to which an analysis of survey responses from people who were responding to questions about their own organization, yielded results that supported or were consisted with the traits that came out of the workshop.

CHAIRMAN BLEY: Okay.

DR. BARNES: Okay, and then the AREVA study Ken's going to talk about is, provides some information about the applicability or generalizability, the consistency of the traits that emerged from industry-wide for power reactors, versus a different kind of industrial setting, different organization. What's the generalizability of the results? It partial addressed, partially addresses that.

DR. KOVES: Why include the study in the discussion? First of all, because as Valerie mentioned, most formulations of safety culture were created by a small, relatively small group of experts. You have a group of 10 to 20 individuals who are considered experts in an area.

They come, they put their best ideas together, and then that is, becomes the basis of what is published. Whereas this is an attempt to incorporate data from a much larger sample, many more people, into the discussion.

I will just say that part of my own personal motive around this was getting back to your earlier concern about the traits getting put into the policy statement, and then those being, I think you

said "stuck with them."

What I was hoping to see was to see that maybe some we felt fairly quick research could inform this process, so that maybe research results in the next few years would be -- what we did now would be more in alignment with what the research might come out with in a few years.

Okay. What are a couple of limitations of the first study? First of all, obviously, as Val mentioned, it's all power reactors. And secondly, that this study is correlational. So therefore, it is not predictive. It's real easy to slip in to talk about well, this causes that and that type of thing.

But that is, you know, that is not the point here. The point here is that this survey relates to other measures of what we would consider related to safety culture.

Next. Also there are a couple of strengths. I think there are a couple regarding the limitations. I think there are a couple of strengths of it, and that is first of all, that it is industry-wide, and also that overall the results were very positive.

Regarding the questions of the study and Val touched on these, they're worded a little

differently, but earlier she touched on them, and the first one is how well do the factors from the safety culture survey align with the safety culture traits that were identified during the February 2010 workshop.

MEMBER ABDEL-KHALIK: How do you define a factor in this statement?

DR. KOVES: Okay. It's based on principle components analysis, and we can talk about that. That comes up a little bit more later actually when we do talk about the methodology. So but I wasn't planning on spending a lot of time talking about it.

MEMBER ABDEL-KHALIK: If it comes out naturally, that's fine.

DR. KOVES: Okay, let's see. And then the second question of the study is okay, once we see what the structure is within the results of the survey, then do these results relate to other measures of safety performance? Basically in the first one, the first question is around construct validation, and the other one is about criterion validation.

Next slide. So what this slide is about is to go through exactly how the survey was developed, and first of all, what we started with was the survey that the Utility Service Alliance was using for their

safety culture assessments and evaluations. That was based entirely upon INPO's principles for a strong nuclear safety culture. They had 73 items that are associated with that survey.

Basically, I took that survey. I then edited, did some type of editing on most of the items, and then also reviewed those questions compared to the workshop traits, and said okay, do I think that, you know, do we have at least five or six questions in this current survey that in my opinion related to all of the traits.

Based on that, there were a couple of traits that I felt weren't adequately addressed, one of which being communication. So I ended up adding a few more questions to the survey at that point. Then I pass that off to the NRC, who reviewed it.

They went through a very similar process comparing it to the traits, but also to the IAEA characteristics and attributes, also comparing to the ROP, the components and also a lot of the literature search that they had done in the past.

The final version was 110 items, which is about 50 percent more items than we started with, and that is very long for a survey. However, this is also a research survey and our goal is very intentional, in

terms of trying to throw a very wide net, okay.

If we were going to be accused of something, we didn't want to be accused of leaving something out inadvertently. So that is why it was so long at this point. Also regarding the scale, it's a seven point Likert scale, ranging from strongly disagree to strongly agree, with a "don't know" point also.

And the idea here is that a, and you'll see some examples of the items in just a moment, but the respondent was to rate how they felt their organization or their plant fell on this particular item on this scale, from strongly agree to strongly disagree.

Next please. Okay. Here's some example items, just to give you an idea of what they look like. People are treated with dignity and respect by station leadership.

We have a strong quality assurance process and organization. Our performance indicators help us to stay focused on the right things. The procedures at the site are generally up to date and easily used. Staffing levels are adequate to meet work demands.

Next. At this station, people are routinely rewarded for identifying and reporting

nuclear safety issues. Dialogue and debate are encouraged when evaluating nuclear safety issues. I would not hesitate to take a concern to our Employee Concerns Programs. Decision-making at the site reflects a conservative approach to nuclear safety, and supervisors are responsive to employee concerns.

So as you see, for each of these there would be a scale, a rating scale, how, to what level do they agree that this was the condition at their site.

Regarding the administration. First of all, it was administered online. It was administered by a vendor that was financed by NEI. It basically what happened was each of the stations sent a list of their full-time employees and I'll call long-term contractors to the vendor. The vendor randomly selected about 100 individuals out of that site, and then sent an invitation to those individuals.

We had 63 sites who participated, which is 97 percent of the industry. An average of 46 individuals participated from each site, and almost 3,000 individuals provided valid responses to the majority of items. So when I talked about, you know, we wanted a larger group of individuals, here we have almost 3,000 individuals who are commenting in a way

on the structure that they see around safety culture.

CHAIRMAN BLEY: Ken, I don't want to hold a dissertation on methodology, but tell me about your background or somebody else that's involved in that, that ensured that the questions in the survey were free or as free as possible of bias and things you did to ensure consistency in how people responded, maybe counter kinds of questions to see if you're getting the correct answer.

DR. KOVES: Okay. If you're talking about negatively worded items, I mean I've done a lot of survey research over the years, you know, some recently at INPO and then particularly at Sprint.

If you're talking about negatively-worded items, my experience with those is that -- or my experience with surveys is that the majority of people do not straight-line responses. Most of them they're very thoughtful. You can see the variance in their responses, and when you do have negatively-worded items, you're throwing in something -- you're throwing in another variable, all right?

So now, if you have a negatively-worded item, okay, you have to ask the question well, and that item falls out separately than where you might have thought it would have, or you know, it's doing

something strange, you're not sure if it's because that item's bad, or you're not sure if it's because that one was negatively worded, and that's why you're getting these extraneous results.

So my experience with analyzing surveys has been that negatively-worded items don't really add a lot of value to your analysis, and that you're bringing up a possible confound to the results.

CHAIRMAN BLEY: Okay.

DR. KOVES: Does that --

CHAIRMAN BLEY: No, not completely. I would guess that nearly every one of those nearly 3,000 people had already seen INPO principles for a strong nuclear safety culture. Is that correct?

DR. KOVES: Probably. I would think so.

CHAIRMAN BLEY: And therefore, even though you expanded it to 110 items, all of those 110 items are probably very familiar, inasmuch as they're just slight variations or extrapolations of the original 70 items. Is that correct?

DR. KOVES: You know, I would say that everyone has seen the principles and you know, if you polled people and asked them at your typical plant, they would probably be able to tell you what a few of the principles were.

But these items are all based at the attribute level, which is Tier 3, and there are like 57. As I recall, there are like 50 or 60, 67 particular attributes. So if, you know, saying that people would be biased because they have some type of memory of that, I would be surprised.

CHAIRMAN BLEY: Well, I mean the plant is kind of familiar with -- people are running around with these books.

DR. KOVES: That's true, but they're not memorizing them, and they're not memorizing all of the, you know, the 60-some attributes that are inside of there.

Plus also, and what you'll see from the results, but also when you look -- if you were to delve into the details around the IAEA characteristics, because IAEA goes from -- you know, we've been talking about Tier 1 and Tier 2, well, and Tier 3 is next.

Well, IAEA not only does Tier 3, but also Tier 4. And if you look into the details of the IAEA characteristics, and you compare them to other frameworks like the principles and like the components, you're going to see a very large amount of overlap in the concepts that are covered.

There's a lot of agreement around, you know, what this big thing is we're talking about, that's when you get into the details that you're getting some differences.

DR. BARNES: I think it's also important to note that, as Ken described earlier, that the staff also had significant input into the construction of the survey items, and where we came up with -- and the licensee personnel are not familiar with the ROP components and aspects, which were derived from research literature, as well as IAEA, and were fundamentally nuclear-based.

But there's a number of concepts in the ROP components and aspects, which is Level 2 and 3, that aren't covered in the INPO principles, in addition to which the large research literature that Roy mentioned we had Idaho do, included data and survey items that were publicly available, that had been used in a variety of other domains, you know, manufacturing, construction, hospitals, small business, off shore oil and gas, chemical plants, you know, a large range of industries, good items, and we actually, for those that were publicly available to use, purloined some of those and included them in the survey as well.

So while there were good coverage of the INPO principles and attributes, there was also good coverage of the ROP, IAEA and then items from other industries, and later on, when we get to my presentation, I'll give you some information about how our workshop traits line up with factors that have emerged in similar studies from other industries.

So it wasn't based on -- I mean it included the principles and attributes, but wasn't based on them.

DR. KOVES: And you know, a question about bias is a very good question. But we tried very hard to have a starting point, but then to go beyond that starting point.

CHAIRMAN BLEY: I had a question. How come you had -- are you satisfied with 46 percent participation?

DR. KOVES: It would have been nice to be more. However, I think when you look at the results and you compare the results to some of the other research that we have, it was adequate.

CHAIRMAN BLEY: Adequate. But I mean doesn't it tell you something, when this is a program that's already been, you know, rolled out, I guess, at plants and they all have their INPO --

DR. KOVES: Well no. This was not --

CHAIRMAN BLEY: They don't want to participate.

DR. KOVES: See, but this was -- this came from a very different -- the communication, okay, that was from the plants, it was very different, and it was just coming out -- say from the typical person at the plant, they would probably just see it as -- I mean this was presented as safety culture research, okay, that was being sponsored by NEI, and not part of the INPO evaluations or anything like that.

CHAIRMAN BLEY: Interesting. I mean I just would worry about self-selection bias there.

DR. KOVES: And that is always, you know, when you don't have 100 percent, that is always a concern, and if you look at the central limit theorem, you know, what you're looking for is you're trying to get over, you know, 30. So that was our goal, is to get beyond 30 respondents.

But I think you know, per site. And we were able to do that. But really, I think, and that's a valid concern. But I think the proof ends up being in the pudding, which are the correlations that we talk about at the very end. They're very similar to other research that we've done.

CHAIRMAN BLEY: Fair enough.

DR. BARNES: If your purpose is to draw conclusions about the safety culture of an individual organization, your response rate inside the organization is something you definitely want to be sure about.

For research purposes, this was adequate to get a sense across the industry, and as Ken will mention later, when they replicated the study within one organization, you know, that study got a much higher response rate, but probably also got a lot more management attention and encouragement than this effort did.

DR. KOVES: That's exactly right. A lot of the stations saw this as kind of an additional thing. So there was great variability in the communication to/from within the station.

What did do for the analysis? We used principle components analysis, and I wasn't planning on talking much about this, other than just saying that principle components looks at the variants of the items, groups those items together, and shows you which ones are related to each other, based upon the responses of the individuals.

The next slide I just put in here, in case

we did want to come back and talk about it, but with the time limitations, I wasn't planning on talking about it unless you want to come back. Go ahead. Flip through it.

CHAIRMAN BLEY: One at a time.

(Laughter.)

DR. BARNES: Back up. Okay.

DR. KOVES: Oops. Back, forward.

DR. BARNES: Forward? Did I miss one?

DR. KOVES: There you go.

DR. BARNES: Oh, okay.

DR. KOVES: What I had --

DR. BARNES: You want to talk about your picture, all right.

DR. KOVES: No. If we need to later, I'd be glad to. These are the results of the factor analysis, and what I would like to say about them is that first of all, there are nine factors that we felt came out of this, that were the most interpretable, and what you're going to see is the order that they're listed in, is the order of the variants accounted for.

And usually, these, the first factor out in descending order are the ones that really account for the most amount of variance in the survey, or the most influential, have the most items. And so that's

the first thing I want to say about it.

What was very interesting about this was that normally in my experience, when you have individuals, a few individuals who kind of go through a similar type of grouping activity that the panel did, and then you follow that with a factor analysis, normally the number of groupings goes down.

So they are normally less factors than there are that the individual comes up with and that the human creates. Whereas this time, it was actually a very similar number, and actually came out with one more. So that is a bit unusual in terms of these results, based upon a lot of other factor analyses that I've done.

The first factor that came out was management responsibility, and what we also did then was we took a number for the factors that were larger. We then took those items, ran them through another factor analysis to come up with subfactors. I put those subfactors on here just to help you understand what are the items and what are the elements that are comprising the factor.

So for management responsibility, we had subfactors a respectful work environment, continuous improvement, one subfactor about performance

indicators, one about resources, and one about rewards.

MEMBER RAY: The third and the fifth would fall under a category of incentives, to me.

DR. KOVES: Yes. Yes. The third one is really about you get what you measure, and the last one is about you get what you reward.

MEMBER RAY: Well, but incentives can be tied to performance indicators?

DR. KOVES: Exactly.

MEMBER RAY: So the two are related. Generally, you don't give out rewards without somebody having met some performance indicator that was set for them?

DR. KOVES: Right.

MEMBER RAY: Having to do with their work.

DR. KOVES: What's interesting here is that came out as a management responsibility to manage that, clearly.

MEMBER RAY: I think Roy's point that it can also surface in that third one, which you'll get to, is correct as well, because you can set up basically organizational performance goals and mandates, whatever you want to call them, in that

domain, that has the same effect. You didn't meet your schedule.

DR. KOVES: Right.

MEMBER RAY: All right. The schedule's in three. You didn't meet as here in one.

DR. KOVES: Uh-huh, right.

DR. BARNES: The items that comprise the performance indicators subfactor though here were -- are performance indicators, provide us useful information, you know, "Our management pays attention to our performance indicators." So these were at the organizational level. They fell on this subfactor.

MEMBER RAY: Are you saying that the Performance indicator would not include where I achieved my goals for whatever my responsibilities were?

DR. BARNES: No.

MEMBER RAY: Okay.

DR. BARNES: No, I wouldn't say that.

MEMBER RAY: All right.

DR. KOVES: The second factor that came out was willingness to raise concerns, and there were two subfactors, and that was about informally raising concerns --

CHAIRMAN BLEY: But when you started this,

you said the ordering is by the highest on this list at the least variance.

DR. KOVES: No, accounted for the most variance.

CHAIRMAN BLEY: Accounted for the most variance.

DR. BARNES: It was the biggest factor.

DR. KOVES: Right, and it's the biggest factor.

CHAIRMAN BLEY: Okay. Go ahead. I'm still trying to relate the questions, of which you showed us a few examples, to these things and trying to thin of what that means.

MEMBER RAY: Well Dennis, I may be totally wrong, but I'm going to try this. A respectful work environment, you'd expect to have a lot of variance in that, because who the heck -- what amounts to respect. Whereas rewards, they're very easily measured and --

MEMBER RYAN: I get the bonus or I didn't.

MEMBER RAY: Huh?

MEMBER RYAN: I get the bonus payments or I didn't.

MEMBER RAY: Yes. It's quantifiable, metric and there's very little variance in what it

means.

CHAIRMAN BLEY: We didn't have this list of factors with people spreading out of them. We had a set of questions that are sort of related to these factors, or are related.

DR. BARNES: The question was are they -- how do the people's responses to these items, I'm going to say this again, and it's not exactly right, but here it goes. How do they clump together, you know? What items in this survey are related, there together? So you know, what are the ones that are most closely related? That's a factor.

DR. KOVES: Go back to the previous slide.

DR. BARNES: Back to the picture? Okay, here's the picture.

DR. KOVES: There's the picture. This is the previous slide, and factor analysis, it looks at these items in multi-dimensional space, that an effort to try and explain what's going on here, what I've done is I've -- actually this is two-dimensional, but it's representing one dimension.

So if you take the mean score of each of the items, okay, and you place them on a number line, they're all going to drop in various and sundry places --

CHAIRMAN BLEY: Did each question correspond to only one factor?

DR. BARNES: Each question was a question.

DR. KOVES: Right.

DR. BARNES: Yeah, and the analysis told us which factor that question was related to, after it had looked at the relationships between every item and every other item in the survey.

CHAIRMAN BLEY: Because I start looking at those questions, which are questions --

DR. BARNES: Right.

CHAIRMAN BLEY: I have a little trouble seeing how you then say the analysis tells me the factors that are related from those questions, because a lot of those questions were --

DR. BARNES: Extracted from the questions?

CHAIRMAN BLEY: Like there was a question on indicators. There may have been ten questions on indicators. I don't know. You had a lot of questions.

DR. KOVES: Yes, a lot of questions. If you look at the example up there, I'm just going to run through this quickly and hopefully that that will help. If you were to match, if you were to take each one of the questions and come up with a mean score

across the entire group for each one of those questions --

CHAIRMAN BLEY: For each question, okay.

DR. KOVES: Okay, for each question, and then to place all of those on a single number line. Now this is not what happens, but I'm giving you this as an example.

If you place them on a number lien, you might have something, and you know, I just randomly made this thing up, that looked like this here, where you have, you know, a lot of ones that are grouped together and then there are spaces between them.

CHAIRMAN BLEY: Each dot is question?

DR. KOVES: Pardon?

CHAIRMAN BLEY: Each dot here is a question?

DR. KOVES: Each dot is representing a question.

CHAIRMAN BLEY: Okay.

DR. KOVES: And actually they would be on a number line that obviously to squeeze them out, you know, to give you an understanding of where they fall, I've actually put them in two dimensions.

CHAIRMAN BLEY: Okay, I understand.

DR. KOVES: Ands o you see how you'd have

groups of items on this number line, all right. Well, what the principle components analysis or factor analysis does is it looks for the distances between these items, and then based on those distances, it determines the clumps, to use the non-technical term, how they all group together.

And so on this example you see F-1 would be like Factor 1. So you have a large group of items there, and then Factor 2, you have a secondary group and Factor 3 might be a third one, and then you've got some extraneous stuff left over --

CHAIRMAN BLEY: If this Factor 1 doesn't mean anything, except it's an area of clumping?

DR. KOVES: Exactly.

CHAIRMAN BLEY: Of scores.

DR. KOVES: Exactly.

CHAIRMAN BLEY: Go ahead.

DR. KOVES: Exactly, and then in terms of the subfactors, you take those particular items and then you look and see if you come up with this type of clumping or grouping again.

But what you end up with is you get the mathematics are telling you which items are close together and now, like I say, this is in one dimension. But it actually goes into multi-

dimensional space.

If you were to think of this as two dimensions, but then to make it three, and you pull that big group out and there was a separate group over here, you'd say okay, all right, this might be another factor. So as you go into multi-dimensions, you can get more factors that way, you know, if it's appropriate. Does that help?

CHAIRMAN BLEY: From this it's very easy for me to see that you get clumps of things that have essentially the same score, between I agree very much and I disagree a lot.

DR. KOVES: Right, and then what it tells you is it tells you, if you notice that large point there, the kind of above each one of the F-1, F-2, F-3? Okay. That's there to represent what might be the central tendency of all these particular items.

So what the software does is it gives you these list of items that it associates with this point, and then also tells you how related it would be to that point, if that point existed in reality.

CHAIRMAN BLEY: If it existed --

DR. KOVES: If it existed in reality.

CHAIRMAN BLEY: Okay.

DR. KOVES: But it's a theoretical point

in this -- if you think of it as a cloud of points.

CHAIRMAN BLEY: That has questions clumped around it.

DR. BARNES: Statistical points.

DR. KOVES: Yes.

CHAIRMAN BLEY: That have scores that are approximately similar.

DR. KOVES: That are from --

CHAIRMAN BLEY: Similar.

DR. KOVES: Right.

CHAIRMAN BLEY: Okay. So now I have theoretical points, but I don't have --

DR. KOVES: Okay, and you don't have factors, right, and what is --

CHAIRMAN BLEY: Not physical, but --

DR. KOVES: You don't have factors.

CHAIRMAN BLEY: Yes.

DR. KOVES: And so what you then have to do is you then look through these items --

CHAIRMAN BLEY: Okay.

DR. KOVES: And you apply intelligence to it and say what do these all have in common?

DR. BARNES: The software provides something called factor loadings, which tells you how each item that's part of -- that's within this clump,

you know, for the factor, how that item correlates with the factor slots.

CHAIRMAN BLEY: That's what I'm waiting to hear.

DR. BARNES: Yes.

CHAIRMAN BLEY: So somewhere online, you wrote all these questions, and then you related these questions to our traits and subtraits or whatever we're calling these factors, these organizational factors or whatever you call these things.

DR. KOVES: It gave us a list of items, and then you have to say what do these items have in common. So therefore the --

CHAIRMAN BLEY: Like -- 3 has something to do with honesty performance indicator.

DR. BARNES: Yes, as an example.

CHAIRMAN BLEY: And so do six other questions that are in this clump?

DR. KOVES: Right, and so therefore it's about --

CHAIRMAN BLEY: But there could be another clump that has the same thing somewhere else, but that's all right. So I got where you're going to.

DR. KOVES: It maximizes the distance between the factors, decreases the correlation to try

to help you get independent factors.

CHAIRMAN BLEY: And that map of questions to these factors, characteristics, I don't like saying factors because I mix them up with these factors, that's something would be very interesting for us to see.

DR. BARNES: Okay. Well, I can't say okay. Your items.

CHAIRMAN BLEY: If I can't see that, I don't know what this stuff means. I mean I really don't. It's a big leap for me without seeing how you organized --

DR. KOVES: How the items are grouped together.

CHAIRMAN BLEY: The questions and to their influences on the factors we're trying to organize and understand. You don't need to show that to me now, but I'd sure like to see the map that does that, that your computer then looked at to perform these --

DR. KOVES: What the results that came out, and how that came out.

CHAIRMAN BLEY: I mean that's got to be the thing that guides.

DR. KOVES: I mean that drives -- you know, that drives the --

CHAIRMAN BLEY: The scores clump them, and then that -- let's just see which things are coming together.

DR. KOVES: Right.

CHAIRMAN BLEY: Go ahead. But that's the thing I really want to be able to look at.

DR. KOVES: Okay, and then you look at those items and you say what are these all talking about, and you label them.

CHAIRMAN BLEY: And I understand. That's a judgment thing.

DR. KOVES: That's a judgment thing.

CHAIRMAN BLEY: But it's the previous judgment that's been systematized, that -- yes, it would be important.

DR. BARNES: You want to know which items loaded on each factor or subfactor, or do you want to see the factor loading scores too, the correlations of each item with the factor, and NEI were to give permission for this?

CHAIRMAN BLEY: That would be interesting. But the thing that's based on, which is each question has some linkage to these factors?

DR. BARNES: Correct.

CHAIRMAN BLEY: That was input to the

calculation.

DR. BARNES: It's correlation.

CHAIRMAN BLEY: For the calculation. That correlation is the thing I'm talking about.

DR. BARNES: You want to see the correlations, from items to factors.

CHAIRMAN BLEY: Yes. Items to questions?

DR. BARNES: Items to questions, yes.

(Laughter.)

DR. KOVES: Yes, sorry.

CHAIRMAN BLEY: Okay, go ahead.

DR. BARNES: We want to see also the results of the correlation.

CHAIRMAN BLEY: Well both. I'm seeing the results, but I don't know how the results became the results without understanding that a little bit, I think, except for "trust me."

DR. KOVES: Right, well and what it -- like I said, what it does is it shows for each one of the items that it groups together, it shows you basically the factor loading of the correlation with that theoretical point.

CHAIRMAN BLEY: And this then unraveling around this point is actually a human interaction judgment process of looking at the items.

DR. KOVES: Items, yes, and making, and saying what -- and making a judgment as to what they're talking about.

MEMBER RYAN: So this is an analytical representation of a qualitative assessment?

CHAIRMAN BLEY: This part's analytical.

MEMBER RYAN: I know.

CHAIRMAN BLEY: On top of that --

MEMBER RYAN: Evidently it's a qualitative assessment.

CHAIRMAN BLEY: Well, it's both. It's both.

DR. BARNES: It's based on 3,000 people's responses to each item in the survey.

MEMBER RYAN: Okay.

DR. BARNES: Okay. So there are 20, almost 3,000 people's responses to each item in the survey. So a factor score is a correlation, or the factor loadings is the correlation of 3,000 people's responses to that item, with the factor that the software created.

So for a specific item, for a factor like management responsibility, you might have -- the item, an item might be -- our managers believe safety, you know, our managers walk the talk, okay, with regard to

safety, and if that -- if the 3,000 people's response to that item --

MEMBER RYAN: Well just to make it easy, if all 3,000 said it's fabulous, what would happen on this graph?

DR. KOVES: Said what was fabulous?

MEMBER RYAN: That managers, you know, that the thing is the managers walk the walk, and they said yes, they all agreed?

DR. KOVES: Everybody gave it a 7.

MEMBER RYAN: What happened?

DR. KOVES: If everyone gave it a 7, then it would depend upon all the other responses were. So if you had other items that had, you know, all 7's, they would all group together, okay. Then if you had items that had a mean of 6.98, they would probably --

MEMBER RYAN: So all these get grouped by the numerical scoring on one of these four points.

CHAIRMAN BLEY: Well no, no. On however many points turn out to be.

MEMBER RYAN: Or turn out to be, okay.

CHAIRMAN BLEY: Right.

DR. KOVES: Yes. This is just --

MEMBER RYAN: I'm no Dennis. I need to read it.

CHAIRMAN BLEY: It looks for clumps.

DR. BARNES: That's what I always say.

MEMBER RYAN: It looks, yes.

(Simultaneous discussion.)

CHAIRMAN BLEY: So you can't -- so you must have some measure of dispersion around a --

DR. KOVES: Well yeah. There's the output and that tells you how the correlation between that item and this theoretical factor.

CHAIRMAN BLEY: And just for example you could look at F-2, and you might say gee, two of these -- let's say there were only two items there. These two items aren't related in any way. It just turned out that they both had the same score.

DR. KOVES: Well, that's up to the person who's -- if you look at Factor 4, Factor 4 is your example.

CHAIRMAN BLEY: Okay.

DR. KOVES: Right there.

DR. BARNES: Right there.

CHAIRMAN BLEY: Exactly, okay. Or they turned out that way. It could have been that they were coming, but it turned out they weren't.

DR. KOVES: Exactly, and that's where you have to use the interpretation properly.

DR. BARNES: Is it interpretable? Does it make sense? Is it talking about something?

MEMBER ABDEL-KHALIK: Now each one of these red points is an arithmetic mean of 3,000 individual scores. There must be some standard deviation associated with each one of these, and the standard deviations can vary significantly within each clump. So how do you handle the data points with widely varying standard deviations in an individual clump?

CHAIRMAN BLEY: For items within a clump.

DR. KOVES: Right. Okay, what it does is it looks at the variance, okay. It analyzes the variance. It doesn't -- see I used means. It does not use means. It analyzes variance. This is just an example to try and explain kind of what happens.

If you were a statistician or a psychometrician, you'd probably throw up on this example, okay. I get that. But it's trying to just get the idea of how the things clump together. So it does not use means. It uses variance.

MEMBER RYAN: So what statistic did you use?

CHAIRMAN BLEY: Variance. They clump by variance.

MEMBER RYAN: I mean just straight variance?

DR. KOVES: Yes. It's a variance, a standardized variance correlation, and so that's -- and what it does is it uses those -- it looks at those as distances.

DR. BARNES: This analysis technique there's, you know, software. There's statistical packages for doing data analysis of, you know, large data sets like this or, you know, that always include how to, you know, software processes, programs to run a correlation, run a multiple regression analysis, you know, to run all the different statistical techniques that are commonly used in the social sciences.

That's what was used is the standard software package for doing this kind of statistical analysis, that both INPO and Idaho, INL, the statisticians and psychologists we had along from Idaho used, for them to do the principle components analysis that Idaho replicated and played around with.

So I mean this is standard run-of-the mill, boring --

DR. KOVES: Typical survey analysis.

DR. BARNES: Yeah, yeah. It's just not something that's commonly used in nuclear engineering

programs, I think perhaps. So you know, it's a -- that's why, and this discussion is what we had hoped to avoid, but I understand why everybody wants to get into the details here.

CHAIRMAN BLEY: I like statistics. I'm interested.

DR. BARNES: Yeah, yeah.

DR. KOVES: Oh, that's okay.

CHAIRMAN BLEY: There's actually no component location? It's only variance in the clumping?

DR. KOVES: Yeah. It uses matrix algebra to look at the -- you can set up to either use the variance matrix or the correlation matrix. Typically, you use the correlation matrix.

DR. BARNES: Okay.

CHAIRMAN BLEY: For me, you can go ahead.

DR. KOVES: Okay.

CHAIRMAN BLEY: I'm done.

DR. KOVES: All right, good.

DR. BARNES: Okay.

DR. KOVES: The only other comment that I have about this particular slide is that you see the respectful work environment, and then -- which is a subfactor of management responsibility, and two, the

willingness to raise concerns. These were very much aligned with two of the factors that came -- or two of the traits, excuse me, that -- two of the traits that came out of the February workshop.

If you had asked me before I had done this analysis, I would have bet you a can of Pepsi, okay, that those two would have folded together and come up as one factor, okay, and yet they vary.

You know, this is one of the surprises. This is why you do the research, okay. So that kind of surprised me a little bit, that actually that they did separate --

MEMBER ABDEL-KHALIK: Why would you have expected these two to be combined?

DR. KOVES: When you looked at the initial definitions and let the -- and what the panel had done, when I first looked at them, I decided to sit there for a while and understand the difference between the two of them.

Plus I mean, you know, if the natural linking of okay, well if you respect my opinion, the I will be more open to just giving you my opinion and raising concerns. If you respect me, you know, I feel more open to raise concerns, and yet it came out differently in the results.

So that was just kind of an interesting point, side point. Next, the third factor that came out was decision-making. There were no real clear subfactors that came out of that. Basically, what did that talk about? Decisions were conservative, timely, safety-focused and engendered confidence in the employees.

Supervisor responsibility was the next one, and the subfactors there were about communication, presence or availability of the supervisor, the coaching and how much coaching and the quality of their coaching, and then also how there was one open that was separate, that was kind of that alignment with management.

So you kind of asked the question about well, what if you get an item here that's kind of out on its own? That was was an example of one of those.

CHAIRMAN BLEY: So the real, the result of this work, would it be fair to say is that this lets you come down to given the way the questions were worded, the minimum set of things that are not clearly separable from each other and these traits?

DR. KOVES: I'm not -- I can give you an answer, but I'm not sure it's really the answer for the question that you asked. So if you'd try me again

--

CHAIRMAN BLEY: Well see, you've mapped in a sense the questions for the traits. In the end, the traits have to come out, unless somehow two or three of them are indistinguishable and they settle in together as a result of this work.

So you don't get more traits than you started with, unless you hadn't identified them all and you had questions that set up this one that surprised you.

DR. KOVES: We have not compared -- at this point in the process, and we're going through chronologically, at this point in the process, these have not been compared to the traits. You will see that coming up, okay.

MEMBER ABDEL-KHALIK: If you had removed the word "nuclear" from all the questions that you asked, and given the same survey to 3,000 emergency room nurses, would you expect the results to be any different?

DR. KOVES: Probably, to some degree, but that's actually where the AREVA study comes into play, I believe helps to kind of answer that question. You know, there are going to be -- there's going to be some differences, but you know, what you want to do is

look at over time and multiple research studies and look and see what the continuity is across them.

So that's the importance of the AREVA study as a part of this, because it is a different environment that power reactors.

DR. BARNES: There's a handout that you should have in front of you that is titled "Principle Components From Other Domains," I think.

CHAIRMAN BLEY: Yes.

DR. BARNES: Okay. We've got --

CHAIRMAN BLEY: Well, it's Principles From Non-Power Reactor Settings.

DR. BARNES: From Non-Power Plant Settings. Okay. Those are the components that emerged from principle component analyses of surveys that are conducted and have been published from other settings.

We've got ICUs in there. We've got hospitals, we've got construction sites, different kinds of manufacturing facilities, small businesses, and so -- and each of those studies used the same approach, developed survey items, administered them to samples of folks in different organizations, ran the principle components analysis to look how the items in those surveys clumped together into factors. You can

see the types of factors that emerged from those studies.

MEMBER ABDEL-KHALIK: But conceptually, one would not expect, big picture, that if you sort of go to an appropriate level of extraction, that there would be any difference between any of these groups.

DR. KOVES: Yeah, I would agree with that, that although there may be some small -- actually, there would be, and this number four here, where if you were looking at the portable gauge, where they may not be supervisors, where you don't have much organization, that in that situation it might be different.

But to a large degree, yeah I believe when you get at an appropriate level of abstraction, there's going to be a lot of similarity.

DR. BARNES: And something else I think that is important to recognize is that in all of these studies, safety culture is a fairly unitary concept. Even though we go through a principle components analysis and come up with factors that describe it, there's like in the case of intelligence, there's a great big G factor, you know, general intelligence.

When you do a principle components analysis on an intelligence test, you'll turn up with

a verbal factor, a quantitative factor, an analytical factor, but there'll be -- but they'll relate to each other to one degree or another, and the variance that verbal quantitative and analytical share is known as the G factor for intelligence.

Well, that's what we're talking about here. We've got safety culture. All of these different items pretty well tap into something about safety culture in these different organizations, in different industries, and but then you go in and you do the factor analysis, and you see well, you know, management is a part of it; how I perceive my supervisor behaving is a part of it; how free I feel to raise concerns is a part of it in the organization, but there's still this general safety culture thing.

So you'll get some variability in certainly how the factors are worded, but I mean I agree with you. The theory for safety culture is it should pretty much be consistent across the Organizational settings, to the extent that the organizational settings are similar, in terms of the relationships between people per se.

Okay. So decision-making? Oh, supervisors we talked about.

DR. KOVES: Okay. A good factor that came

out was questioning attitude, and the subfactors around that were situation problem awareness, process use and plant knowledge.

I do want to take one moment and talk a little bit more about that one, this particular factor, and that is when we, as we go into the further research where we do the correlations between the other measures, in general a questioning attitude had the highest and not for everything, but in general, had what is the best correlate with the kind of the majority of the indicators that we looked at.

And that was also very consistent with some other research that we did at INPO about a couple of years ago, where we took -- actually, it was not -- it wasn't our survey. It was actually a vendor's survey, and one of their factors was not questioning attitude, but it was really more about a passive culture.

That was, had the best correlations with our other variables that we compared to. So it lines up with this questioning attitude correlating well with other variables.

CHAIRMAN BLEY: When you say it that way, that means if I get a -- if you give me a good score on this one, that we have a strongly questioning

attitude, then the other things end up at the positive end as well. Is that correlating?

DR. KOVES: It depends on what the other measure is and how it's measured. Is it, you know, is it measured so that high is good or that high is low, and depending upon which way it's measured, it will give you positive or a negative relation.

CHAIRMAN BLEY: Okay, fair enough.

DR. BARNES: And you know, we've called it "questioning attitude." Those are buzz words in the nuclear power industry. In the other studies that where I've shown that factors that emerged, and in other industries and in literature from other industries, they talk about perceived risk in the workplace, you know, how scary is my job, you know.

What are the -- how potentially risk is the work that I performed, you know, of maintaining a questioning attitude and a constant awareness of the risk and hazard associated with the work that I do?

They just use -- they use different words for questioning attitude and other environment.

CHAIRMAN BLEY: We've eaten up all our extra time and now we're in negative time.

DR. BARNES: Are we on overtime?

CHAIRMAN BLEY: Yes. So I think if he can

go through it quickly here.

DR. BARNES: Okay. I'll skip to the factors.

CHAIRMAN BLEY: On the other hand, I'm not sure where that leaves us as a subcommittee.

MEMBER ABDEL-KHALIK: Maybe it's about Item No. 5. How does plant knowledge fall within that questioning attitude?

DR. KOVES: Because that's where -- I mean that was the question -- when I looked at the items, that was the question I had too. But the plant knowledge, the more knowledge I have of a plant, the better questions and the more I can exercise a questioning attitude.

If you were to take me into a nuclear power plant and showed me, you know, showed me something, I'd say "Oh, okay." But if you had someone who was knowledgeable about a plant, they might say "Wait a minute. Why is that like that?"

And so therefore, I mean plant knowledge. If I have no plant knowledge, I can't ask good questions.

DR. BARNES: And that interpretation of this subfactor is consistent with the interpretations and research in other domains that I was talking

about. So you have to know what you're looking at.

DR. KOVES: Okay. I will start zipping through these. So you saw communication. Seven was personal responsibility. Here are the definitions, prioritizing safety. And then lastly, training quality. This was very narrow, okay.

This came out. These items grouped together. They accounted for the least amount of variance of all the ones who are interpretable, and it was just very, very narrowly focused on training and quality and support by management. So next slide. Here is where --

CHAIRMAN BLEY: You had the good end score, from the words you have here.

DR. KOVES: Yeah. Well, they're all positively -- I mean all the items were positively related, and these were -- I mean so these descriptions are positively worded. Here is the comparison between what the factors were and the traits, and you'll see basically side by side there was a lot of similarity between them.

It was not identical. However, you'll see a lot of similarity. The leadership safety behavior, which everyone agrees is very important, and the management responsibility were the same.

You'll see that the respectful work environment under the traits, problem resolution and metrics and continuous learning were really involved in part of that continuous improvement, and in an effort to move on, the one other noteworthy thing was that the processes and procedures, as we thought, saw it falling under a questioning attitude.

The next slide is this is my interpretation, okay. Let me be very clear about that. What I did was I took the survey factors and then compared them to what my understanding of the workshop traits, my understanding of the INPO principles and also then my understanding of the ROP components.

This is what's sometimes referred to as kind of a cross-walk, kind of well okay, now if we were to put these side by side, what might they look like? But this is all my interpretation of them.

Moving on to the next slide, this is AREVA fuel survey administration. Basically, what they did was they took the survey as it was. They dropped out one item. They modified a number of items, but not -- they were rather minor modifications.

So for example, the example I give here is deleted the words "at this station." A lot of items

had that phrase in there, so they deleted that. They're rather minor modifications.

CHAIRMAN BLEY: Basically the same questions?

DR. KOVES: They were essentially the same questions, except for one. They deleted one out. They administered it online. It was administered by their corporate. They invited all the employees in the function, which was around 993. 813 responded.

A lot of them kind of started and then dropped after like the first page of questions. So there were about 673 that provided valid responses to 99 percent of the items, and that as 68 percent.

CHAIRMAN BLEY: And this was to give to a Fuels Group?

DR. KOVES: Right. This was the Fuels Group in AREVA.

CHAIRMAN BLEY: Developing fuels.

DR. KOVES: Yes.

CHAIRMAN BLEY: Through a factory for research?

DR. KOVES: That's my understanding. I'm not intimately knowledgeable of their organization. Here is what you see in terms of the factor results. Went through the exact same process that I earlier

described in terms of coming up with factors.

Once again, you see this whole leadership safety behavior and management responsibility as being most important. Just in summary, you'll see a lot of the same things here that you saw with the trades, and what was interesting about the AREVA fuel factors is that when you looked at the reactor factors, it was really pretty obvious as to what it was talking about.

These AREVA fuel factors were a little muddier, and it was like you're actually taking a little bit more interpretive liberty when I was working with these factors.

MEMBER ABDEL-KHALIK: Why do you think that is?

DR. KOVES: You know, I asked myself that question, and you know, I'm not completely sure whether it's the fact that they were all within one kind of organization, as opposed to the power reactors were a lot of, out of a lot of different sites.

My understanding that this is all one particular site, and I'm not -- not really, not completely sure. I'm sure that natural variants also kind of came into play in part of that also.

MEMBER ABDEL-KHALIK: Is it related to the nature of the job that these indivduals make, which is

probably more widely varying within this sample than it was within the --

DR. KOVES: You know, that's a possibility. It would really -- to answer that question, you'd really have to dig into it and do some additional research. Once again basically we see the main -- the main point here is that once we're seeing the traits again, only this is in a similar but different, and in a population outside of the power reactors.

Here, do the reactors relate to other safety measures, and what we did was we correlated, basically found the mean, okay. Well, I'll go into the details in just a second, but calculated the correlations of the factors and subfactors for each site within INPO and then NRC measures, and correlated them with a variety of other organizational effectiveness and equipment performance measures.

Now this next bullet point is put in here for the reason that if you -- it is my understanding, I don't have an engineering background, but it's my understanding that if you have an engineering background, you're looking, used to looking at correlations that are much higher than this.

In the social sciences, these were a

couple -- not fact analysis. The meta-analysis studies that looked at lots of different research, and these were some of the -- these were kind of average correlations they came up with, .22 and .31.

And that just the point of this is that if you're looking at engineering calculations, my understanding is they're typically quite a bit higher. You just don't get those kind of correlations in the social sciences.

MEMBER ABDEL-KHALIK: In fact, these kind of things that behave almost independently in physical systems.

DR. KOVES: So this is to look at some of the factor and some of the specific validities that we got, and these are the correlations between each of these factors and various measures. We looked at a lot more than this, but these are some of the measures that we looked at.

And so this -- remember, the N here is 63, okay, for these correlations, not 3,000. So you're looking at a lot of correlations, .2. And then what you see in these parens some of the subfactors. I talked about the subfactors underneath some of these. This is, you know, you would see like under management responsibility and under emergency power

availability.

One of the subfactors of management responsibility had a .3 correlation with emergency power availability, even though the aggregate factor had a .26 correlation.

CHAIRMAN BLEY: You have completely confused me.

DR. KOVES: Okay.

CHAIRMAN BLEY: I mean the stuff across the top are events in a power plant that we haven't talked about at all so far.

DR. KOVES: Right, and these are -- the first one is -- the first column is where the plant falls in the ROP matrix.

CHAIRMAN BLEY: Okay.

DR. KOVES: The second one is the number of unplanned critical scrams. The next one is unplanned automatic scrams. The third one is the system heat removal unavailability, emergency power availability. The next one is an index that INPO creates, a personnel safety index.

CHAIRMAN BLEY: And this was done across all the plants that were in the study?

DR. KOVES: Right. The N is 63.

CHAIRMAN BLEY: For the values you looked

at for say the unplanned scrams is over how long a time period?

DR. KOVES: These were the most recent data that was reported to INPO by each of the plants.

MEMBER RAY: Fourth quarter.

CHAIRMAN BLEY: Fourth quarter of what year?

MEMBER RAY: The following year.

DR. KOVES: Yes. Typically, it's a rolling number. I think a year would be typical, although I'm not -- I can't say for sure, for certain that all of them are.

MEMBER ABDEL-KHALIK: And for each one of these 63 plants and each one of the factors, you just use the arithmetic mean of the score of the 40-some odd people just participated from that site?

DR. KOVES: Yes. It's the arithmetic mean of the scores of those 40, average 46 people, for each one of the factors and subfactors, and that was why I said, you had asked earlier about okay, is this enough people? We've also done similar studies with -- INPO administers an organization effectiveness survey before each one of the evals.

There we had response rates that were much higher. A smaller number of plants when we did the

study, but the correlations were very similar, and then you'll see that -- so that is -- the whole point of that is that if you ask the question do these survey results relate to other measures of safety, the answer is in this domain yes, they do, and the relate pretty well actually overall.

MEMBER BONACA: Go back to a previous slide. Explain to me the numbers. Are they --

DR. KOVES: Those are correlations between -- so for example, if you look under the factor "management responsibility," if you take the average aggregate score of all the items that came under management responsibility for a particular site, and then you correlate that with where that site fell in the ROP matrix. It's that correlation out of the 63 sites.

So we have moved from an individual level analysis up to a station level analysis here.

DR. BARNES: Because our theory is that safety culture is somehow related to a plant's safety performance.

DR. KOVES: Right.

DR. BARNES: Okay? That's what we --

MEMBER ABDEL-KHALIK: I know why you're doing this, but you know, there is sort of a

philosophical difference between the rows and the columns in this table. Perhaps the scores that you get are more aspirational, whereas the columns represent reality.

DR. KOVES: Right, exactly. But the point is that what is, you know, what the survey and the psychological construct is related to reality. I mean if there were no correlations here, then we would say the survey, either the construct or safety culture, is hogwash, or the survey is hogwash. So you're absolutely correct in that.

DR. BARNES: So this says that if people at a site are perceive that the decision-making that's done at that site is positive, you know, is supportive of safety, then these correlations show that they're going to be -- that organization is going to be performing better on the ROP. They're going to have -- these are actually negative correlations in most cases.

They're going to have fewer numbers of unplanned scrams. They're going to have fewer numbers of unplanned automatic scrams. They're going to have a higher capacity factor. That's what these correlations are saying, yeah.

We're not saying causality and we're not

predicting performance. Correlation is not causality, and we're not predicting how they're going to perform next year on these safety performance measures.

We're just saying out of this that how people think about what's going on in their organization is related to how that organization --

DR. KOVES: Actually performs.

DR. BARNES: Actually performs.

DR. KOVES: Did you have questions?

MEMBER BONACA: The reason why I asked the question is that I participated in a number of studies years ago, where we attempted to that, and the remarkable thing was that we had a Plant X, which was, had a bad reputation of performance at that time, and yet that's why it was a system --. And we did not find this correlation.

We had a look at it but surprisingly, because it was quite -- the number of scrams. It was difficult to see much more variance --. It's interesting.

DR. KOVES: Yes, and there's a number of reasons why you may not have found something. I mentioned INPO's organization effectiveness survey. A number of years ago they did some analysis and did not come up with any correlations, and there were a number

of reasons. I think personally that had to do with how they analyzed the survey.

CHAIRMAN BLEY: Yes, I'm still a little -- one needs to see more than this to really get a good idea. If I look at unplanned critical scrams, almost all the plants are at zero. So this result might just be that one plant had one scram in the last year, and their people did score a little bit lower. That might be all the information that's --

DR. KOVES: I'd have to, but because this is an aggregate score over time, some of these I don't know how long. You know, I don't know the details around these measures to tell you how long.

CHAIRMAN BLEY: I picked one I know about.

DR. KOVES: Yes, and you know, so if it's obviously if it's a longer time period, then you're going to have more examples.

CHAIRMAN BLEY: It's still almost all zeroes, unless you go back a lot of years, more than ten.

DR. KOVES: I don't know. I'd have to -- I mean I've got the information on my laptop. I can pull it up and show you the range of scores. But that's --

CHAIRMAN BLEY: I mean the correlation is

clearly there. On the other hand, what is it that's driving that? It could be a single data point. And I bet you on that scram one, it's no more than one or two. It can't be more than one or two.

DR. KOVES: Well, you could very well have a very restricted range. But I mean with the ROP matrix, you've got a very restricted range. You've only got four. That's your range there.

So you clearly have a restricted range with unplanned critical scrams and still get a correlation out of it, because you do that with the ROP, and there aren't that many plants who are, you know, two or three, yeah, who aren't down there. So and you still get a correlation with them. Any other questions about this?

Lastly, general conclusions. I think the results support the existence of the workshop traits, however, in a slightly different configuration. Factors are consistent with research and other demands and the sort of factors are related to other measures of organizational effectiveness and equipment performance.

I'd just go on to say that, you know, what I was showing you were INPO measures. Val and the NRC brought a whole bunch of data and looked at theirs and

got similar type of results with their data. Very similar?

DR. BARNES: Similar, yeah.

CHAIRMAN BLEY: But you don't have a report from Idaho yet?

DR. BARNES: I had a presentation about what we did. So you've got the slides from that.

CHAIRMAN BLEY: Yes, I do. I'll go through them. I think, though, we have to hurry on, and I just don't know what the committee's going to do with this.

But I'm not also sure how relevant it is to what we'll have to say about the policy statement. But if we think it's very relevant, we've got to understand this better, and we don't have much time to do that.

So thank you very much. I wish we could hear the rest of it. We should have had an all-day meeting, I suppose. We just don't have time to absorb it.

MEMBER ABDEL-KHALIK: So the message that you're trying to convey to us is that the attributes or the list of attributes --

DR. KOVES: Traits.

MEMBER ABDEL-KHALIK: Traits is the right

list?

CHAIRMAN BLEY: Or sort of.

(Simultaneous discussion.)

DR. KOVES: At this point in space, time, they're probably a pretty good approximation.

MEMBER ABDEL-KHALIK: Okay.

DR. BARNES: Yes.

DR. KOVES: Thank you very much for your time.

DR. BARNES: And they probably are useful for the array of environments that we're trying to talk about here.

CHAIRMAN BLEY: We appreciate you volunteering to tell us more and come back. I just don't know when we can do it.

DR. BARNES: I understand.

CHAIRMAN BLEY: And I wish we had been here a lot sooner with this.

DR. KOVES: Well, we wish we could have too also. Thank you very much for your time, and I'll be more than happy to come back and spend time with you. Thank you.

CHAIRMAN BLEY: Thank you. Who's up first? Tom's up first, right?

MR. HOUGHTON: We'll try not to be so

sophisticated in our presentation, but sophisticated enough. Mr. Chairman and members, thank you for having us back. We were here a year ago and talked to you about our safety culture policy, our safety culture approaches and what we were trying to do.

We also spoke to the Subcommittee on Operations in July. I'm going to lead off, and then Mike Gaffney, who is from Hope Creek, will provide some very specific details for how the program is being implemented at Hope Creek.

At our previous meeting with the Ops Subcommittee, we had an individual from South Texas project who talked about how they did the work there. I am the Director of Safety-Focused Regulation at NEI. I've been with NEI for about 12 years.

When I first came there, I worked on the development of the ROP as it came into fruition. Previous to that, I had my own consulting business and I was with Dr. Bonaca at Millstone when they were going through their recovery back in the mid-90's. Mid-90's, right, and actually brought some of the metrics we used at Millstone into use in the ROP process, as we developed it.

CHAIRMAN BLEY: Tom, as you go through this, if you can relate what you're going to show us,

some of which we've seen before I think, to what we've been hearing for the last three or four hours, it would be good.

MR. HOUGHTON: Right. Let me start off. That's a good thing to start off with, because what we've done in our process is we have taken the INPO principles and attributes and used that as the lens that we used for this program, okay, both for assessing safety culture on an ongoing basis and through a survey, which you've been hearing, the basic survey around which the validation study was built.

The game plan, we support the NRC's activities on the safety culture policy statement. We have minor issues with it. We think it's on the right track. We think that after the SRM comes out, that we're well-positioned to work with NRR to develop common language, which is one our main goals that we started with here, was to have a common language.

So we think we're well-positioned for that, and we think we see a success path for that with the policy statement. So and I'll try to keep in that regard.

The challenges that we see with the existing situation. After Davis-Besse, the industry really didn't take the lead on safety culture, and we

think that we were derelict on that, and we want to get back in front, where we are identifying the safety culture problems and the NRC is overseeing what we're doing.

We think that that's the correct path, and that's what we do in QA and we do in every other area. Our feeling is is that the inspection approach right now of inspection findings is really a limited set of data, and by that I mean that when we talk about safety culture, we can talk about -- we can talk about concepts of safety culture, but we can also look out in the plant and we can see what's going on in terms of maintenance backlogs, in terms of operator work-arounds, in terms of observations in the field, self-assessments, INPO looks.

We can collect a lot of data that can tell us that there's something wrong, and we can look at see if we think there are cultural aspects to what are causing those incipient problems, okay.

Our feeling is that the NRC's approach is limited, in that it only looks at a few inspection findings over a year, and comes to a general conclusion, which we don't think the limited data allows for that. In any event --

MEMBER ABDEL-KHALIK: Have there been a

lot of situations where those findings were inconsistent with assessments of the larger body of data that you're referring to?

MR. HOUGHTON: The problem is that there are only about 12 inspection findings at a plant a year, and if four of them are assigned the same safety culture aspect, the region meets and decides whether the issue is important or not, based on those four items, and either declares a substantive cross-cutting issue or it doesn't.

Our feeling is that that's inadequate data to do that. The licensee is really kind of under the gun, because if he says "I don't think those four aspects are a significant problem at my station," then they're ignoring the problem. So it's a little difficult to be in that regulatory position.

MEMBER ABDEL-KHALIK: I guess I'm asking a different question.

MR. HOUGHTON: Okay.

MEMBER ABDEL-KHALIK: I'm wondering if those findings, if one were to go back and analyze the larger body of data that you're referring to, you would arrive at the same conclusions?

MR. HOUGHTON: And you may, and that's what our process is designed to do. In other words,

this process in NEI 0907 is designed to do exactly that.

MR. CHEOK: I think the answer to the question -- this is Mike Cheok from NRR. I think to answer your question more directly, industry's only done it at four plants, four pilot plants at this point. So there is -- I don't think there's enough data to answer your question, as to whether we have sufficient data from all plant events to point to a different conclusion, as to what the NRC would identify plants with substantive cross-cutting issues.

MEMBER ABDEL-KHALIK: But he's not talking about operator work-arounds, maintenance backlogs and I'm sure all plants have a lot of data about that.

MR. CHEOK: Yes, they do.

MEMBER ABDEL-KHALIK: They religiously keep all that.

MR. CHEOK: Yes.

MEMBER ABDEL-KHALIK: And now you have that larger body of data.

MR. HOUGHTON: Right.

MEMBER ABDEL-KHALIK: And I'm wondering if you were to use that data to try to check whether or not the original findings that you claim is based on a limited set of data is justified.

MR. CHEOK: Correct, and they haven't done that yet at this point, except at four plants.

MR. HOUGHTON: And that is what the pilot plants have been doing for the past year, and will expand it to the entire industry where we will do that.

MEMBER ABDEL-KHALIK: Okay.

MR. HOUGHTON: Okay. The other issues is that there isn't a consistent way of conducting surveys and snapshot looks at the industry, and finally, we've got this different terminology, which is what the subject of this, part of the subject of this meeting was, was the different terminology, and we want to work towards that common terminology.

What are our objectives? Three objectives. We want to have a repeatable, holistic, integrated way of looking at all this data, and Mike is going to talk about that in some depth so you can understand how they did that at Hope Creek, so that to have a process that NRC can oversee and look at and see a consistent way of looking at information.

Okay. The second thing is to have a common methodology for conducting a survey and a snapshot assessment, and the third is the common language. Okay, so those are our goals in our

industry initiative. Any other questions to that point?

(No response.)

MR. HOUGHTON: So what I'll do is turn it over to Mike now and let him walk through -- oh, let me just say, before he starts, we had four pilot plants, one in each region. We had Hope Creek, we had North Anna, Region II, we had South Texas project in Region IV, and we had the Braidwood station in Region III.

Each of these pilots started last November. They're still implementing the process that Mike's going to talk about, and they have had observation by NRC, and we've had meetings with the staff to discuss issues and findings and lessons learned from that, and we've updated our guidance to do this.

And in December, the SAIC, which is the Chief Nuclear Officers, will be meeting to vote on an initiative whereby if passed all plants in the country would follow this NEI 0907 guidance. Michael.

MR. GAFFNEY: Thank you. Mr. Chairman and members of the committee, thank you for the opportunity to talk to you today about our learnings from this pilot process. I am a Naval Academy

graduate. I spent 30 years in the Navy. I commanded two ships, the last being a nuclear cruiser, the USS South Carolina. Came into the industry 13 years ago and achieved an SRO license. Spent some time in an operating crew as an SRO and then moved up to management. I've been at Hope Creek as the reg assurance manager for a little over three years.

We're excited about doing this pilot. I think my main message to you is threefold. First, as Thomas said, we looked at lots of data. Over a rolling four quarters, there's over 250 data points that we review, and that gives a broad view of safety culture.

Now we all know culture. We've heard a lot about it today. Culture is very hard to assess and put your arms around, and so that's been a real learning for us, to learn how to analyze this data.

Second, it's also provided our off-site review committee, part of our QA program. We have a nuclear safety review board. The opportunity to do their assessment, safety assessment of us by looking at this data also and sharing with us their views on what they think the data means, and that provides useful feedback to us.

Then thirdly and most importantly, by

looking at this large amount of data from very minor things going on at the plant to the most significant things going on, we're able to have an early detection of what we perceive to be are the cultural aspects that may need some corrective actions.

So what I'd like to do next is this is the process, and I will step you through quickly how we implemented it. Some of you have seen this before.

CHAIRMAN BLEY: The same to us last time. The same, is it?

MR. GAFFNEY: Now I'd like to give you some specifics about how they did it.

CHAIRMAN BLEY: Yes, okay.

MR. GAFFNEY: Now we have improved it since July and made a couple of small revisions here. But it's essentially the same process. So the basics are that we took this process, and we do with everything, we built a process that fits our station around it.

So along with that, we used this nuclear safety culture monitoring panel, which is in the middle there, the pink. That's the working group of experts that analyzed the data and assigned the issues to a particular safety culture principle. They then decide

what they believe that means, in terms of what the safety culture's doing, and make recommendations to the senior leadership team, the site leadership team.

So this monitoring panel is made up of subject matter experts. The station CAP manager, th corrective action manager, self-assessment coordinators, the QA supervisor, the ECP program manager of the individual process inputs, those subject matter experts, analyze their own data.

We get together collectively as a group and make, analyze that data collectively then and make recommendations that go to the senior leadership team.

As I said in a process, the normal nuclear process is we put it together as both in metrics and then also in the data that supports those metrics, to provide to the senior leadership team, that then looks at that.

We have a challenging meeting where we're both the panel is there and the site leadership team, discuss it, and help to decide, them to decide what the proper actions are for the issues that they see coming out of that.

That then goes into our corrective action program. It also goes to our off-site review committee for their review and discussion at their

next meeting, and then it goes out in communication form to the entire site, to let them know how we think we're doing, and as well as, as Tom said, we've had the NRC observing this pilot.

So we've gotten valuable feedback from our regional observers. As I think Mr. Ray said earlier, you know, the culture is expressed through outcomes. So this aspect of looking, as you see, those green process inputs. We're looking at the minor corrective action things that resulted in apparent cause evaluations, common cause evaluations, root causes.

We're looking at our observation program that looks at hundreds of observations of crew work a month, and those go into our trending and our bubbled up as issues, as what are the significant trends there, as well as our NRC findings that we receive each quarter.

So a lot of data gets reviewed and binned to each of the principals. Then as part of that, we then assign a level of consequence to it. In other words, for the minor things that came out of an apparent cause or a worker observation where you may not have followed a procedure correctly, those we call precursors. If it's something more significant, like it resulted in a root cause or a common cause

identified several instances, we would call that perhaps a near-miss.

If it's actually something that's a root cause event that's directly attributable to a cultural aspect, one of the eight principles, we would then call that a finding. And so then those are taken and put into a bar graph and we set thresholds of at what point the number of precursors would you say you have a problem, that you have to then go do something with.

So then that information goes to the leadership team with recommendations. For example, we did have, in the rolling 12 months when we first started this, we had met the criteria for a cross-cutter aspect in procedure use and adherence.

Our process told us that we had that problem by looking at more data, identified a lot more instances of the same kind of thing but at a lower level than the five findings, I think, that we have had in that 12 months. So in this case, the region had not given us a letter, because we had already taken action.

Now this pilot process came along after that, looked at that and then evaluated the actions that we were taking for that cross-cutting aspect, and evaluated what else we needed to do about that and

whether the actions that we were taking were adequate.

So in that way, it added a lot more data to those five green NCVs that caused the cross-cutter, and we were able then to look more broadly at why is this. I think one of the learnings we have also from doing this process is by having so much data from all these sources, we're able to kind of drill down beyond well okay, we have a procedure use problem, but why is that?

What are the other aspects of that from these other minor events that are occurring, that would tell us why people are doing it, that would help lead us to better corrective actions. So that's been a benefit to this process, to be able to drill down a little bit farther, and capture more instances, so that common cause evaluations, when we do them, have more examples to go after and look for.

Through the process, with the feedback we've been given both from our offsite review committee and the NRC, we've looked at, we've established a threshold. Now we're looking at, going forward, we've determined that each of the principles shouldn't have the same threshold.

Everyone responsible for safety may have a threshold that's higher than the one that says

decision-making reflects safety first, because of the number of events we're seeing and the number of minor things we're seeing.

So we're starting to probe into that. So we set the right threshold, so that we do get the early detection of the problem.

MR. ZIMMERMAN: Can I ask a question, sir? Can I ask a question? Just I've seen this before, and I think I understand. I'm trying to overlay, fast forward a little bit, and assume for a moment that the safety culture policy statement has been endorsed by the Commission. Would that act upon this? Would that change this in any way?

MR. HOUGHTON: No, it wouldn't change. Whatever change, it's the lens we use to determine what the safety culture problems are. In other words, this is the raw data, okay, and when we look at the raw data, we use the X number of principles and Y number of attributes, and we say what is this data telling us about decision-making, and what is it telling us about trust in the organization, or what is it telling us about accountability?

MR. ZIMMERMAN: So you'd put it th rough some of the traits?

MR. HOUGHTON: Right, right, and the goal

is to have the same traits that NRC uses for its violations, as we have -- that we're using in this process, so that we can all use the same words.

MR. ZIMMERMAN: So that's the terminology alignment you were talking about?

MR. HOUGHTON: Right, right. So we'll have to update what we do when we have the final wording, but it won't change the process itself.

MR. ZIMMERMAN: Did you see terminology alignment having been gained over the last year in the work that we've done on the policy statement, but we still have misalignment when you apply it to the ROP.

MR. HOUGHTON: Yes. I mean we've got three now. We've got traits, we've got compliments and we've got principles. So in one way you can say we've taken a half step back, in order to make progress and make three strides forward to have the common language.

MR. GAFFNEY: And I think one thing that I would add in from our aspect is what has been very helpful for us in using the INPO principles book, is that we actually bin our individual issues to the subattribute, the Tier 3 level, because it provides us more clarity.

For example, in Principle No. 5, which is

nuclear technology is special and unique, there are a couple of subattributes there. One is that you'll provide high quality procedures and processes. So we actually then bin, when we have a procedural problem that we find, we would bin it to that attribute.

That gives us again, drills down a little bit farther beyond the principle, to say what in that principle and so I think the Tier 3 work that is going to be done is going to be important for us, and we as a pilot group have talked about, that these attributes that INPO developed were never meant to bin to metrics on.

So it will be an opportunity for that Tier 3 group to be something that makes a lot of sense, if people are going to ultimately try to quantitatively go after this, to come up with some good criteria.

MR. ZIMMERMAN: Thank you.

MR. GAFFNEY: This slide is merely to document kind of what I went over with the thing, but I probably missed some points.

When we picked our monitoring panel team and the senior leadership team, the monitoring panel team, the group of subject matter experts, and then the senior leadership team was obviously the chairman, the station vice president and the plant manager and

the directors and managers of the line departments, and we include security in that.

Hope Creek is a little different from other stations, in that we have at our site, Hope Creek and Salem have one common security group. So the security group is included in all of our meetings as well, and they're included in our analysis of culture.

But we include quality assurance group and we, much like South Texas, we're going to start using. We have an advisor, a psychologist type advisor who helps us with developments and succession plans, will help to provide that organizational effectiveness specialty look also.

All of these folks have to go through a jobs familiarization guide, kind of a qualification process, to make sure they understand both the NEI process and our own process, and then an interview to make sure that they understand it before they start dealing with it.

And then just so we're clear we look at rolling four quarters with the data, and there is approximately 65 new items every quarter and at total that we look a year of about 250. Just one of those items can be the trend results from 200 field

observations by supervisors. So there's a lot of data that's looked at in this, and I think it's important to note that, because we are -- on the one hand, the senior leadership team and even the subject matter experts, are familiar with the data, from looking at it through the normal process, the corrective action process, the work management process, etcetera.

This provides that different lens, by binning it to an attribute and to a principle. It puts those, it groups those events and issues in with a different lens on well, here's the outcome of that, that it may affect this cultural principle.

So that is an important result of this, and I think that's our overall perspective then is that while the leadership team knows what's been going on through their normal meetings, the corrective action, the work management meetings and several other meetings, they then look at this data that's grouped in a separate way and a cultural principle way, so that they're then looking at the data they're familiar with, from the lens of well, how would this impact my culture.

How does it impact everyone's responsible for safety, decision-making, reflect safety first? Then they're able to see how those impacts are made,

and it provides a means for well, what was handled, how that individual issue was handled. It may take a broader set of actions to go after the cultural thing.

MEMBER ABDEL-KHALIK: But this assumes that this is correct?

MR. GAFFNEY: Yes, absolutely. It depends on --

MEMBER ABDEL-KHALIK: So it can sort of lead you to the wrong conclusion, if this binning is done incorrectly?

MR. GAFFNEY: That is the challenge, and that is why at Hope Creek we have done, we bring in the monitoring panel team who did that binning, and the leadership team has reviewed the data and then it's a challenge board of why did you put that apparent cause in safety culture principle No. 5. Why didn't that go in No. 6?

We had that kind of a challenge meeting, to try to come up with that. Then as a second phase, which is the second bullet there, is when we present to our off-site review committee, they do the same type of analysis, and they challenge then the senior leadership team of I've looked at the data. Why do you say you don't have a problem with decision-making?

So they perform another -- their true

function of reviewing the performance of the plant and related to nuclear safety, they're able to then look at this data in a nuclear safety culture perspective, and then challenge us on why we view it that way.

But it is important, and it is the most difficult thing we do, and that throughout this year-long process, it is each time we meet, we learn something more about some of the attributes and why we think we're putting them there, and is that the right place, and it is an important part.

I think when the whole industry is involved, we will take this to another level, because we'll have everyone participating and providing feedback, to where we'll learn from each other much quicker. We've certainly learned; the four pilots have weekly phone calls and have met almost every quarter face to face, and have learned a lot from each other through this process.

MEMBER RYAN: Mike, do you see after this process of all the plants getting together, of the binning becoming a finer set of bins that you use? I mean you can solve the problem of which bin does it go in by subdividing bins?

MR. GAFFNEY: Well, I think --

MEMBER RYAN: You mentioned you had looked

at that.

MR. GAFFNEY: I think that yes, what I've seen in my time in the industry, we all are striving for excellence and we look for best practices, and as th four pilots have shared, we've kind of taken what we view as the others' best practices. Remember, one of the things about this process, if I can go backwards safely, is this is the quarterly monitoring that's going on.

Every two years we'll do this baseline safety culture assessment, and then in the in-between years, we have the INPO evaluation come in and look at us, and evaluate safety culture. Those form baselines, so that that -- our overall process in the industry, as we strive for excellence and we look at who's doing it best and then try to follow along, and INPO helps drive us there.

So I think we'll see, as take the best and keep refining this down to where we'll eventually be.

MEMBER RYAN: Practically speaking, does that mean these green boxes at the bottom get finer, more finely divided?

MR. HOUGHTON: Some people may have, and in fact, the original thought I had had N, a box with N in it, because different plants may have different

metrics or different things that they want to look at.

MEMBER RYAN: So that makes it tough?

MR. HOUGHTON: Well, I mean this is saying that --well, there's -- infinitely, we could take each person in the plant and take every activity they did every day, and I mean that's impossible, and then the other is just to use --.

MEMBER RYAN: So you end with bins. I understand all that. But I'm just trying to -- the plant to plant comparison is where I'm stuck. If everybody uses the same system, with kind of the same bins, it makes a lot of sense as a system evaluation. If everybody's got their own slant on the bins, you may have apples and oranges.

MR. HOUGHTON: Yes. But the bins, though, are the principles and attributes. So everybody has the same -- they're binning this raw data into the eight principles and the X number of attributes.

MEMBER RYAN: That's fine, but are they doing it under the same criteria, so that if you bin their data, you'll end up with the same distribution that they did?

MR. HOUGHTON: Well, that's an astute observation. It's the same one the NRC made at our public meeting in July, that looking at the four

pilots, we didn't all do it exactly the same, and maybe that that would be an improvement. I think we then got together and refined this process somewhat and talked about that.

I think going forward, that's certainly our desire, because we want to be able to compare station to station.

MEMBER RYAN: You either end up with a collective learning, where everybody is ultimately doing the same kind of binning with the same sort of results, or you'll end up with, you know, individual plant histories that are okay linearly for that plant, but are a little together to correlate.

MR. HOUGHTON: The game plan is to train the entire industry using the pilot plants, and to have recurring, recurring meetings for lessons learned.

MEMBER RYAN: Yes. So you're working towards that coherence goal?

MR. HOUGHTON: Yes.

MEMBER RYAN: All right.

CHAIRMAN BLEY: They started this -- I was started to say this morning, it seems --

(Laughter.)

CHAIRMAN BLEY: They're going slow, and I

hope we can hold to that a bit, because we've got to do some experimentation and working with it. You can't set it up initially. From the one thing you raised though, you might, if you're not getting things right or this thing's off a little bit, you might not be optimal in making things better.

But I can imagine that with all these people within the organization focusing on these issues and thinking about them, that you're not moving ahead.

MEMBER RYAN: Well, this inter-comparison step helps to overcome some of that if it's there too.

CHAIRMAN BLEY: If it's there.

MR. HOUGHTON: One of the comments that the site-based president at North Anna made was is that this provides -- this was the first opportunity he had had to sit down with his direct reports and talk about the culture of the station using data.

You know, he had lots of meetings to talk about root causes and lots of meetings to talk about trends and maintenance backlogs.

But this provided him a vehicle for setting aside a couple of hours a quarter to sit down and talk about what are the cultural implications of what we're doing, and that's one of the key benefits

we see from coming from this process.

MR. CHEOK: This Mike Cheok again. Just a quick comment.

CHAIRMAN BLEY: Yes.

MR. CHEOK: I think a lot of the comments that the committee's making now are very similar to the comments that the staff has made to NEI and the industry, and we would actually strongly encourage all the plants and all the CEOs to adopt this initiative, because we think it is an initiative that would lead to safer plant operations, and you know, like as you said also, that we need to go a little slower.

So what we're saying is, you know, we would like to retain some kind of agency oversight, some independent agency oversight on the process for the next X years, and in X years we'll see what we get, and then we will address the ROPS (ph) meeting.

MEMBER RYAN: So Michael, you get the same question in your head then. How is this going to be come more and more consistent and useable across the industry over time?

MR. CHEOK: Correct, and which is why I made the comment earlier that at this point, we have four pilot plans, and so we need to see more data.

CHAIRMAN BLEY: How closely has staff been

involved in following what's going on in the pilot plans?

MR. CHEOK: We have observed the activities in all four pilot plans.

MR. HOUGHTON: They've been at panel meetings, senior leadership team meetings, and They've been at the survey assessments that we've done at three of the plants. We're happy with the coverage.

CHAIRMAN BLEY: So you're really staying concurrent with every one of these major activities?

MR. CHEOK: Yes, we are.

CHAIRMAN BLEY: Yes, great.

MR. GAFFNEY: And they provide good feedback to us. I'd be remiss if I didn't talk to Mr. Ray's issue, which is our performance incentives for our employees are linked to the safety culture principles, and we have several links to them, not only with the standard industrial safety, but also with the development of people in the equipment reliability and the -- which is reflected in the principles, and of course in the human performance and collective radiation exposure, etcetera.

So I leave you with again, we look at much, a wide, diverse set of inputs, analyze, gives us a broad safety cultural aspect. I think we've learned

a lot from this process and we look forward to continuing. Thank you.

CHAIRMAN BLEY: Mike, I'm getting the strong impression you think this is really doable and useful?

MR. GAFFNEY: I'm very excited about it. I think, when I came into the industry, they embraced human performance, the anatomy of an event, which speaks to the bad, how to prevent bad outcomes. This really takes us to the next level. Rather than working an individual level, working at the cultural level to take actions early to keep everybody focused on the right behaviors.

CHAIRMAN BLEY: Thank you.

MR. HOUGHTON: Mr. Chairman, I had some more examples from the other pilots, but I don't think there's a need to plow through the additional data.

CHAIRMAN BLEY: I looked through them, and I noted that a lot of the things we've heard earlier are cropping up in those other examples. They aren't quite arranged exactly the same way, but they're very similar. So if that's okay with you, I think --

MR. HOUGHTON: So that's the end of our -- if there are any other questions, we'd be happy to answer them.

CHAIRMAN BLEY: Okay. I think we'll go around the table. But first, are there any comments from the public? Anybody out there need to say something?

MR. SOLORIO: Do we need to get them off of mute or whatever?

CHAIRMAN BLEY: Should we get Eric on? He was the only one I knew we had. Could we take the phone line off mute please?

MR. ZIMMERMAN: Eric is a future employee.

CHAIRMAN BLEY: I understand. He's, that's very admirable to come in early and listen in on this, and he'll be in this, in your group, right?

MR. ZIMMERMAN: Yes.

CHAIRMAN BLEY: Eric, can you hear us?

VOICE: Well, somebody's got to --

CHAIRMAN BLEY: Nobody's in the booth. Okay. We'll be there in a second.

(Off mic comments.)

VOICE: Try again.

CHAIRMAN BLEY: It's open.

VOICE: Yes.

CHAIRMAN BLEY: Eric are you still there? Anybody on the phone line?

VOICE: Maybe he just got tired.

CHAIRMAN BLEY: Or got tripped off.

MR. ZIMMERMAN: It would have been admirable if he was still there.

(Laughter.)

MR. ZIMMERMAN: He was certainly there in the beginning.

CHAIRMAN BLEY: All right. As we go to the members, I'm going to start with Mike, because you have some pressing things. Is there any comments you want to leave us with and leave me with and the staff?

MEMBER RYAN: Well, I think the implementation at the pilot studies has been really informative, Mike. I'm encouraged by the fact that it's working for you and it's getting better as you do more and more of it. So that's very positive.

I think the fundamentals and the studies that try and, that you implement, the culture and you know, what you presented earlier is very interesting, and you're clearly making a lot of progress.

I think it would be helpful to somehow translate the statistical analysis data that's familiar and loved by all statisticians, me included, it would be good to translate that for the every man or every person who is not going to understand, you know, covariants and variants analysis of variants

and, you know, all sorts of other statistical analysis, so they can really understand a very simple question: when are you confident and when are you not?

Because that's what they want to know. You've got all this stuff. When are you confident about it, and when are you not confident about it? How does your confidence vary over, you know, various aspects of the way data can change from one study to the next.

Not just for non-statisticians, but I think having a way to explain this complicated data to the public will be very helpful, because the plants ultimately are going to want to share this, I'm sure in their public information programs and how they measure their own success in this area of human performance, and helping develop tools that easily communicate the depth of the work that you've done, and then how that can be related in a clearer way would be very, very helpful. So thank you very much, Mr. Chairman.

CHAIRMAN BLEY: Okay. Mario?

MEMBER BONACA: Well, it's interesting. I mean I must say that, you know, what you have done has been elusive for the whole industry for a long time, and if it holds together, it would make one of our

commissioners very happy.

(Laughter.)

MEMBER BONACA: Commissioner Apostolakis, who has attempted to correlate the availability of components with safety culture, to no avail until now. So but it's a very interesting presentation and I intend to go back and look at what you showed us. Thank you.

CHAIRMAN BLEY: I think he ran out of money. Harold?

MEMBER RAY: Well, I believe this is good management practice. It's advancing the professionalism with which all of the enterprises affected will be managed, but especially nuclear plants, and I'm certainly glad to see that what I in my experience is a major disincentive for safety is recognized by everyone as being an important factor.

The thing that continues to concern me, I guess, and therefore I wouldn't in any way turn away from what's being done or not support it fully, what concerns me I've said already, and it was mentioned, a better metaphor perhaps, was the black swan phenomenon, and that is do we really achieve the most important data that we have this way, and is there any possibility that we contract from achieving it, which

is to avoid major catastrophic events, such as the Gulf coast event or many other events we can think of, including within the nuclear industry.

You can say while we -- I know the industry does say we're looking at precursors to those kind of events, and as long as we manage those effectively, we've done all we can to avoid them. Perhaps that's true. I'm not sure.

But in any event, for the time being, we'll have to assume it is, and the only thing I would do potentially any differently than what's being done, and I think Roy already said this would be done, is to apply it to real events, where you can identify the negatives that need to be -- the lessons learned, so to speak, that need to be drawn from those events, and make that information, build that in somehow to this program.

So that we're not just looking at improving the practice of management, but we're actually trying to avoid repeating mistakes of the past.

MR. ZIMMERMAN: We are intending on doing that. We'll be coordinated with the program offices to make that happen.

MEMBER RAY: Yeah. But you understand

why I say that. I mean you can get very wrapped up in just trying to be better and better managers all the time, comparing plants with each other, trying to learn from them and so on and so forth.

All of that's good. I don't want to denigrate it whatsoever. But at the end of the day, we need to avoid the big events.

MR. ZIMMERMAN: Right.

CHAIRMAN BLEY: Okay. Said?

MEMBER ABDEL-KHALIK: As I said early on, I'm sort of concerned about the completeness of the set of traits. I'm also concerned about the sort of bias in the study, where you start with the INPO principles of strong safety culture, with which most of the participants in the study are familiar, and the question is are you getting correct information, or are they just telling you what you want to hear?

MR. HOUGHTON: It is anonymous, sir.

MEMBER ABDEL-KHALIK: Pardon me?

MR. HOUGHTON: The surveys, of course, are anonymous.

DR. BARNES: Yes. One of the --

MEMBER ABDEL-KHALIK: Yes, and --

DR. BARNES: Oh, I'm sorry.

MEMBER ABDEL-KHALIK: If I may, the third

point is that the pilot study, the binning is based on the INPO principles and attributes, and in order for this to be correct, that small booklet has to be not only accurate but also complete. If it is not, if it's either inaccurate or incomplete, that binning may just lead you in the wrong direction. Those are my concerns.

MEMBER RAY: Is it possible to --. It might be.

(Simultaneous discussion.)

MEMBER ABDEL-KHALIK: Yes, a little. Overlap, overlap.

CHAIRMAN BLEY: I'd like to thank everyone who gave presentations and talked with us today. I think they were great presentations and very interesting interactions. I think you've made a lot of progress and I look forward to seeing the policy statement. I hope you could get it sooner rather than later, and really backing us up on that.

I just have the one concern I raised earlier. I don't know how important the validation study is to what the committee's going to decide. If we think it's important as we look harder and harder, then we really need some details we can dig into to understand it.

I'm still, I know when we got to the correlations at the end, the correlations are there. I also know if you do regression, you sometimes see good regressions and I need all the tests and then you look at them.

You say what's that funny point out at the end? Is that doing something? Then regression 30 years ago or more came up with Mallows' CP test, to find if there's a pivot point or some funny point that's really over-affecting the results.

There must be something like Mallows CP for factor analysis, to see if there are a few points that are dramatically affecting the results. I did a quick look and saw there are some papers out there on that. I don't know. But I'm suspicious of that from those results.

So we really just ought to see more detail on that, as soon as possible. If you've got reports, if you've got things you can feed us on it, that would be very helpful. It might turn out, you know, that isn't the key hinge for us.

But if it is, we don't have much time to d eal with that, and I wish we had had time to have another meeting. We could learn a lot from you. But I don't think there's a way to work that in. Overall,

it was very good, and we look forward to seeing you at the full committee.

I should say when you come to the full committee, to not present it the way you did today. I wouldn't start at the beginning and work all the way through. I would tell very briefly a bit of the history. I would emphasize the meetings you've had and the workshops, and then give us one time the preamble, the definitions and the traits. These are the ones that came out of that process.

Then something of justification of the traits, however you best do that. You may link that to parts of the validation study, you may link it to other things, and you might look at the questions that came out of last year's meeting, again from our people about the ways these could be grouped or compared to, and the comments you heard today, to make a real convincing case for those traits.

If you could work in, I know you haven't done the implementation phase, but at least the flavor of what it might look like and when it might begin to come to past, given that the policy statement comes out on time. So we'll probably get two hours, an hour and a half? We don't know. We don't know yet. We won't get a whole lot of time.

(Simultaneous discussion.)

CHAIRMAN BLEY: Well, I think an hour to an hour and a half probably. So it's gotta be compact and really tight. Thanks everyone for being here. Sorry to keep you so late, but we went over a bit. This meeting's adjourned.

(Whereupon, at 5:55 p.m., the meeting was adjourned.)

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Draft Safety Culture Policy Statement

Diane Sieracki

Sr. Safety Culture Program Manager

Office of Enforcement

ACRS Subcommittee on Reliability and PRA

November 3, 2010

Objectives

- Provide information on activities concerning the development of the safety culture policy statement (SCPS)
  - 2009 FRN & public comments
  - 2010 safety culture workshop
  - Outreach Activities
  - Public Meetings
  - 2010 FRN & public comments
  - Final SCPS and SECY

2009 Commission Direction

- Publish the draft policy statement in the *Federal Register* for comment
- Consider incorporating suppliers and vendors
- Continue to engage broad range of stakeholders
- Seek opportunities to comport terminology with existing standards and references

Draft SCPS November 2009 FRN

- Draft SCPS was published in the *Federal Register* in November, 2009
  - Definition based on the International Nuclear Safety Group's (INSAG), an advisor to the International Atomic Energy Agency (IAEA) definitions of safety culture
  - Eight characteristics based on the ROP, lessons learned, and benchmarking studies
  - 90 day public comment period

NRC Draft Safety Culture Definition November 2009 FRN

That assembly of characteristics, attitudes and behaviors in organizations and individuals, which establishes that as an overriding priority, nuclear safety and security issues receive the attention warranted by their significance.

NRC Draft Safety Culture Characteristics, November 2009 FRN

- Licensee Decision Making
- Accountability
- Work Planning and Control
- Continuous Learning Environment
- Problem Identification and Evaluation
- Safety Conscious Work Environment
- Work Practices
- Resources

Safety Culture Workshop
February 2010

- Workshop was composed of a panel of 16 stakeholders with various affiliations (e.g., reactors, medical facilities, fuel cycle and gauge manufactures, universities, Organization of Agreement States) who worked together, and in breakout sessions with other attendees
- Panelists reached alignment on a definition and 8 traits of a positive safety culture using common terminology

February 2010 Workshop
Safety Culture Definition

Nuclear Safety Culture is the core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment.

February 2010 Workshop
Safety Culture Traits with revisions by staff

- Leadership Safety Values and Actions
- Personal Accountability
- Work Processes
- Continuous Learning
- Problem Identification and Resolution
- Environment for Raising Concerns
- Effective Safety Communication
- Respectful Work Environment

NRC's Draft Safety Culture Policy Statement characteristics November 2009 FRN	February 2010 workshop safety culture traits
Licensee Decision Making The organization's decisions ensure that safety and security are maintained.	**Leadership Safety Values and Actions** Leaders demonstrate commitment to safety.
Accountability Roles, responsibilities, and authorities for safety and security are clearly defined and reinforced.	**Personal Accountability** Everyone is personally responsible for nuclear safety.
Work Planning and Control Process for planning and controlling work activities are implemented such that safety and security are maintained.	**Work Processes** Processes for planning and controlling work activities are implemented such that safety is maintained.
Continuous Learning Environment The organization maintains a continuous learning environment in which opportunities to improve safety and security are sought out and implemented.	**Continuous Learning** Organizational learning is embraced.
Problem Identification and Evaluation The organization ensures that issues potentially impacting safety or security are promptly identified, fully evaluated, and promptly addressed and corrected commensurate with their significance.	**Problem Identification and Resolution** The organization ensures that issues potentially impacting safety or security are promptly identified, fully evaluated, and promptly addressed and corrected commensurate with their significance.
Safety Conscious Work Environment The organization maintains a safety conscious work environment in which personnel feel free to raise safety and security concerns without fear of retaliation.	**Environment for Raising Concerns** The organization maintains a safety conscious work environment in which personnel feel free to raise concerns without fear of retaliation.
- discussed in Work Planning and Control characteristic	**Effective Safety Communication** Effective communication is essential to maintain focus on safety.
	Respectful Work Environment Trust and respect permeate the organization.
Work Practices Personnel demonstrate ownership for nuclear safety and security in their day-to-day activities.	*- incorporated into Work processes trait*
Resources The organization ensures that the personnel, equipment, tools, procedures, and other resources needed to ensure safety and security are available.	*- Incorporated into Leadership trait*

Tiers for Development and Implementation of the SCPS

Tier 1

Definition

Overarching definition that applies to all of the nuclear industry

- Easy to understand
- Timeless
- Inclusive

Tier 2

Description

Set of high level descriptions of what constitutes a strong safety culture

- Applies to everyone who engages in NRC licensed activities
- Speak to all levels of the organization

Current activities – definition and traits

Tier 3

Application

Illustrates how the high level descriptions are translated to lower level descriptions that are implemented in different environments

- Describes programs, processes, procedures, practices, behaviors, etc.
- Details may vary depending on licensee type and environment (potential for different sets)

Next step – implementation

“Leadership” Exercise
February 2010 Workshop
Example of Tier 3

- Management is in the field enforcing standards
- Commitment to maintaining equipment
- Resolves conflict
- Rewards safe behavior
- Rewards (incentives) and sanctions used to reinforce desired positive nuclear safety behaviors
- Respects differing opinions
- Actions match words
- Schedules are realistic and do not challenge safety standards

Evaluation of Public Comments on November 2009 FRN

- Comment period ended March, 2010
- Three main issues identified:
  - Implementation of policy statement needs clarification
  - Inclusion of “security” in definition and traits not recommended
  - Use of a policy statement which is not enforceable vs. a regulation

Public Meeting
July 15, 2010

- Conference call with February workshop panelists and members of the public
  - Reviewed results of public comments on the November 2009 FRN
  - Specifically addressed issue of security
  - Continued endorsement of the workshop definition and traits

Additional Outreach
May - August, 2010

- NRC staff attended or participated in industry forums
  - Health Physics Society; Fuel Cycle Information Exchange; Institute of Nuclear Materials Management; National Conference on Radiation Control; NRC workshop on Vendor Oversight, etc.

INPO Validation Study

- Study results presented to the:
  - NRC steering committee on September 2, 2010
  - workshop panelists during a public meeting/conference call on September 16, 2010
  - workshop panelists and members of the public during the Las Vegas public meeting on September 28, 2010
- Results demonstrated reasonable alignment between the traits identified in the study and those developed at the workshop
- Suggested adding “questioning attitude” as a ninth trait

NRC Revised Draft Safety Culture Policy Statement
September 2010 FRN

- Includes use of 2010 workshop definition and revised workshop traits
- The term “security” not included in revised definition or traits
- A preamble was added prior to the list of traits to address the significance of security

Preamble Added to the NRC Revised Safety Culture Traits

- Defines a trait as a pattern of thinking, feeling, and behaving that emphasizes safety
- Notes that although the term ”security” is not expressly included in the traits, as the primary pillars of the NRC’s regulatory mission, consideration of both safety and security issues, commensurate with their significance, is an underlying principle of the Statement of Policy

Preamble addressing security

Experience has shown that certain personal and organizational traits are present in a positive safety culture. A trait, in this case, is a pattern of thinking, feeling, and behaving that emphasizes safety, particularly in goal conflict situations, e.g., production vs. safety, schedule vs. safety, and cost of the effort vs. safety. It should be noted that although the term "security" is not expressly included in these traits, safety and security are the primary pillars of the NRC's regulatory mission. Consequently, consideration of both safety and security issues, commensurate with their significance, is an underlying principle of this Statement of Policy.

Additional Changes
Revised Draft Safety Culture Policy Statement
September 2010 FRN

- Traits are included in the Statement of Policy (rather than included in the Federal Register to support the Statement of Policy)
- Is applicable to vendors and suppliers of safety – related components
- Indicates Commission's expectations that the Agreement States and other organizations interested in the safe use of nuclear materials develop and maintain a positive safety culture
- Asked whether the INPO Validation Study results should be considered.

Public Meeting
September 28, 2010

- Two locations (Las Vegas as the focal point and Rockville as a second location) with attendance through webstreaming
- Presented the INPO Validation Study results
- Stakeholders representing different industries presented their views – 6 of the February workshop panelists presented.
- Expressed support for the definition and traits from the workshop
- Expressed concerns with implementation phase

Evaluation of Public Comments on September 2010 FRN

- Comment period ended October 18, 2010
- Two main issues identified:
  - Distinction should be made between different types of licensees in the SCPS, and credit given to those with existing safety culture practices
  - Stakeholders requested continued involvement, through workshops and other outreach methods, during the implementation phase of the policy statement.

Proposed Final Draft Safety Culture Policy Statement/SECY

- Definition and traits of a positive safety culture are in the Statement of Policy
- “Questioning Attitude” added as a ninth trait
- Complacency is mentioned in the description of “Questioning Attitude”
- Preamble to address security
- Implementation is not directly addressed
- Recognition of diversity of regulated entities
- Vendors and Suppliers are included

Proposed Final Draft Safety Culture Policy Statement/SECY

- Nuclear safety culture is the core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment

Proposed Final Draft Safety Culture Policy Statement/SECY

- Leadership Safety Values and Actions
- Personal Accountability
- Work Processes
- Continuous Learning
- Problem Identification and Resolution
- Environment for Raising Concerns
- Effective Safety Communication
- Respectful Work Environment
- Questioning Attitude

Next Steps

- Provide proposed Final Statement of Policy to the Commission
- Commission Direction
- Implementation Phase
  - Stakeholder involvement with program offices for “tier 3”
  - Office of Enforcement remain as the focal point for the coordination of activities in the implementation phase

Key Messages

- Two year effort with considerable outreach to stakeholders
- Definition and Traits have been almost unanimously approved by the various stakeholders
- Requesting a letter of recommendation from ACRS to the Commission

Organization of Agreement States

David Walter, Chair, Alabama
Cheryl Rogers, Chair-Elect, Wisconsin
Ann Troxler, Past-Chair, Louisiana
Mike Snee, Treasurer, Ohio
Pat Gardner, Secretary, New Jersey
Mike Welling, Director, Virginia
Lee Cox, Director, North Carolina

October 22, 2010

Diane J. Sieracki
Sr. Safety Culture Program Manager
Office of Enforcement
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852

RE: Organization of Agreement States (OAS) Talking Points on Safety Culture for the November 3, 2010 Advisory Committee on Reactor Safeguards Meeting of the Subcommittee on Reliability and PRA

Dear Ms. Sieracki,

I offer the following talking points for the above meeting on Safety Culture Policy:

1. Reasonable Assurance of Adequate Safety, Not Absolute Assurance of Perfect Safety

Imperative for success but does not guarantee it.
Safety Culture best described as always "a work in progress."
A priority of leadership in which performance is demonstrated by being prevalent throughout an organization.

2. Existing Agreement State Risk-Informed Safety Culture

Current pre-licensing visits, licensing, inspection, investigations, increased controls, regulations, licensee commitments, NMED, NSTS, SS&D evaluations are all part of the existing culture.
No need for a huge shift in the pendulum.
Safety goals and expectations differ within industries and types and quantities of material.
Differing expectations specified in sub-tier language of traits and characteristics of a clear and concise policy.

3. Policy Being the Appropriate Regulatory Vehicle

All AS support the development of the safety culture policy statement in lieu of a formal regulation.
Formal regulation would further strain suffering budgets.

4. Agreement States' Safety Culture Outreach Activities

35 states shared and continue to share information with their licensees about the policy.

5. No One Material or Use of Material to be the Preeminent Thought

Defining "Radiation Safety Culture."
States not having the luxury of nuclear only focus.

6. Agreement State Position on the Proposed Safety Culture Policy Statement

Strong foundation of all Agreement State programs.
"Nuclear Safety Culture" (although not necessarily by that name) the preeminent thought in development and implementation of the Agreement State programs and their regulated community.
Awaiting a final policy statement for consideration.

7. Implementation Phase

Continue to work with the Agreement States as co-regulators on clear policy guidance.
Integrated Materials Performance Evaluation Program (IMPEP) currently evaluates performance with regard to safety culture.
Collegial relationship should be path forward.

Thank you and I look forward to sharing the Agreement States' perspective with regard to the proposed Safety Culture Policy.

Sincerely,

W. Lee Cox, III

W. Lee Cox, III, OAS Director
NC Radiation Protection Section
3825 Barrett Drive
Raleigh, NC 27609
919-571-4141 ext. 201
lee.cox@ncdenr.gov

Institute of Nuclear Power Operations

Safety Culture Traits Validation Studies

ACRS Public Meeting

Washington DC

03 November 2010

G. Kenneth Koves, Ph.D.

Presentation Purpose

- Present research results of two studies
  - Safety culture survey administered across the power reactor industry
  - Slightly modified version of the safety culture survey administered within AREVA Fuels

Why Include these Studies in the Discussion?

- Most formulations of safety culture (IAEA, NRC, INPO) were created by a small group of experts
- This is an attempt to incorporate data from much larger groups into the discussion

Limitations of the First Study

- Only power reactors
- Correlational, not predictive

Questions of the Study

- How well do the factors from a safety culture survey align with the safety culture traits that were identified during the Feb 2010 workshop?
- Do the factors relate to other measures of safety performance?

Survey Development

- Started with the Utility Service Alliance survey based upon INPO's Principles for a Strong Nuclear Safety Culture (73 items)
- Edited and added questions to accommodate workshop Traits
- NRC reviewed and suggested edits and additional items based on Traits, IAEA, ROP, and literature
- Final version was 110 items (51% more items)
- 7-point scale (strongly disagree to strongly agree w/ Don't Know)

Example Items

- People are treated with dignity and respect by station leadership
- We have a strong quality assurance process and organization
- Our performance indicators help us to stay focused on the ‘right things’
- The procedures at this site are generally up-to-date and easy to use
- Staffing levels are adequate to meet work demands

Example Items

- At this station, people are routinely rewarded for identifying and reporting nuclear safety issues
- Dialogue and debate are encouraged when evaluating nuclear safety issues
- I would not hesitate to take a concern to our Employee Concerns Program
- Decision-making at this site reflects a conservative approach to nuclear safety
- Supervisors are responsive to employee questions

Survey Administration

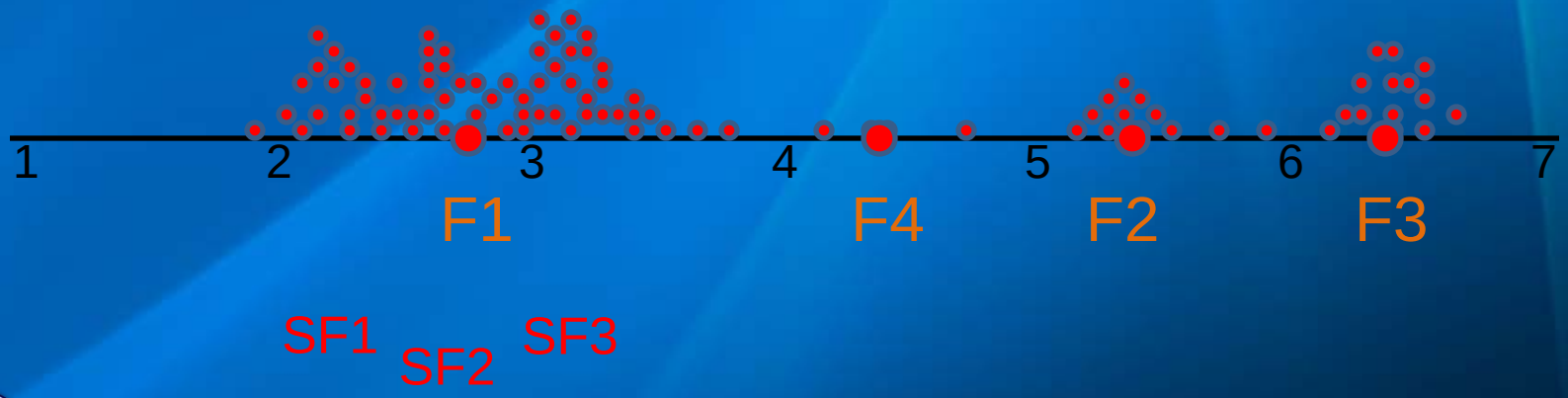
- Online survey
- Administered by a vendor
- Randomly selected sample of 100 personnel from each site
- 63 nuclear reactor sites participated (97%)
- An average of 46 individuals participated from each site
- 2,876 individuals provided valid responses to the majority of items

Survey Analysis

- Principal Components Analysis performed to identify the “factors” within the data

PCA / Factor Analysis

- Need: to reduce the set of variables (items) in a dataset
  - Intuitive factor analysis
  - PCA/Factor analysis



Reactor Factor Results

1. Management Responsibility
   - Respectful Work Environment
   - Continuous Improvement
   - Performance Indicators
   - Resources
   - Rewards
2. Willingness to Raise Concerns
   - Informally
   - Formally

Reactor Factor Results

3. Decision Making
   - Decisions are conservative, timely, safety-focused, and engender confidence
4. Supervisor Responsibility
   - Communication
   - Presence/Availability
   - Coaching
   - Management Alignment

Reactor Factor Results

5. Questioning Attitude
   - Situation/Problem Awareness
   - Process Use
   - Plant Knowledge
6. Safety Communication
   - Safety communication is broad and includes plant-level communication, job-related communication, worker-level communication, equipment labeling, operating experience, and documentation

Reactor Factor Results

7. Personal Responsibility
   - It is my responsibility to report concerns and practice nuclear safety
8. Prioritizing Safety
   - Nuclear safety is a priority that is seen in meetings, expectations, coaching, and decisions
9. Training Quality
   - Training is high quality, supported by management and encourages nuclear safety

Reactor Factors vs. Traits

- Management Responsibility for Safety
  - Respectful work environment
  - Continuous improvement
  - Performance Indicators
- Willingness to Raise Concerns
- Supervisor Responsibility for Safety
- Questioning Attitude
  - Procedure Use
- Communication
- Personal Responsibility for Safety
- Decision Making
- Prioritizing Safety
- Training Quality

- Leadership Safety Behaviors
- Respectful Work Environment
- Problem Resolution and Metrics, Continuous Learning
- Encouraging Report of Problems
- Processes and Procedures
- Effective Safety Communication
- Personal Responsibility and Attitudes

Reactor Factors, Traits, Principles, & ROP

Survey Factors	Workshop Traits	INPO Principles	ROP Components *
Management Responsibility	Leader Safety Respect Work Environment Problem Res & Metrics Continuous Learning	2. Leader Demonstrates 3. Trust Permeates 7. Org Learning 8. Nuc Under Cons Exam	2. Resources 5. CAP 6. OE 7. Self & Ind Assessment 8. Environ Raise Concerns 10. Accountability 11. Cont Learn Environ 12. Org Change Mgt
Supervisor Responsibility			
Personal Responsibility	Personal Accountability	1. Everyone Personally Responsible	
Decision Making		4. Decision Making Reflects Safety First	1. Decision Making
Communication	Effective Safety Comm		3. Work Control
Training Quality			
Questioning Attitude	Work Processes	6. Ques Att is Cultivated 5. Nuclear Tech is Unique	
Willingness to Raise Concerns	Environment for Raising Concerns		9. Preventing Retaliation
Prioritizing Safety			13. Safety Policies

* 4. Work Practices too broad to categorize

AREVA Fuels Survey Administration

- Slightly modified power reactors survey
  - Deleted 1
  - Slightly modified 39 (e.g. deleted ‘at this station’)
- Online survey
- Administered by AREVA corporate
- Invited all employees in the function (~993)
- 813 responded (82%)
- 673 individuals provided valid responses to 99% of items (68%)

AREVA Fuels Factors vs. Traits

- Management Responsibility for Safety
  - Addressing Concerns
  - Process/Proc Use and Quality
  - Continuous improvement
  - Questioning Attitude
  - Decision-making and Communication
  - Training
- Positive Work Environment
  - Respectful Work Environment
  - Clear Focus/Performance indicators
  - Information Sharing
  - Employee Input
  - Staffing Levels
- Personal Responsibility for Safety
  - Reporting Issues
  - Plant Knowledge
  - Security
- Supervisor Responsibility for Safety
  - Responsiveness
  - Presence
- Prioritizing Safety
- Raising Concerns
- Co-worker Procedure Use

- Leadership Safety Behaviors
- Problem Resolution and Metrics, Continuous Learning
- Effective Safety Communication
- Respectful Work Environment
- Personal Responsibility and Attitudes
- Encouraging Report of Problems
- Processes and Procedures

Do the reactor factors relate to other safety measures?

- Calculated correlations of the factor (and subfactor) for each site with INPO and NRC measures related to safety culture/organizational effectiveness and equipment performance
- Average correlations in previous meta-analyses were .22 and .31 (Clarke, 2006; Christian, et al, 2009)

Factor-Specific Validities *

Factor	ROP	Unpln Critical Scram	Unpln Auto Scram	Heat Remo Avail	Emer Power Avail	Per Safe Idx	CY Idx	HU Err Rate
Mgt Responsibility	.30	.29	.34	.18	.26 (.31)	.23 (.31)	.27 (.39)	.38
Raising Concerns	.25	.17	.24	.19	.27	.22	.22	.37
Decision Making	.32	.28	.38	.22	.24	.25	.28	.36
Sup Responsibility	.28 (.35)	.15	.22 (.40)	.35	.30	.19	.14 (.32)	.40
Quest Attitude	.18	.27	.26 (.44)	.16	.37	.32	.26 (.32)	.28
Safety Comm	.20	.32	.34	.16	.27	.27	.28	.39
Per Responsibility	.05	.16	.21	.20	.14	.25	.27	.21
Prioritizing Safety	.21	.24	.30	.23	.17	.22	.21	.25
Training	.12	.33	.40	.14	.15	.13	.30	.19

(Subfactor scores in parentheses)

* Correlations absolute values

General Conclusions

- Results support the existence of the workshop traits, however in a slightly different configuration
- Factors are consistent with research in other domains
- Survey factors are related to other measures of organizational effectiveness and equipment performance in nuclear power plants

Q&A

- Questions
- Plus/Delta
- koveskg@inpo.org

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NRC Independent Evaluation of INPO's Safety Culture Traits Validation Study

Valerie Barnes, PhD
Office of Nuclear Regulatory Research

ACRS Subcommittee on Reliability and PRA

November 3, 2010

Purposes of the Study

- Independently evaluate INPO's approach and data analysis decisions
- Assess whether the factors from INPO's safety culture (SC) survey correlate with other measures of SC and equipment performance the NRC has available

INPO/NEI/NRC Roles

- Nuclear Energy Institute funded the data collection
- INPO developed the survey, oversaw administration, performed majority of the analyses
- NRC reviewed/commented on survey items and study design
- Idaho National Lab, under contract to NRC, independently verified INPO's analyses, conducted additional analyses

Examples of NRC Measures

- Number, source and type of allegations
- Performance indicators maintained under the Reactor Oversight Process (ROP)
- Inspectors' assignment of SC aspects to inspection findings
- Location and movement in the ROP Action Matrix
- Cross-cutting and substantive cross-cutting issues identified during mid-year and year-end performance assessments

Overview of Criterion Validity Results

- Correlations between the factors/subfactors and NRC 2009 measures were satisfactory and in the expected direction
- Correlations between factors/subfactors and NRC 2008 measures weaker but also in expected direction

Example SC Correlations*

Factor	Variable	Correlation
Mgt Responsibility	HP Aspects	.31
Raising Concerns	Substantiated Allegations	.40
Decision Making	PI&R Aspects	.38
Supv Responsibility	Total Aspects	.30
Questioning Attitude	HP Cross-cutting Issues	.35
Safety Communication	Total Aspects	.30
Personal Responsibility	HFIS Communication Issues	.26
Prioritizing Safety	HFIS Work Practices/Procedures	.27
Training Quality	Total Aspects	.29

* Correlations are absolute values

Example Correlations w/ Equipment Performance*

Factor	Variable	Correlation
Mgt Responsibility	Power Changes/7000 hrs	.38
Raising Concerns	Power Changes/7000 hrs	.27
Decision Making	EDG Actuations	.38
Supv Responsibility	Findings related to Initiating Events	.39
Questioning Attitude	Forced Outage Rate	.43
Safety Communication	Forced Outage Rate	.34
Personal Responsibility	Unplanned auto scrams	.30
Prioritizing Safety	Forced Outage Rate	.32
Training Quality	EDG Actuations	.43

* Correlations are absolute values

Consistency with Research from Other Domains

Workshop Traits	PCA Results from Non-nuclear Domains
Leadership Values/Actions	Hospitals, construction, manufacturing, small business
Personal Accountability	Construction, manufacturing, small business
Work Processes	Hospitals, small business
Continuous Learning	Hospitals, small business
PI&R	Part of Continuous Learning in hospitals, small business
Envi for Raising Concerns	Hospitals, construction, manufacturing, small business
Safety Communication	Hospitals, small business
Respectful Environment	Hospitals, construction, manufacturing, small business
Questioning Attitude	Hospitals, construction, small business

NRC Conclusions

- INPO methods, data analyses and interpretations appropriate
- Workshop traits supported by either a factor or subfactor from INPO survey
- Stronger correlations of Questioning Attitude with SC and equipment performance measures support its inclusion as a trait
- Similar traits identified in non-reactor settings

Fostering a Strong Nuclear Safety Culture

NUCLEAR ENERGY INSTITUTE

Challenges with the Existing Situation

- Industry is responsible and needs to take the lead
- Inspection findings, with cross-cutting aspects, are a very limited set of data
  - Value of Substantive Cross Cutting Issues is unsubstantiated
- Industry has not taken full advantage of all the possible indications of safety culture weakness
- There is no industry-wide guidance for conducting safety culture assessments
- Different NRC/INPO terminology creates confusion

Industry Objective: Achieve A Strong Nuclear Safety Culture

- Establish a repeatable, holistic approach (NEI 09-07) for sites to use in assessing safety culture on a continuing basis
  - Integrate all data available
  - NRC provide appropriate and transparent oversight
- Establish a common methodology for conducting surveys and snapshot assessments (NSCA)
- Work with NRC and other stakeholders to develop a common language of nuclear safety culture

PSEG Hope Creek Pilot Results

STP Results

- **Improvement Opportunity identified against Principle 3, *Trust Permeates the Organization.***
  - **Personnel in some organizations lacked confidence that some concerns would be fully addressed by their supervisors.**
  - **This issue did not deter individuals from expressing nuclear safety concerns in each organization.**
  - **Actions were put in place to improve supervisory behaviors that build trust.**
  - **This issue had the potential to impact the safety culture if not addressed at a low threshold.**

STP Results

- Communicate more clearly to station personnel the relationship between the STP Incentive Compensation Plan and nuclear safety
- Improve manager and supervisor visibility in the field
- Improve strategic benchmarking
- Resolve relationship issues between organizations that are hindering station performance

Braidwood SLT Semi-Annual Review

- Identified safety culture improvement opportunities
  - Principle 3 – Organizational Trust
    - Long-term issues not being resolved
    - Communication challenges
  - Principle 5 – Nuclear is Recognized as Special
    - Cross-functional human performance issues
  - Principle 7 – Organizational Learning
    - Investigation and issue resolution weaknesses

Braidwood Results

- Monitoring Panel identified safety culture weaknesses in specific departments and with specific site issues
- Monitoring Panel binning and focus areas were consistent with independent NSCA observations
- SLT review challenged sites actions / progress related to resolving NSCA negative observations
- SLT review identified Improvement Opportunity in Principle 7 – Organizational Learning
  - Consistent with Oversight / Offsite Review Board feedback of recent decline in CAP performance
- NSCA and SLT review noted effective site action and improvements in decision making – consistent with recent NRC feedback related to existing SCCI

North Anna Results

- **Provided Training, and other actions to address issues identified in panel and SLT meetings**
  - **Results tracked by CAP**
  - **Davis-Besse and Strategic and Action Planning leadership training**
  - **Managing Risk and Proceeding in the Face of Uncertainty leadership training**
  - **QVV (Question, Validate, Verify) leadership training**
  - **Change Management (Who, What, When) leadership training**
  - **Importance of adhering to nuclear standards and personal accountability leadership training**
  - **Collective significance review of items binned under INPO principle #7, (Organizational Learning is Embraced)**
  - **Passive Design Features training for the entire staff**

Conclusion

- The NEI 09-07 process:
  - Provides a method to identify nuclear safety culture issues and take action
  - Provides a forum for perception issues (i.e., faint signals) to be addressed
  - Is transparent
  - Is well-defined and repeatable
  - Promotes management accountability for nuclear safety culture

Hope Creek Generating Station, PSEG Nuclear LLC

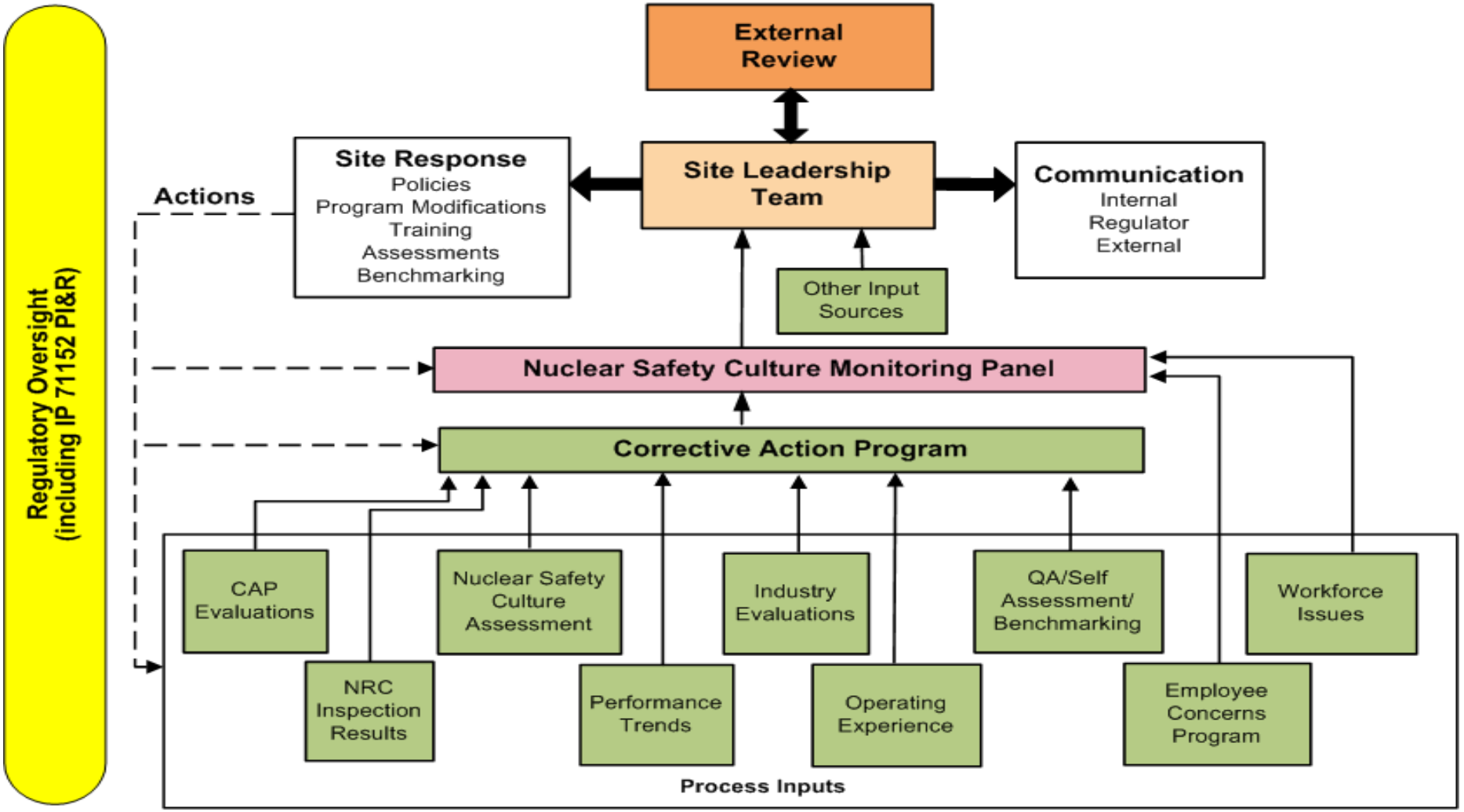
Mike Gaffney,
Regulatory Assurance Manager and Safety Culture Project Lead

November 3, 2010

PSEG Nuclear LLC

Hope Creek Safety Culture Pilot Project

Site Nuclear Safety Culture Process



Hope Creek Safety Culture Pilot Project

Pilot Implementation

- Developed a procedure
- Compiled a cross-functional Nuclear Safety Culture Monitoring Panel (NSCMP) Team
- Trained NSCMP and Senior Leadership Team (SLT)
- Identified severity levels for the process inputs
  - Precursor
  - Near Miss
  - Event
  - Strength
- Established metrics and thresholds to evaluate results
- Held quarterly NSCMP and SLT team meetings
  - NRC observed the meetings
  - NSRB reviewed the results
- Incorporated lessons learned

Hope Creek Safety Culture Pilot Project

Perspective after four quarters of review process:

- Process provides a different view of familiar plant issues that generates healthy discussions, reflection and comparison to SLT's perspective
- Offsite Review Committee engaged in reviewing process and provides valuable perspective
- Process classifies low level issues and allows early, proactive action

Conclusions

- Large number of diverse plant inputs analyzed provide a broad view of safety culture
- The SLT perception of plant issues were validated through cultural data analysis and discussions with Nuclear Safety Culture Monitoring Panel
- Process allows early identification of cultural issues