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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)

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RADIATION PROTECTION AND NUCLEAR MATERIALS

SUBCOMMITTEE

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MONDAY

JUNE 20, 2011

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 1:00 p.m., Michael T. Ryan, Chairman, presiding.

SUBCOMMITTEE MEMBERS PRESENT:

MICHAEL RYAN, Chairman

SAID ABDEL-KHALIK

DENNIS C. BLEY

CONSULTANTS TO THE SUBCOMMITTEE PRESENT:

JOHN FLACK

NRC STAFF PRESENT:

DEREK WIDMAYER, Designated Federal Official
MARGIE KOTZALAS
DOUG COLLINS
DENNIS DAMON
JONATHAN DeJESUS
JAY HENSON
MARISSA BAILEY

T-A-B-L-E O-F C-O-N-T-E-N-T-S

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

12:59 p.m.

CHAIRMAN RYAN: It being the appointed hour, the meeting will now come to order.

This is a meeting of the Advisory Committee on Reactor Safeguards Subcommittee on Radiation Protection and Nuclear Materials.

I'm Michael Ryan, Chairman of the Subcommittee. ACRS members in attendance include Said Abdel-Khalik and Dennis Bley. ACRS Consultant John Flack is also in attendance.

The purpose of this meeting is to hold discussions with NRC on proposed enhancements to NRC's fuel cycle oversight process, FCOP. In a letter to the NRC staff dated April 19, 2011, the ACRS indicated they would like an opportunity to review the staff's findings, conclusions and recommendations prior to NRC staff response to the Commission on proposed enhancements to the fuel cycle oversight process. This meeting is in response to the Committee's request. So, thank you very much for it.

The Subcommittee will gather information, analyze relevant issues and facts and formulate proposed positions and actions as appropriate.

Derek Widmayer is the designated federal official for this meeting.

A transcript of the meeting is being kept and will be made available on the Web.

It is requested that speakers first identify themselves and speak with sufficient clarity and volume so that they can be readily heard.

We have not received any requests from members of the public to provide comments. The phone line is not open at this time for that reason.

We will proceed with the meeting and call up Margie Kotzalas, Acting Branch Chief, Technical Support Branch, Special Projects and Technical Support Division of Fuel Cycle Safety and Safeguards, NMSS, to open the presentations.

That's a lot of hats there, Margie. Must be very busy.

MS. KOTZALAS: Thank you, Dr. Ryan.

CHAIRMAN RYAN: Thank you.

MS. KOTZALAS: As Dr. Ryan stated, my name is Margie Kotzalas, and this afternoon we are going to be presenting the work that we are doing to enhance the fuel cycle oversight process, or FCOP.

While the existing process is effective and provides reasonable assurance of safety and security of fuel cycle facilities, we are undertaking enhancement to improve the process to make it more risk-informed, performance-based, predictable and transparent.

We are currently focusing our efforts on two enhancements: We're developing cornerstones which will help us focus our inspections on the items most important to safety and we are developing a process to give licensees incentive for maintaining effective corrective action programs because we know that when licensees identify and correct their problems, it benefits them, us and the public.

The work that we're presenting to you this afternoon is work in progress. We're continuing to work on the elements of an enhanced FCOP as we respond to the Commission's SRMs and prepare a SECY paper. Our SECY paper, as I stated earlier, is now due to the EDO on September the 30th and we look forward to hearing your feedback and the feedback of the full Committee as we work through our process.

Now, to refresh your memory, I'll

provide a summary of the Commission direction we received on the FCOP.

Next slide. Okay. We have received at least two SRMs. The first SRM was in response to the ACRS Commission briefing on April the 29th of 2010. That SRM directed us to prepare a paper comparing the Integrated Safety Analysis for fuel cycle facilities and the Probabilistic Risk Assessment for reactors and submit it for your review. We submitted our ISA-PRA paper on December the 15th and we met with you on January the 11th and the full Committee on February the 10th. You had issued your letter report on February the 17th and in this report you recommended that we continue to develop and test the use of focused PRA-like analyses to help assess the risk significance of inspection findings for fuel cycle facilities.

Next slide. In the second SRM the Commission disapproved our plan for enhancing the FCOP as we described in SECY-10-0031. Instead, the Commission directed us to make modest adjustments to the existing oversight process to enhance the effectiveness and efficiency, including providing incentives for licensees to maintain strong corrective action programs, asked us to develop a set of cornerstones, and to provide an assessment of the work we've accomplished and recommendations for next steps.

Now, I would like to turn over the presentation to my team mates who will go over the elements of the enhanced FCOP.

Doug Collins, who's sitting next to me, will present our approach for developing a set of cornerstones.

Jay Henson will present our initiative to provide licensees incentive to maintain strong corrective action programs.

Dennis Damon will present the staff's proposal to develop and test a fuel cycle significance-determination process for assessing the significance of inspection findings.

And finally, Jonathan DeJesus to my left will conclude the presentation by summarizing the staff's work and describing the next steps.

So with that, I would like to turn it over to Doug.

MR. COLLINS: Good afternoon. I'm Doug Collins. I'm a rehired annuitant working for NMSS and I'm the former director of the Division of Fuel Facility Inspection in Region II.

I'll discuss what we've done thus far in response to the Commission's direction to develop a set of cornerstones that would be useful in fuel cycle oversight.

Today I'll discuss how we used the strategic plan elements, our bible here, to develop the cornerstones, I'll outline the proposed cornerstones and their elements, and use the criticality safety systems draft cornerstone as an example to show how the NRC staff can determine if a licensee is meeting a cornerstone objective.

Next slide, please. We used the strategic plan in a top-down approach to selecting the cornerstones. We started with the mission and strategic goals to ensure adequate protection of public health and safety and the environment, and the secure use and management of radioactive materials. To meet these goals, the strategic plan then gives the safety strategic outcomes of preventing inadvertent criticalities, preventing acute radiation exposures resulting in fatalities, preventing releases of radioactive materials that result in significant radiation exposures or significant environmental impacts.

Note that today we're discussing safety

cornerstones. We're considering delaying the development of security cornerstones because of ongoing rulemaking in the security and material control and accounting areas.

In addition to these radiation-related strategic outcomes, we also included as an outcome preventing certain chemical releases that could lead to significant chemical exposures. We did this because NRC regulations require licensees to control potential impacts on workers and the public from certain hazardous chemicals used at their facilities. These chemicals would be those that are associated with processes involving radioactive materials. These requirements stem from a Memorandum of Understanding with the Occupational Safety and Health Administration, or OSHA, and so we're implementing an outcome based on that.

In developing the fuel cycle cornerstones, we also reviewed how the reactor oversight process cornerstones had been developed by reviewing the Commission papers associated with that development and by reviewing the basis documents for that program in the Inspection Manual chapters.

We started with a concept that the cornerstone would be the fundamental building block for the regulatory oversight process. Acceptable license performance in each cornerstone would provide reasonable assurance that the NRC's overall mission would be met.

Next slide. In developing each safety cornerstone the staff identified the objective, the desired results, the key attributes of licensee performance necessary to achieve the results, the scope of what the NRC needs to inspect to ensure the objectives are met and the metrics used to evaluate performance in the cornerstone.

The objective of each cornerstone was derived from one or more of the strategic outcomes or the chemical exposure outcome. For example, the objective of the criticality safety systems cornerstone was derived from the strategic outcomes noted above in preventing criticalities, acute radiation exposures that could lead to fatalities, or releases of radioactive materials that could result in significant exposures or significant environmental impacts.

The desired results, the next item on the slide, were related to the determining that there is reasonable assurance that the cornerstone objectives could be met. A key attribute is a characteristic of a cornerstone that needs to be achieved or maintained to meet the objective. The scope of inspection activities is what the NRC would inspect to determine whether a key attribute is being implemented effectively. Metrics, as used here, are the acceptance criteria for the inspection findings.

Next slide, please. We considered several different sets of cornerstones, some of which had been proposed in earlier efforts to improve the fuel cycle oversight. These considerations led us to this set of cornerstones because they were considered the most important elements in meeting the strategic outcomes, acceptable performance in each of these cornerstones provides reasonable assurance that the NRC's overall mission is met, the proposed cornerstones are consistent with how licensees developed and implement their integrated safety analyses, or ISAs, and they would result in effective communication with stakeholders because they used terms commonly used when discussing fuel cycle facilities.

CHAIRMAN RYAN: Doug, one thing that would be helpful I think that may be explained; and if this isn't the right fine, that's fine, but we've kind of in a way, at least on the slides, compartmentalized radiological and chemical.

MR. COLLINS: Yes, sir.

CHAIRMAN RYAN: And they're not always so in the plant. So, are you going to talk a little bit about how you deal with when they show up in the same piping system and may have combined risk that could be greater than the sum of the two, or --

MR. COLLINS: Well, the way that's handled is that when licensees did their ISAs their analyses would have considered the total impact; chemical, radiological, or both. And we anticipate that the oversight for ISA-related cornerstones will be based on the ISA results. So, the ISA would have established a set of controls or items relied on for safety depending upon the risk in any particular accident sequence that was analyzed.

CHAIRMAN RYAN: So, the licensees really would be the ones that would have to convince you that they either put it all together, that the things that are mixed correctly, or you'll have that opportunity to challenge whether or not they've addressed, you know, where materials are commingled in the review process. Is that right?

MR. COLLINS: Yes. And the summaries of

those ISAs have been sent to us and we've reviewed them, and we've actually gone out and done some vertical slices at the sites before we agreed that the ISAs were appropriate.

CHAIRMAN RYAN: Right. Any specifics that you can maybe share with us to talk us through that would be helpful. Maybe not at this meeting, but maybe later.

MR. COLLINS: Yes, and I have to think. You know, generally if you have a criticality, that will potentially in certain facilities result in chemical releases. But again, the controls have to be in place so that the consequences are mitigated under and --

CHAIRMAN RYAN: Right. You know, another one that comes to mind that's a little simpler than a criticality perhaps is a fire that involves both radioactive material and solvents. You know, where does that end up? How is that mitigated? That's one where you clearly have both interacting in the same time so --

MR. COLLINS: Yes. Okay. We'll take that.

CHAIRMAN RYAN: Okay.

MS. KOTZALAS: We'll take that. We'll

take that.

CHAIRMAN RYAN: Just as a general question, I think it would help certainly the Subcommittee, and perhaps the full Committee, to get your insights and appreciate for where you're dealing with that combination of the radiological and the chemical risk to understand how you've dealt with the range that it possibly can be.

MR. COLLINS: All right. And as I say, that originally -- I think we'll have to look at some ISAs and maybe get you some examples --

CHAIRMAN RYAN: That's fine.

MR. COLLINS: -- of where that -- but you're right. Solvents and, you know, UF6 would be areas that would --

CHAIRMAN RYAN: Yes.

MR. COLLINS: -- potentially have both of those.

MEMBER ABDEL-KHALIK: You indicated earlier that you will address security issues later on.

MR. COLLINS: Yes, sir. We believe we will. We haven't made a final decision on that, but we're considering delaying the development of the details of those cornerstones until after the rulemakings are over.

MEMBER ABDEL-KHALIK: But wouldn't it be appropriate to at least include it on the list of cornerstones and indicate that you'll address this later

MR. COLLINS: Yes. And in fact, right now what we've presented to members of the public when we talked about security cornerstones were two cornerstones: One that's security, which would be physical protection and information security, and then material control and accounting. Now, that may change. Those two cornerstones may change as we further develop things, but --

MEMBER ABDEL-KHALIK: Yes, but, you know, by not including it at all, I think that conveys the wrong message.

MR. COLLINS: Okay.

MEMBER ABDEL-KHALIK: And now, if I look at this list of cornerstones, if you were to include security, and I compare those against the cornerstones in the reactor oversight process, the only difference then becomes the first two.

MR. COLLINS: The first two are different than the first three in the reactor oversight process.

MEMBER ABDEL-KHALIK: Well, correct. In the reactor there is a third one that relates to initiating events. Here you're focusing on systems. I mean, it may be a good idea to try to mirror or have a symmetry with the reactor oversight process. And rather than just focusing on the systems, it may be also appropriate to look at the initiating events that would cause concern that one would have to keep track of.

MR. COLLINS: Well, when we talk about systems, we do it in a broad sense. When you look at, for example; and we'll get to it in a minute, the criticality safety cornerstones, we include design, we include procedures, we include staff performance, we include corrective action programs. So, when we say systems, we mean it in the broad sense, not just hardware systems.

MEMBER ABDEL-KHALIK: Right, but not initiating events.

MR. COLLINS: Well, and let me back up and talk about how we got to here, rather than replicating the power reactor cornerstones.

We considered that process; initiating events, mitigating systems, barrier integrity --

MEMBER ABDEL-KHALIK: Right.

MR. COLLINS: -- and on. And in fact, we proposed that in an earlier effort to improve fuel cycle oversight.

And let me back up and talk a little bit about how an ISA looks at those kinds of things, those three boxes.

First of all, ISAs don't use those terms. And ISA may look for process upsets. At one of those facilities, as I'm sure you know, there are a large number of processes and people have to develop a large number of sequence of events that could lead to accidents. So, some licensees might talk about process upsets and which might be akin to initiating events. Their ISAs will talk about items relied on for safety, which in a sense could be mitigating systems, but they also could be systems or elements or controls that minimize the likelihood of an initiating event. They kind of mix the two. And when an ISA uses the term "barrier," they are more talking about a kind of generic control rather than the three fission product barriers in the ROP. And so, it would be a control or an IROFS that they might be talking about. So, there is some symmetry, but the paradigms are different.

But initially, several years ago when we

-- as I say, doing this at an earlier time, we proposed something like that and we got considerable feedback from our stakeholders, strong feedback that we ought not try to force-fit the power reactor cornerstones on their processes, that there's another way to look at the way they control safety; and it's the way that's in the ISA. And they suggested that we use the terminology in the ISA rather than just using the cornerstones from power reactors. And given that we believe that we can get to the goals of cornerstones and their objectives by using terminology that's familiar to those in the fuel cycle oversight and fuel cycle business; both stakeholders, members of the public, NRC staff. We right now have chosen these cornerstones.

Did I answer your question?

MEMBER ABDEL-KHALIK: I understand where you're coming from, but I still -- I mean, at this very, very high level I just don't see the danger of symmetry.

MR. COLLINS: And I wouldn't say there's a danger. What I'm saying is since we can meet the objectives and use the language that's in place, we've thus far decided to use these cornerstones.

Now, if you look at the level below the

cornerstones; and we'll get there in a minute, for key attributes there -- I mean, safety is safety and the key attributes of assuring a mitigating system operates, those key attributes are quite similar at the next level down to the key attributes you might find at a power reactor. Now, they're talking about different things. They're talking about items relied on for safety rather than, you know, safety-related equipment and so forth, but again --

DR. DAMON: Okay. Do you mind if I make a comment.

MEMBER ABDEL-KHALIK: Yes. Yes, please.

DR. DAMON: Because I thought about this. There are some systems in the fuel cycle facilities that kind of analogous to reactors in the sense that they've got a process and they'll talk about a process upset as an initiating event and then there will be some kind of hardware or software to protect against whatever the upset is.

But like in the field that I used to be in, criticality safety, they don't make that distinction. Usually, where they share critically safety is there are controlling parameters in the system, like say mass and moderation. So, if you got like a low enriched facility, you've got to have both critical mass and it has to be moderated to go critical. And they don't draw the distinction as to whether an upset in moderation or an upset in mass are the initiating event.

Now, they could make that distinction by saying, okay, whatever one happens first is the initiating event. But they don't designate one as being a process upset and the other one as the control, you know? So, they don't identify it as initiating.

And so, if you did it the way I suggest; which is the one that happens first is the initiating event, then there'd only be one cornerstone, that everything that happened would be an initiating event unless you actually had a criticality. And so, the whole paradigm that's used in the reactors thing would collapse down to initiating events, because they don't have barriers. They don't have shielding or containment usually around these things. So, the whole paradigm for reactors just collapses down to one thing, initiating events. And so, it's not very useful.

MEMBER ABDEL-KHALIK: I don't agree with that, but continue.

MEMBER BLEY: Let's see what comes and

then we'll talk about it. But before you leave this one though --

MR. COLLINS: Yes, sir?

MEMBER BLEY: -- one little piece of it worries me.

MR. COLLINS: Yes.

MEMBER BLEY: We have the last two which deal with people and protecting people.

MR. COLLINS: Yes.

MEMBER BLEY: We have the second one that sounds like it's protecting the system rather than the people. I wonder why there isn't a parallel between the worker and public chemical safety.

MR. COLLINS: Well, we have integrated into the chemical process safety systems those elements in the ISA that protect people. But the chemical process safety systems are there to make high-consequence events under Part 70 highly unlikely, and those are events that could have significant chemical impact on a worker or a member of the public. So, workers and members of the public are integrated with the chemical process safety systems.

And the same for an intermediate

consequence event, which is a lower consequence event from a chemical point of view. And again, workers and members of the public, that has to be -- controls or IROFS have to be put in place so that an intermediate consequence event is unlikely. So, high-consequence --

MEMBER BLEY: I'm just curious why they're different. So, why not have radiation process safety in parallel with chemical process safety? Historical reasons?

MR. COLLINS: You could, but --

MEMBER BLEY: It just seems odd that there's no parallel there, but let's go ahead and hear the rest of what --

MR. COLLINS: Again, we looked to the objectives, you know, what do we want from these cornerstones. Public radiation safety or public safety is the terminology used in the ROP. And again, we looked at those when we started, so --

MEMBER BLEY: Well, let's come back to this one at the end and see --

MEMBER ABDEL-KHALIK: I guess my concern --

MEMBER BLEY: -- how comfortable we are.

MEMBER ABDEL-KHALIK: -- really the same

as yours, Dennis. I look for this same level of abstraction in these cornerstones, and yet I don't see that. It's sort of and mix and match between things where you say public chemical safety and worker chemical safety are integrated within the first two. And why is that? Why not approach this with the same level of abstraction in each one of the cornerstones?

MR. COLLINS: Well, to start to answer that question radiation safety is integrated into criticality safety systems, because again items relied on for safety that come from criticality safety systems are there to prevent public and worker exposures in the event of a criticality.

Now, we've had suggested cornerstones. For example, someone suggested why don't we have a public chemical safety and a worker chemical safety cornerstone. And in a sense right now our regulations only require limits for chemical exposure under the accident conditions as defined in an ISA. We don't have chemical limits for routine operations at these plants. So, rather than have another cornerstone, since they're integrated into the chemical process safety systems, the limits are integrated there as part of the ISA, we --

CHAIRMAN RYAN: Just a question. If you run a chemical facility, radiation or not, you do have effluent controls.

MR. COLLINS: Yes.

CHAIRMAN RYAN: So, the public aspect of dose from chemicals is addressed.

MR. COLLINS: Under accident conditions as analyzed in the ISA.

CHAIRMAN RYAN: Right, but you also have routine release requirements as well.

MR. COLLINS: And routine releases are under EPA jurisdiction --

CHAIRMAN RYAN: Right.

MR. COLLINS: -- or state jurisdiction, depending on --

CHAIRMAN RYAN: But at some point they've got to come together, you know, with the same analyses structured around that facility, that location, those people and all the rest. So, there is some common ground for thinking about routine and accidental releases.

MR. COLLINS: Right. Well, you know, we appreciate whatever you can do to help us --

CHAIRMAN RYAN: Yes.

MR. COLLINS: -- and approve these, but

I'm trying to give you at least the logic that we've gone through. We have considered --

CHAIRMAN RYAN: It's helpful to have the logic of where you are, but it's good to have a conversation about what might be, too.

MR. COLLINS: Right. Oh, yes. Yes.

CONSULTANT FLACK: Just out of curiosity, if I may, why wasn't fire protection a key cornerstone? Is it integrated into the other cornerstones?

MR. COLLINS: It's integrated under facilities and equipment in the other cornerstones and in criticality system safety and chemical process safety systems. Again, we considered that potentially to be a cornerstone, but the logic was the fire protection systems are there to protect so that you don't exceed the criticality safety systems objective, that you don't exceed the chemical process safety systems objective. You know what I'm saying? So, they're integrated as key attributes elsewhere.

CONSULTANT FLACK: But again, the same thing, fire protection, size and inequalities could be like cornerstones. But getting back to the earlier comments about having things generic in a sense, initiating event is a generic event. It can apply to all types of events. And the same with mitigation and the same with barriers. It could apply to all of them. So you're not left vulnerable to why isn't this a cornerstone? I mean, is the program not important enough to be a cornerstone? I think you may be susceptible to those kinds of arguments.

This was sent to the Commission once before, I believe, right, earlier with the same cornerstones as was presented to the --

DR. DAMON: Did it have the cornerstones in it, do you remember, in 31?

CONSULTANT FLACK: The first paper that went up on discussions of the reactor oversight process, that this is the same approach that was presented?

DR. DAMON: It probably was in there. Yes, in SECY-10-0031.

CONSULTANT FLACK: Yes, right. Right. And the Commission rejected the approach? Or why did they reject the approach that was being used at that point in time.

DR. DAMON: It's hard to say, because each Commissioner really had their own reasons. But

I mean, some of the Commissioners I think felt that we were being too ambitious maybe, you know, trying to do the whole thing just like the Reactor Oversight Program and they thought maybe --

CONSULTANT FLACK: Okay.

DR. DAMON: No, but different Commissioners had different views. The Chairman had one view and Commissioner Apostolakis had a view and so on. And so, it's hard to generalize.

CONSULTANT FLACK: Okay.

MEMBER BLEY: So, going ahead, you've got five cornerstones listed here.

MR. COLLINS: Yes, sir.

MEMBER BLEY: I expected to find slides about all five of them. It looks like I only find slides about criticality safety.

MR. COLLINS: Right. We were going to use criticality safety as an example to show how we developed the elements of a cornerstone. We do have those four. We have drafts of all the other cornerstones. And, I mean, we could provide those to you if you'd like to look at them. But, for the meeting today our goal was to show you how we developed crit safety.

MEMBER BLEY: Okay. Yes, I think we'll

certainly want to see those, because I want to understand how the whole structure works together and if in fact these things that feel a little ad hoc really integrate in a good way, not just for facilities where criticality is the main problem, but for other kinds of facilities that have lots of other radiation hazards and the like, of which we might see some in the future.

CHAIRMAN RYAN: And there may be some where the chemical has -- it tends to be a driver more than some other things as well. So, I mean, to me the interesting thing about this category of facilities is on the list of five, or if you had a sixth, or whatever it is, you can always find a facility where one of those is the key one and may not be in any other, you know, or maybe just a few. So, it's interesting to think about how you balance the system so that you don't over emphasize one cornerstone or under emphasize another over the range of facilities you have to deal with. So, there has to be some art in the clarity with which you deliver the message on how you apply these to a range of facilities, I think. Is that a fair thought?

MR. COLLINS: Absolutely. And in fact,

the next thing I was going to talk about is the fact that not all of these cornerstones may apply to all the facilities. For example, if you've got a uranium conversion facility, they process actual uranium. They don't have enriched uranium. Criticality is not possible. And therefore, the criticality safety cornerstone would not be applicable at a conversion facility.

Next slide, please. As I indicated earlier, to give a better understanding of what's been developed as a result of our efforts today, I'll walk through the elements of the criticality safety systems cornerstone, and this is the objective. And the objective of this cornerstone is to ensure that nuclear criticality safety controls and items relied on for safety protect worker/public health and safety by preventing criticalities. This includes ensuring adequate nuclear criticality safety analyses and ensuring the availability, reliability and capability of NCS controls and IROFS.

Next slide. From this objective an NRC working group identified the key attributes and scopes of inspection for all cornerstones. This working group included staff from NMSS, Region II, NRR and NSIR. The drafts were reviewed within the NRC and provided to external stakeholders for discussion at public meetings. Comments from within the NRC and from the external stakeholders are being evaluated and incorporated. If further work on this approved, we intend to use the inspection activities that you will find outlined on what we call the football diagrams that we'll talk about in just a minute. We intend to use those to revise the inspection procedures. Once the cornerstone objective was defined, the working group developed these key attributes or characteristics of a cornerstone that need to be achieved to meet the cornerstone objective.

For the criticality safety systems cornerstone, the working group identified the following key attributes; and here they are: Staff performance, procedure quality, facility and equipment performance, design, configuration control, criticality analysis and corrective action program. And so, you can see from these that when we say "systems," we're using a broader, not just a hardware definition of systems.

CHAIRMAN RYAN: Just a question.

MR. COLLINS: Yes.

CHAIRMAN RYAN: Help me understand a little bit, Doug. If I think about criticality control, I immediately think about sampling and analysis samples for criticality content. Where does that fit in?

MR. COLLINS: That would fit in either under procedure quality or staff performance. The sampling would be done in accordance with -- well, the initial procedure for sampling would have a basis based on the criticality analysis itself. Specifications would be placed. And then there would be a procedure developed for that sampling. And so, that procedure is dependent upon the quality of the procedure itself and the performance of the staff in implementing that procedure.

CHAIRMAN RYAN: So, basically it sounds like that you're putting what I would call a traditional QA/QC into every one of the elements?

MR. COLLINS: Yes.

CHAIRMAN RYAN: So, how does QA/QC come together as an overall assessment?

MR. COLLINS: The licensees are required to have a level of QA and QC under something called management measures which are applied to items relied on for safety. And so, when someone implements an item relied on for safety, they have to have QA and QC around that item relied on for safety. So, it would be around the samples, the sampling procedure, the training of the people who do the sampling procedure, the equipment. And so, it's integrated with the item relied on for safety.

CHAIRMAN RYAN: These look like an NQA-1-type program, or not?

MR. COLLINS: I wouldn't want to say that, no. Some of the newer applicants have committed to a higher-level quality assurance program, but some at the operating facilities. I wouldn't want to say -- I'm not sure we've done an NQA-1 inspection at operating plants, because they're not really required to meet NQA-1 in an operating plant for this kind of work.

CHAIRMAN RYAN: Yes, that's one of the interesting challenges I think you all face is that you're going to see this kind of range from NQA-1 to some other versions of a lesser, you know, standard program, not necessarily bad, but certainly not NQA-1. So, that's a hard thing to wrestle with across a whole industry component.

CONSULTANT FLACK: And how do the findings relate to risk in the end.

CHAIRMAN RYAN: Yes.

CONSULTANT FLACK: I mean, you know, how important are they?

CHAIRMAN RYAN: So, I mean, to pick up on Said's point, I think the idea that how do you get to uniform application or uniform implementation of some of the concepts across the range of facilities is a tough challenge.

MR. COLLINS: Well, the licensees in providing us their license application do describe to us the management measures that they will apply to their items relied on for safety. And we have a Standard Review Plan that establishes the acceptance criteria for that. So, there is some normalization in the license review as far as risk is concerned.

CONSULTANT FLACK: That's true, but look at the MOX facility with 12,000 IROFS.

MR. COLLINS: Yes.

CONSULTANT FLACK: And then you put this on top of that, and then what does it all mean in the end? I mean, it just overwhelms you, right?

MR. COLLINS: There's a lot of IROFS. But the licensee has to establish management measures for every one of those IROFS.

CONSULTANT FLACK: Twelve-thousand?

MR. COLLINS: Yes, sir.

CONSULTANT FLACK: And if you find one out of whack, you have to assess the significance of that?

MR. COLLINS: Yes.

CONSULTANT FLACK: And how do you do that then? I mean, it's just incredibly complicated.

MR. COLLINS: Well, then we turn to Dr. Damon.

DR. DAMON: I didn't review MOX. I don't really --

MR. COLLINS: You know, we do have risk analysts.

CONSULTANT FLACK: Okay.

MR. COLLINS: But, I mean, that's part of what he's going to potentially talk about is how do we assess the significance of findings?

MEMBER BLEY: You're going to get to that on this one?

MR. COLLINS: No, sir.

MEMBER BLEY: I mean on criticality.

MR. COLLINS: I think -- I'm not sure how much detail Dennis Damon is going to talk about. He's going to talk about risk assessment of findings.

MEMBER BLEY: Okay. Well, after you go through the flow chart I've got a few questions about that.

MR. COLLINS: Yes, sir.

MEMBER BLEY: It looks like a model of everything and --

MR. COLLINS: At this point it might be, yes.

MEMBER BLEY: It's not quite processed to a result, so you'll find a place to put anything that happens, but how do you decide what you ought to do about it?

MR. COLLINS: Well, let me explain how that's done now. And then again, that's something we're going to be developing. But for example, what to look at at a plant when an inspector plans an inspection. The inspector looks at the ISA summary first, and the ISA summary provides a sense of what the risk of certain operations are. And an inspector pre-selects what IROFS they might want to look at. Now, that may be modified when they show up at the plant because something unique may be going on at the plant which would change their thought about the priority for work. And I would expect a similar situation might occur under this new program. But again, that's to be developed. We have not --

MEMBER BLEY: Okay. Because there's nothing here that hints how you would do things differently than you're doing it today, is there?

MR. COLLINS: And if the Commission approves, I would think we would be considering how we would put some process in place for that.

MEMBER ABDEL-KHALIK: If I look at two of these, staff performance and the corrective action program, they're sort of similar to two of the three cross-cutting issues.

MR. COLLINS: Yes.

MEMBER ABDEL-KHALIK: So, will these appear in each one of the cornerstones?

MR. COLLINS: They do now.

MEMBER ABDEL-KHALIK: So, why not again follow the same sort of logical structure by introducing cross-cutting issues?

MR. COLLINS: And we are considering having cross-cutting issues or safety culture traits, depending upon what decision is made, across the cornerstones. And staff performance, which we use here, if you look at the details under staff performance, it looks like human performance under the ROP.

MEMBER ABDEL-KHALIK: Right.

MR. COLLINS: The ROP has a key attribute pretty much in every one of their cornerstones that's called human performance. We use staff performance so that it would not necessarily be confused with all of the elements of human performance under the safety culture or cross-cutting issues. When we say "staff performance" here, we're talking about observation of the staff's performance, whether they're trained and provided adequate procedures to do the job right. Okay? That's somewhat different than human performance under cross-cutting issues.

CHAIRMAN RYAN: But then just to sharpen the pencil on that one a little bit, I mean, if a staff member isn't provided with the training and the procedures to follow, I mean, that's so very basic. It seems to me you'd have to have that as a prerequisite to even apply for a license, let along et one.

MR. COLLINS: Correct. And what the inspector would be looking at is the implementation of that. I mean, there clearly would be a training and qualification program that would have been reviewed as part of the license application. There clearly would be a procedure system established as part of the license application. But what we're talking about here is the inspection of the implementation of those things.

CHAIRMAN RYAN: And I think, I mean, just from being a receiver of many inspections over many years, the rigor of the inspection is really where you learn. So, there's got to be some element of, you know, how rigorous is the inspection? Is it a -- and I don't mean this to be critical, because it does serve a useful purpose, but a checklist-kind of approach as opposed to a diving down into the details of, you know, time, motion, material and personnel and how all that works as an integrated whole rather than the parts and pieces.

MR. COLLINS: And again, those are the kinds of things that I would expect would come out of our development of inspection procedures once we've decided on the cornerstones and key attributes and what needs to be inspected to assure that the cornerstone objective is being met.

CHAIRMAN RYAN: But somewhere along the line, if I'm hearing you right, your plan is to tie the cornerstone objectives into a coherent, synthesized, this is how the plant and its people and its procedures and its design requirements and design implementation should all work together to prevent accidents.

MR. COLLINS: I would say that that probably is now being done through the ISA and implementation of the ISA. And this is intended to inspect the implementation of the ISA. The ISA assures chemical safety, radiation safety, criticality safety, fire protection, general plant safety. It's all integrated in the ISA. So, if the inspections are based on the ISA, I would say we will get to that point.

CHAIRMAN RYAN: And that kind of gets back to Said's comment about, you know, where is the cross-cutting aspect of the program or the plan as you outlined it to say some of those things touch all of them.

MR. COLLINS: And if you were to look at -- and I don't know if we have a copy of the framework slide.

CONSULTANT FLACK: No, not --

MR. COLLINS: We can get you a copy of the framework slide, because it gives an integrated flow of how we get from a cornerstone to a consequence from an NRC action point of view, and it does include cross-cutting issues. It is our intent; again, if approved by the Commission --

CHAIRMAN RYAN: Yes.

MR. COLLINS: -- that this process would have cross-cutting issues or safety culture traits, to use the current potential terminology, as part of the oversight. All we're looking at here are cornerstones sort of separated from the whole framework.

CHAIRMAN RYAN: Maybe it would be helpful to go through the criticality flow chart and see that example, how that's laid out.

MR. COLLINS: Okay. Slide 10. As we indicated, these are the elements of the current draft of the criticality safety cornerstone. And we recognize that these slides are busy, but they are an attempt to show how the cornerstone objective leads to the key attributes and eventually to what the NRC would inspect to determine whether a licensee meets the cornerstone objective.

And take for example on slide 10, facility and equipment performance, in order to assure that the facility and equipment perform to meet the objective of the criticality safety cornerstone, there would have be effective maintenance surveillance testing, post-maintenance testing. Here we have fire protection, flood protection and cold-weather protection. And then below that, in the boxes below that are proposed inspection activities that would be used to assure that, for example, maintenance is effective.

MEMBER ABDEL-KHALIK: So, why isn't procedure compliance a box under your staff performance?

MR. COLLINS: Well, it is in a sense, because if you look down at the bottom, we talk about staff performance and staff walk-throughs. The intent is to observe staff; and there's a verbal description of this as a cornerstone. And it talks about observing staff conducting activities to determine whether they are using their procedures effectively and doing the work in a safe way.

Did I answer that question? It's imbedded, but not -- we call -- this is a football diagram, and it's really an attempt to summarize much more. And again, we can get you for criticality safety and probably for the other cornerstones the current write-ups that describe what this really means in detail.

CHAIRMAN RYAN: That would be helpful.

MR. COLLINS: Okay.

CHAIRMAN RYAN: This is kind of an odd question perhaps, but you have cold-weather protection features.

MR. COLLINS: Yes.

CHAIRMAN RYAN: Do you have hot weather? I mean, I live in South Carolina, so hot weather's a lot more important than cold weather.

MR. COLLINS: You know, I don't think we've applied hot-weather protection procedures. I guess there's -- we've not found anything at the plants that --

CHAIRMAN RYAN: Well, some chemicals, you know, might not be too good at real high temperatures. You might boil them.

MR. COLLINS: Okay. Well --

CHAIRMAN RYAN: You know, you get to 90 or 100, 110 degrees in a process building, something might go wrong.

MEMBER BLEY: Plus the environment for the operator.

CHAIRMAN RYAN: Oh, yes. The environment for the operator is also a problem, Sure.

MR. COLLINS: Yes.

CONSULTANT FLACK: But could I just --

MR. COLLINS: Okay. We'll think about that.

CONSULTANT FLACK: -- a question on this? Again, getting back to the question on fire protection, I see it listed on the facility and equipment performance, but say I raise that up to a cornerstone. Wouldn't these other things apply as well, like staff performance, procedure quality and so on and so on? I mean, how does that all get folded up into the fire protection program from below? It looks like it's just focusing on things related to facility, equipment and performance. That's what I'm --

MR. COLLINS: Yes, that may be something we need to consider as we move forward. Again, if you look at phase 2, in-depth fire protection of NCS controls, fire protection of NCS IROFS, when you see the words, that talks about looking at those kinds of elements when you get into the level of an inspection procedure, but maybe that --

MEMBER BLEY: Well, I guess we need to see the write-up, but when I'm looking at --

MR. COLLINS: -- communicate effectively.

CHAIRMAN RYAN: When I'm looking down there, I thought what that was doing was picking up what you talked about before on the NCS controls. Make sure the fire protection is controlled in a way that you're not putting water where it could cause a criticality problem. And the same thing with the IROFS that are aimed at fire protection. Same thing, make sure the things that are in place rather than, you know, including the kind of things John was just raising about the general --

CONSULTANT FLACK: The general nature of fire protection.

MEMBER BLEY: Well, general nature of people interacting with that sort of --

CONSULTANT FLACK: Yes. Right. Yes.

CHAIRMAN RYAN: You know, one -- just to look at that same box, control of combustible materials is procedures and people.

MR. COLLINS: Yes, it is.

CHAIRMAN RYAN: So, that is, you know, kind of at a higher level over the staff side than the other one. So, I kind of second John's observation that, you know, fire protection is kind of off in a box by itself, and you may intend for it to be as connected, but it doesn't seem to have that same structural connectivity across the programs.

MR. COLLINS: Well, we'll consider that, because originally in one of the versions of the cornerstones we had fire protection up at a higher level. And again, in interactions with our stakeholders we --

CHAIRMAN RYAN: When you say "interactions with our stakeholders" on this point, you mean licensees?

MR. COLLINS: Anybody who showed up at a public meeting, but for the most part it's licensees at public meetings who've said really think about it. Is that where we ought to be considering? I think the substance would change as to what we mean by "fire protection." But the question was do we give it the importance of making it something separate when it fact it really is integrated with all of the equipment cornerstones, and even radiation safety cornerstones.

MEMBER BLEY: Let me ask you a question about what goes on now --

MR. COLLINS: Yes.

MEMBER BLEY: -- and what you envision

for the future. Because if we go back to reactors for just a minute, before we had the ROP, we had the meeting where people would sit around after some event was observed or an inspection finding and say, boy, this one's really important. We're going to put this down in our guide list. And so it was very subjective and that caused a lot of the things that drove toward the ROP to have some more objective way to find things.

I'm assuming now you work kind of the same way. If an inspector finds something, somehow you folks decide whether it's important enough to somehow elevate the intensity of observing this facility. Is that right? Is that what you do?

MR. COLLINS: Every inspection finding is evaluated for significance.

MEMBER BLEY: In kind of a collegial sense in NMSS?

MR. COLLINS: Yes. Well, if it appears to be something that is of low safety significance, something we would call a severity level IV -- we have severity level I, II, III, IV and then minor violations. If it's something that is a severity level IV -- I'll talk about the way it was, because as I said I'm a rehired annuitant. But as I understand the words and the process still, that decision, if it's low safety significance, is between the inspector and his or her branch chief. If it looks like it's going to --

MEMBER BLEY: So, it's at that level?

MR. COLLINS: Correct. And we have examples in the enforcement policy of what a severity level IV is. If it looks like it could be more than severity level IV, if it could be a severity level III or a II or a I, then we have an enforcement panel. An enforcement panel involves the division director of the division, the branch chief, the enforcement coordinator in the region, somebody who knows the enforcement policy well --

MEMBER BLEY: Yes.

MR. COLLINS: -- the counsel for the region, a representative of NMSS. And there's a preparation for that which attempts to determine or provide an explanation of what the safety significance of security significance of the finding is.

MEMBER BLEY: Okay.

MR. COLLINS: Now, occasionally when we get --

MEMBER BLEY: And it's still a

descriptive finding of this group that then has possibly some penalties associated with it?

MR. COLLINS: And the basis for the decision that this could be an escalated enforcement is sent to the licensee and they're offered or told we need an enforcement conference. That's a public meeting unless it's security issues. And they come in and they tell us why we're right or wrong in our determination of safety significance. Then we go back and evaluate the results of that.

But as far as criteria used, right now what's in the enforcement policy is a guide; not controlling, but it's a guide.

MEMBER BLEY: Now, and I assume if you're at the higher levels the group becomes more elevated that over --

MR. COLLINS: Yes, if it's a higher level -- under any circumstances more senior management can come to the enforcement --

MEMBER BLEY: Yes. Where I was really taking you though is, given that's how it's done; and that's kind of the way it was done in reactors, what's the vision for what's going to come out of this? It looks like you're still going to have -- well, now you've got a place where this fits in the hierarchy, but you're still going to have to go back to something about like it is now to make a judgment about how severe this event is and how you are to treat it. Is there something new associated with this that you're trying to get to?

MR. COLLINS: There is the potential if the Commission approves that we would have a fuel cycle significance determination process which would be more transparent, which would use for radiation protection and emergency preparedness the flow charts as they're used now in the ROP. So, a licensee can pick the -- you know, if somebody comes in and says you've got a violation of this, this and this, then go to the flow chart and find out whether it's going to be a severity level I, II, III or IV.

MEMBER BLEY: And in the ROP, those are tied to the quantitative results of a PRA. And that tells you that, yes, this thing's more severe than this one. It's more likely to get us into trouble. I haven't seen anything out of the ISAs or anything on these charts you're showing us that show me how you're going to have a map to that importance function you're talking about.

MR. COLLINS: And we haven't been authorized by the Commission to do that.

MEMBER BLEY: Isn't that what you're looking for? I thought that's what this --

MR. COLLINS: Eventually --

MEMBER BLEY: -- whole process was supposed to be looking for.

DR. DAMON: Yes, but they didn't direct us to do it this year.

MEMBER BLEY: Okay.

DR. DAMON: We're proposing to do it next year.

MEMBER BLEY: So, this year they're building a structure, but the structure has no hierarchical content in terms of risk significance of these things?

MR. COLLINS: We could not begin to do this without some concept of where we were going, honestly. I mean --

MEMBER BLEY: Well, that's what I'm hoping to hear. I'm not hearing where we're going.

MR. COLLINS: We have --

MEMBER BLEY: That's why I took you through this, but --

MR. COLLINS: Okay. Well, we'll have to get back to you on that because we have a framework that includes the potential for that kind of risk assessment, particularly for the ISA-related cornerstones. Where we have risk information and where we don't have risk information Dr. Damon's paper to you guys earlier showed how we could potentially --

MEMBER BLEY: Showed some ways to estimate risk in some of these cases?

MR. COLLINS: Correct.

MEMBER BLEY: You didn't bring that framework to us today?

MR. COLLINS: I don't.

DR. DAMON: Well, I'm going to talk about it.

MEMBER BLEY: Okay. Then I'll shut up.

CONSULTANT FLACK: But the key piece was the ranking that wasn't really picked up; and that is putting things in a certain way that you could see what the highest one was on down. And I think that was the piece that -- I think that when you came back to the letter to the ACRS said that you didn't have enough time to think about that.

DR. DAMON: Well, we've thought about it. Back in 2009, we, Rudy Bernhard and I developed risk thresholds that we thought might work.

CONSULTANT FLACK: Yes.

DR. DAMON: But you have to test them out basically, is my view, because you have to do a whole bunch of examples to see how things sort out and then maybe you adjust those thresholds in some way.

CHAIRMAN RYAN: This may not be a fair question, but on the reactor side of the house there's a couple of basic designs; PWR, BWR with I know lots of variations among them, but maybe not as many as we would think. Yet in the fuel cycle facilities, I mean, my own experience is there's quite a wide range of, in my estimation, relative hazard points of chemical inventory. You know, I'm a lot more interested in toluene and xylene than I am kerosene, for example, you know, and other things and differences like that among fuel cycle facilities. Is this difference among fuel cycle facilities, one to the next, part of the dilemma that you're wrestling with trying to figure out how to make a one-size-fits-all, or can be adapted to all process?

DR. DAMON: Yes, I mean, my thoughts are on the -- what risk metrics you would use is you tie it to the actual health effects, you know? Fatality is fatality and --

CHAIRMAN RYAN: Yes.

DR. DAMON: -- has the same significance no matter how it happened. And so, there's a hierarchy of consequences, and actually it's built into the rule.

CHAIRMAN RYAN: Sure.

DR. DAMON: There are consequence thresholds in the rule. You could use those or you could have a slight modification of it. But I mean, you tie things to -- you know, most accidents in fuel cycle facilities are -- they don't affect all -- it's not a question of like having a lot of accidents where you would affect a lot of people. Usually the accidents affect a small number.

CHAIRMAN RYAN: Just like reactors. And that's why we get back to the sequences probabilities where we begin to make the judgment rather than the number of accidents.

MEMBER BLEY: Just where you began, although in general these two kinds of reactors look the same, there are two areas whereby they're absolutely unique.

CHAIRMAN RYAN: Oh, absolutely.

MEMBER BLEY: And that's their electric power systems and their cooling systems.

DR. DAMON: Right.

MEMBER BLEY: And their risks are unique. So, there isn't a general location there.

CHAIRMAN RYAN: So, when we get down to the --

MEMBER BLEY: You got to look at the plant-specific configuration.

CHAIRMAN RYAN: Okay. And I accept that, but I mean, in a way it's the same thing among fuel cycle facilities. They all have --

MEMBER BLEY: They're even more -- they start more different.

CHAIRMAN RYAN: They're different, yes.

MEMBER BLEY: Yes.

CHAIRMAN RYAN: Well, I guess that was my point.

MEMBER BLEY: Yes.

CHAIRMAN RYAN: They start a lot more different, even though the reactors have different settings, you know, and we state that. But it seems to me that you quickly get to -- the currency of all this is the probability of something happening rather than accident rates.

DR. DAMON: Well, what I was going to say is like on a reactor they use LERF, right, large early release frequency, as a surrogate metric that works good enough for their purposes of sorting out things by importance. And in the fuel cycle facilities we have -- different processes have different ways of doing bad things to people. But by tying it to actual health effects, then you're liberated from how the heck it happened and you can just use the -- so, the metrics that we were envisioning our, you know, probability of death by criticality essentially. I mean, we wouldn't necessarily put it that way, but and the same for --

MEMBER BLEY: I could understand that one, if you got there.

CHAIRMAN RYAN: No, but the part that doesn't get captured in that is death by inhalation of nitric acid fuels.

DR. DAMON: Well, that would be in the chemical cornerstone.

CHAIRMAN RYAN: Yes, so you're saying that you use criticality as an example, that the others -- for all the other --

DR. DAMON: Yes, there are all the different ways that you could do the health effects.

CHAIRMAN RYAN: Okay.

MR. COLLINS: Next slide?

CHAIRMAN RYAN: Yes, please.

MR. COLLINS: The next slide is more of the criticality safety cornerstone.

Next slide, quickly, please.

MEMBER ABDEL-KHALIK: Well, let me ask you about No. 4 then.

MR. COLLINS: Yes, sir.

MEMBER ABDEL-KHALIK: I mean, presumably we're doing all this with the ultimate goal of coming up with a coherent oversight process.

MR. COLLINS: Yes, sir.

MEMBER ABDEL-KHALIK: Review of the design happens early during the licensing of the facility. And it would seem to me that for an oversight process, which you ought to be focusing on, is item 5, configuration control. What are the temporary modifications or what are the permanent modifications, rather than the design per se? So, can you explain to me why this item is sort of explicitly included in an oversight process?

MR. COLLINS: Licensees under Part 70 have the authorization to do significant changes to the facility without coming back to the NRC for a license amendment. And so, for -- and you'll notice we have ISA summary, ISA safety analysis. The thought is here when these significant changes are made some of those changes might be inspected from a design point of view to look at how the decisions were made and what went into the design.

MEMBER ABDEL-KHALIK: So, it's design change?

MR. COLLINS: It's more intended to be design change; yes, sir.

DR. DAMON: I might mention something in that context. Unlike reactors and some other systems that the NRC regulates, the staff of the Fuel Cycle Division does not review and approve the design of the plant. They look at the ISA in a selective way. I mean, there is what they call a horizontal slice. So you look to see if they've covered the whole plant, but you don't really review that detail.

You pick what they call a vertical slice, which is a small subset of the many hundreds of things in the plant and look to go to the facility and look at the full ISA that they've got, because they don't send us the full ISA. They send us what they call an ISA summary. When you go to the plant, then they got big stacks of documentation on what they actually did when they analyzed a particular process. So, the purpose of doing that vertical slice is to see if the staff feels that the licensee's process for doing ISAs is adequate, but they don't review and approve the whole design of the plant.

So, when inspectors go out, they do in fact look at -- you know, they'll pick a particular piece of equipment and they will look at the design and they may be the first person from the NRC that's ever looked at that.

CHAIRMAN RYAN: That's interesting.

CONSULTANT FLACK: So, you're actually evaluating the performance of those that we have originally submitted, I guess the original design and the IROFS that were not identified at that time, which now maybe an inspector would say why isn't that an IROFS? And then you go back and you find out the licensee never identified it as one and now it becomes a performance issue in the context of this process, right?

DR. DAMON: Yes, I mean, I could give you an example of a case where something happened at the plant and they went there and found out that there were no IROFS. They had screened out the entire process as identifying that, well, nothing could really go wrong with this thing, and then something did and they didn't have any controls in place. There was no safety design for that process.

MEMBER BLEY: We don't review the IROFS, right? I mean, the ISAs.

DR. DAMON: We review the ISA summary. And like I say, they do a horizontal slice, which means that they look to see if they think they've covered the plant, the whole plant.

MEMBER BLEY: Okay.

DR. DAMON: But they don't --

MEMBER BLEY: That's our inspectors do that?

DR. DAMON: No, no, no. The license reviewers when they approve the ISAs.

MEMBER BLEY: Okay.

DR. DAMON: Okay. They look at the ISA summary and they look to see if they think they covered the plant. Then they'll pick a subset, a small subset of the processes which -- on a risk-informed basis, you know, something that sort of covers a variety of things, but are high-risk significance. Then they'll go to the plant and they'll look at the detail documentation for those things that they've selected. Now, they may change what they look at when they get to the plant and they may find something more interesting, but that's the process they go through. But they don't look in detail at the entire design of the plant and approve it, you know? They're not in the business of approving. Now, implicitly you are when you review something. You know, you're implicitly approving it. But that's not the nature of the process.

MEMBER BLEY: It's not like a design certification for a --

CHAIRMAN RYAN: Well, it's a design certification of one plant.

MEMBER BLEY: But it's not. It's not an approved design.

DR. DAMON: Yes, it's quite --

MEMBER BLEY: It's they've looked at it and haven't found anything wrong.

MEMBER ABDEL-KHALIK: So, in the context of this process one may find himself reviewing a design change that had not been evaluated in the first place, that where the unrevised original design may not have been evaluated in the first place. So, how would you do that?

MR. COLLINS: In doing that, we have certain criteria established in the regulation for how an analysis must be done. Now, if it's an accident sequence that they screened out, I'm not sure how this would be done. I mean, there is the potential for an inspector in observing activities at a plant to say wait a minute, I don't remember any IROFS related to this operation and it looks to me like -- okay? And it can go from there.

But with regard to having a design change, I'm not sure whether this is going to expect the inspector to go back to the original design and verify the original design and then the change. Again, I'm not sure how this is going to be done. It's to be determined.

Jay, right now when somebody goes and looks at a design or a design change out of an ISA summary, I guess they do go back and look at the entire design, because you --

MR. HENSON: Yes, there's -- of course there's --

MR. COLLINS: -- can't do this.

MR. HENSON: From the time they get their license and before they go into operation we do operational readiness readings. And so we have inspectors that go out and look out all the IROFS that are listed in the ISA. We confirm that those

IROFS have been installed and are capable and able to do their design function. But we don't do an evaluation of the overall ISA. We're just looking to make sure what they said they would implement has indeed been implemented as they described.

When an inspectors goes out and does that inspection of operations, he again looks at the ISA, picks out some of the IROFS to look at and they go out with a questioning attitude and an open mind. And if they identify any concerns, then they address it first with the licensee to see, okay, why isn't there an IROFS or why isn't this control that you say is important, you don't call it an IROFS, you just call it a safety control? And so they engage in that conversation to locate why did you decide that? And then they call back to NMSS and talk to these ISA engineers to say, okay, here's what we found. Now, where are we in ISA space and do we need to go further?

Unfortunately, a lot of the issues we've discovered with the problems with ISA have been a result of events or related to events that the licensee discovers. And I think in the case that Dennis is discussing that, oops, we missed one. We've had an event, we've looked at it, we've done an investigation. We now realize we didn't characterize the safety controls that are here as IROFS, so we don't have management measures. So, we didn't do the right thing and so we've got enforcement cases around that.

MR. COLLINS: But back to your first question: I'm not sure how you can look at a design change well without looking at the original design, as I think about it. So, I would anticipate; can't say for sure, because, you know, these would -- how this is going to be done will be reviewed or determined when we revise the inspection procedures. But I would expect design changes will have to at least look at part of the original design.

MEMBER ABDEL-KHALIK: Which may or may not have been reviewed early on in the licensing process.

MR. COLLINS: Yes, that's true. Anything else on slide 11?

MEMBER BLEY: Not exactly, but, Dennis, back when you were telling us how some of all this stuff works you talked about the riskiness factor, whatever it is, really coming from the enforcement policy. And is that a particular document?

DR. DAMON: Yes, there's an enforcement

policy document.

MEMBER BLEY: For fuel cycle facilities in particular, or just the --

DR. DAMON: Right. The things in the enforcement policy is called supplements. So, there's a fuel cycle supplement. And in that supplement it has guidance as to how to assign severity levels to inspection findings.

MEMBER BLEY: Okay. When we're done if somebody could point me to that. I haven't read that and I want to get a look at that.

So, Derek, if you could track that down for us.

Or one of you guys can give it to Derek, or at least the reference so we can pull it up. I'd like to understand that. I think to go further, I really need to know what's in there.

DR. DAMON: Yes, of course that strictly is in in fact enforcement, so those are, you know, used in an enforcement process whereas --

MEMBER BLEY: Understand.

DR. DAMON: -- you know, I think the idea here is to get a lot of this stuff out of enforcement space.

MEMBER BLEY: But you're trying to draw

on that substance to set up what you're doing, I think.

DR. DAMON: Well, the way I would put it is they were trying in fuel cycle supplements to do something similar to what's an ROP in terms of risk significance, but they couldn't count on having risk information available, you know, because the ISAs don't necessarily have --

MEMBER BLEY: Right.

DR. DAMON: -- good risk information. But they're trying to use it. They're trying to use the ISAs. Like I say, there's a revised enforcement policy. It has different supplements. It used to have much more purely qualitative criteria. For example, severity level I for criticality was an actual criticality.

MEMBER BLEY: Okay.

DR. DAMON: Okay? And severity level II was you've lost all your criticality controls. You had none left, but fortuitously you did not have a criticality. And then the next one was you have one control still left, and so on.

Well, they've revised that to be more directly a risk metric, I would say, based on concepts that are in the ISAs. But my proposal here, which is supposed to come at the end, is I'm saying I would like to do better than that, because the ISAs weren't done for the purpose of risk significance and many of them they leave out safety controls that actually exist. And they're formal controls and they're managed and everything. And so, I'm proposing that you consider that when you do the risk significance, otherwise you get the wrong answer, you know? Yes, they lost the controls that were designated IROFS, but they still had something else that they didn't tell you about.

And the other one, the other big conservatism is in assessing consequences to the public off site, especially from large chemical releases. They do worst-case weather and then they don't take credit for the fact the wind might not be blowing at the public. And so, there's a gross conservatism in there, and I think you have to take that out.

MEMBER ABDEL-KHALIK: I'm guess I'm still having difficulty with the level of abstraction and the consistency in what is being attempted here as part of an oversight process and what was originally done as a part of licensing. If the safety case is made during licensing on the basis of sampling, and yet you're trying to essentially do the oversight on a more comprehensive basis than what the original safety case was made on, I find that troubling and inconsistent.

MR. COLLINS: I would like to be sure that we don't give the impression that this is more than sampling. This is sampling. This is intended. We would not, for example, look at every permanent plant modification, I would not think. Again, that's to be decided later. But right now we don't look at every permanent plant modification. We make a judgment as to which affect the risk based on looking at the ISA summary and choose what we believe to be the higher-risk modifications to look at, not all of them. And I would anticipate this would operate the same way. We would not look at all permanent plant modifications. We wouldn't look at all temporary modifications. We would only do a sampling of walk downs of equipment alignment, again all of it based on being informed by the ISA.

So, if I left you with the impression we were going to do more here than in licensing --

MEMBER ABDEL-KHALIK: Well, I guess, you know, to me I think your presentation has too much detail and not enough detail. It would seem to me that a big-picture overview of the process would be very helpful versus sort of jumping into the details which leave me quite confused as to -- my initial reaction is that you're trying your best to not duplicate anything out of the reactor oversight process, trying your best to be different than the reactor oversight process and I don't see the logic.

MR. COLLINS: Well, just like we couldn't develop cornerstones without looking at where we think we might end up going, even though the Commission didn't tell us we could go there, I think we need to get you a copy of that framework. I think once we do that, if we need to we can sit down again and talk about it to see how this fits over the whole framework.

With regard to not using the same terminology, there is some of that, because what we're talking about may look like the same thing, but really isn't. And let me give an example: The alert notification system, which everybody knows in reactors what that is. That's the sirens, that's the off-site organizations. Well, some licensees, fuel cycle licensees have sirens. It's not an alert notification system. It doesn't meet all the criteria of an alert notification system. It's not expected to meet those requirements. And so, there is a different term used for that because it is different. And I think that's somewhat the approach we've attempted to use.

I mean, in the ROP "configuration control" is the same term as we use. "Design" is the same term. The -- well, they call it "equipment performance." We call it "facility and equipment performance." "Procedure quality." I mean, we weren't trying -- where there's a difference, we did try to make a distinction. But we need to be sensitive that this is not exactly one-for-one.

MEMBER BLEY: I think the problem we're having, if you look at the one for the reactor, you can make and they've made arguments why at each level it's a complete system and why anything that creates a significant hazard comes up through one of those paths that reflects a cornerstone. I don't see here at the top level, even at this level an argument for completeness or an argument that anything coming up from the bottom of this, up in one of these paths is likely to defeat the criticality safety system. If that's there, it isn't coming out real strongly.

MEMBER ABDEL-KHALIK: Right.

MEMBER BLEY: So, as Said says, the logic, the abstraction doesn't -- at least hasn't been explained in a way that I get it, that I see, well, this is a complete set and all the pieces of this are not only complete, but are important. And how I would use this to do anything more than say, oh, they found that some sprinklers weren't working properly, or we see that fits in -- I see a place in here to put it, but I don't know what I'd do with that other than say I got a place to put it.

MR. COLLINS: And what we would do with that depends on something to be developed later. The intent of this is to identify at the top what the Commission said our strategic outcomes are. How do we take a fuel cycle facility and ensure that those strategic outcomes, that we have reasonable assurance as a regulator that those strategic outcomes will be met? And so, this was a top-down. We didn't start at the bottom and say what are all the things that you need to do to have a safe plant?

We started at the top. Right or wrong, we started at the top and said, okay, how do we meet the outcome for not having significant environmental impact off site, or not have significant radiation exposures? We said, okay, we'll establish those objectives for the five cornerstones, or however many. The objectives will probably be pretty much the same not matter how many cornerstones you have.

And then we said, okay, what things make sure you don't have a criticality? What do you do to make sure you don't have a criticality? And those are the key attributes. And then we said, okay, how do I have reasonable assurance as a regulator that those key attributes are going to be met? And those are the things that we look at.

MEMBER BLEY: I guess --

MR. COLLINS: Okay. So, it's --

MEMBER BLEY: -- that first step, how do I know these are the key attributes? I haven't seen an argument for that yet. I'm sure you've come up with these and you think they are the key attributes, but --

MR. COLLINS: And we used the experts on our working group and we said, okay, how do you make sure you don't have a criticality? Well, we go to the ISA. The ISA lists lots of things that say we're going to do not to have a criticality. And we've come to the conclusion that that provides reasonable assurance if they're effectively implemented.

CONSULTANT FLACK: But doesn't all this lead to is a performance indicator for the cornerstone and then that performance indicator's got to be fed into an action matrix where you're going to take some action? I understand all the words you're saying; at the very top this is what we're trying to achieve, but down here somehow what Dennis is saying has to be converted into a performance indicator on critical safety systems. And whatever that performance indicator, what color it is in the ROP, gets fed into an action matrix which then determines whether you have to increase your inspections or not. But I don't see that connection at all at this point.

DR. DAMON: No, it's not here.

CONSULTANT FLACK: Is it there?

DR. DAMON: It's something that remains to be developed. We've had discussions about it, but we weren't directed by the Commission to work on that this year.

CONSULTANT FLACK: But that is a key piece, isn't it?

DR. DAMON: Oh, yes, absolutely.

CHAIRMAN RYAN: Well, and then coming after that then it comes to, you know, procedures and all that aspect, and then it comes to the training and capability of the work force aspect, because it is a system that has to operate together.

MEMBER ABDEL-KHALIK: I mean, I understand that the Commission has not directed you to do this, but is there a potential then if and when the time comes for you to work on this you'll look at this and say this is not going to work?

DR. DAMON: Well, I mean, the action matrix is quite a different thing. And the same with like I think Dennis Bley was referring to; you don't see the direct connection to the safety of the design. Well, yes, it's not like a fault tree of all-the-things-that-can-go-wrong-kind of thing. For example, the 1Y seed in fact does use fault trees for all the criticality safety analyses they do. And you could make a generic fault tree for all criticality safety because there's a defined set of parameters that determines the criticality of the system. You know, mass, enrichment, some moderator, reflection, heterogeneity and so on.

There's a list of parameters in the crit safety discipline that control those parameters and the most common strategy is to pick two parameters that you're going to control. Then in the safety analysis, in the criticality analysis you assume that all the other parameters are at their most-reactive, worst-case condition. And so, by doing the analysis that way, controlling two of the parameters to some limiting value, you achieve a double contingency, which means that two different things have to happen to get you in trouble. So, any one parameter will not cause a criticality, you know, no matter how bad it goes. And so, that's the normal strategy.

Now, sometimes, I mean, they'll only control one parameter. There's facilities called dry conversion facilities and they just control moderation, and they just keep moderator out of that facility basically. And they just don't have pipes full of water running around and stuff like that. But traditionally in the low-enriched facilities they like to control two parameters because then it gives you that independence. You're really working with two physically separate things.

Now, in the high-enriched facilities of course they can't exactly do that, but you know, because in principle at least you could go critical without moderation. But they just have to be very careful with their single parameter that they control. But like I say, even if you don't use a fault tree, there's an implicit fault tree for criticality safety, you know, that covers everything because they --

MEMBER BLEY: If-and-only-if logic?

DR. DAMON: Yes, they're looking at all the parameters that would influence criticality. And now chemical is different, but like I say, some of the licensees do use fault trees, some use event trees. Most of them though they don't. Most of them use -- they use HAZOP, which is a structured logic that looks at the parameters of the system; flow, temperature, so on. They make a list of --

MEMBER BLEY: Against the guide questions?

DR. DAMON: Yes, right. So, they use a structured method, but it's not oriented towards quantification, which again is another problem with using ISA results. I found that often when you do a HAZOP you're not defining your quantities quite as crisply as you would if you did a fault tree.

MR. COLLINS: So, the intent is, under here for inspection activities there would be a metric and that metric would be based on a regulatory requirement that would be a pass/fail and that once -- if there's an inspection finding, that an inspection activity has identified a finding, we would then have a significance determination process that would for certain risk-informed ISA-related findings use the ISA to determine the significance. And then for others a flow chart; for example, transportation safety, a flow chart not unlike in the ROP to come to a safety significance.

MEMBER BLEY: But your purpose in building this tree structure then is to identify the points which might be selected for inspection?

MR. COLLINS: Correct. Yes. How do we come to a reasonable assurance that a licensee is not going to have a criticality, licensee is not going to have a release that has significant off-site impacts? What do we need to look at to come to that decision? And if we find something that doesn't meet our acceptance criteria down here in the inspection activities, we then would go to a significance determination process, which would lead to a hopefully predictable NRC and licensee action.

MEMBER BLEY: And it's not there yet?

MR. COLLINS: And we're not --

MEMBER BLEY: How often does a facility get an inspection, if they're okay? You know, if they're not on some special list?

MR. COLLINS: It depends. For example, a low-enriched facility gets a criticality inspection once a year. They get an HP inspection once a year. They get a waste inspection once a year.

CHAIRMAN RYAN: Not all together at the same time?

MR. COLLINS: No.

CHAIRMAN RYAN: Yes.

MR. COLLINS: Well, it could be, but they might get a fire protection inspection every two years.

MS. KOTZALAS: Two to three years.

CONSULTANT FLACK: There's a triennial one, that complete thing, and then there's an annual.

MR. COLLINS: Okay. But, so right now there's a structured process based on a year.

MEMBER BLEY: If you keep going the way you're going, you'll have a set of these logic structures, one for each of the five cornerstones? And then somehow you'll have to pick off of that very large list at the bottom a handful of these things to inspect on when you go visit a plant?

MR. COLLINS: Correct. And right now, all these things at the bottom, all of these inspection activities; I should make it clear, our stakeholders haven't focused on those. And we've got potentially a meeting with all of the inspectors in the near future to encourage them to focus on those things, because we may have missed some things, like licensees have done, and there may be some things in here that really are not significant from a risk --

MEMBER BLEY: Do you expect any effort to pick at least one from each of the columns?

MR. COLLINS: It seems to me we're going to have to do something. I would expect we'd have to do something to determine that, for example, staff performance is adequate.

MEMBER BLEY: Yes.

MR. COLLINS: We'd have to do something to make sure that the facility and equipment is adequate and assures that the IROFS --

MEMBER BLEY: So, for 1 through 7 at the top you'd have to do something on each of them, or maybe not.

MR. COLLINS: I would think so, but I don't want to --

MEMBER BLEY: Because we got another four of these charts.

MR. COLLINS: We do not have performance indicators. If we had performance indicators, I might be able to say maybe not, but we don't. Now, we may not have to do it every year. I mean, like fire protection, we do a detailed look every three years and that's based on experience. But that's to be determined.

MEMBER BLEY: Okay.

CONSULTANT FLACK: And then there is the connection with the cross-cutting issues as well. So, in addition to all that, you'd have to look across your cornerstones to see if you're getting cross-cutting issues, right?

MR. COLLINS: And there we anticipate; and this flow chart will show it, the framework, which we didn't give you, would show that there is conceptually an approach, you know, as a starting point not unlike the ROP to identify if there are cross-cutting issues coming from numerous folks at the licensee.

So, I talked about metrics. And then finally in summary, we're developing it --

MEMBER ABDEL-KHALIK: Let's speak about

that slide on metrics.

MR. COLLINS: Yes, sir.

MEMBER ABDEL-KHALIK: When one thinks of metrics, you think of measurable and objective measures.

MR. COLLINS: Yes.

MEMBER ABDEL-KHALIK: How are these measurable, the list of four that you have on the slide?

MR. COLLINS: Well, Part 70, Subpart H gives specific performance or limits that a licensee must meet. The license does the same thing. You must do this. You must have a procedure for this. It must be adequate.

Now, this does include a decision on adequacy, but the decision on adequacy I would expect will be based on performance. You know, this says you have to have procedures as they are in the license. Okay? There are certain procedures that a facility has that the license requires them to have and to implement. And whether they're implemented adequately would depend on a view of the performance. That's the way it is now.

MEMBER ABDEL-KHALIK: So, these are all pass/fail metrics?

MR. COLLINS: For this, these are pass/fail. In a simple sense they're pass/fail. And that would lead you into a significance determination process, if you fail. If you fail to do a safety analysis that's required, how significant is that? If you fail to follow procedure and take a sample adequately, that's a violation.

Got a procedure that says take a sample. Do it this way. Use this scoop. Take the scoop, put it in here. Write down on the form, etcetera, etcetera, and send it over and do a moisture evaluation on it before you do anything else.

MEMBER ABDEL-KHALIK: And report it back to the --

MR. COLLINS: And report it back. Okay? Somebody uses the wrong scoop. Okay? That's a violation. Okay? It could be a minor violation, or it could be significant. Because again, this is for moisture content and that's the significance determination that comes from the quasi-pass/fail here. And that's to be developed.

Did I answer your question? No?

MEMBER ABDEL-KHALIK: That's okay.

MR. COLLINS: So in summary, we're

developing cornerstones from top down.

MEMBER BLEY: Can --

MR. COLLINS: No, please; go ahead.

MEMBER BLEY: Back to your previous slide --

MR. COLLINS: Yes, sir?

MEMBER BLEY: -- you know, I get where if they're missing something on Part 70, it's a violation.

MR. COLLINS: Yes.

MEMBER BLEY: What would be the kind of things in the ISA that would be a finding from an inspection?

MR. COLLINS: Well, the example that Dennis brought up. You've got an accident sequence that's not evaluated in the ISA.

MEMBER BLEY: And it happened?

MR. COLLINS: And it happened.

MEMBER BLEY: Okay.

MR. COLLINS: And the regulations say your ISA has to encompass all potential accident sequences. That's a violation.

MEMBER BLEY: Okay. Now, that you find because you have an event. You go to inspect the plant. If you just went to the plant and inspected things --

PARTICIPANT: You wouldn't find it.

MEMBER BLEY: -- you probably wouldn't have found that one.

DR. DAMON: Now, I'll tell you a funny story: Actually it wasn't done by an inspector; it was done during the review of the ISA itself. One of our reviewers went to a plant and she walked into a room and she says this room's got HF piping running through it. How come there isn't a sensor in here for HF? And, you know, they said, well, maybe we overlooked, you know, this. A couple months later they had an HF leak in that exact spot. Okay? So, she not only identified it; she predicted it.

MEMBER BLEY: Okay.

MR. COLLINS: Does that answer your question?

MEMBER BLEY: I'm must thinking about it. Yes, I'm a little biased by having looked most recently at that enormous ISA. In a more normal ISA I expect you could review the summary in short order before you went to the plant and be pretty familiar with it. Nobody could be familiar with the one for the MOX branch in any level of detail.

MR. COLLINS: Even the ISA summary? Is that right?

MEMBER BLEY: The ISA summary was over 400 pages thick, maybe 600.

PARTICIPANT: Yes, more like 600.

MEMBER BLEY: No, nobody could be familiar with that. I tried studying it. It was really a beast to work your way through.

MR. COLLINS: And in fact, NMSS has done a risk ranking, haven't you, on the IROFS because of that?

DR. DAMON: We did it on the centrifuge plants, okay, because the centrifuge plants only had like 60 IROFS, whereas, you know, like you say, MOX, if we tried to do a ranking of, you know, all that stuff in there, it would take you forever, you know?

MEMBER BLEY: At least from their documentation, going through it every page looks almost the same.

DR. DAMON: You know, the centrifuge plants applied a risk-indexing method like there's in the standard review plan and they only have like 60 IROFS. So, we had a guy come from Region II and came up for a couple months. He put it on all on a spreadsheet and we did a risk ranking of --

MEMBER BLEY: Oh, that's interesting. I hadn't heard about that.

MS. KOTZALAS: Yes, and we are working on one, a risk ranking for the IROFS for MOX so that it will help focus our inspection activities.

MEMBER BLEY: It's going to take you awhile.

MS. KOTZALAS: Yes, well, we've been working on it for awhile. Yes, a couple years already.

MEMBER BLEY: Yes, okay.

MR. COLLINS: So, next slide. I think we've talked about the summary. We've talked about that.

Next slide. I invite more questions.

MEMBER BLEY: You don't really mean that do you?

MR. COLLINS: I do. I do, because you haven't been seeing me writing, but Margie's been over writing all the things you've said down. So, we'll take them back and work on them.

MEMBER ABDEL-KHALIK: I guess I must confess, I'm comparing what you're doing against sort of an established reactor oversight process. And when one studies the reactor oversight process, there is a certain logic, elegance and consistency in the process, which I don't see here.

MR. COLLINS: Yes, the reactor oversight process has a lot of --

MEMBER ABDEL-KHALIK: I understand that there are differences. I understand, you know, that your constituencies might want to shy away from using the same terminology, but I'm just looking for a big-picture structure and logic which I don't see.

MR. COLLINS: And the framework might help, but after the reactor oversight process was put together, a lot of these basis documents were published, and we have not done a lot of those basis documents yet.

MEMBER ABDEL-KHALIK: We have a lot to learn from. I mean, you know, there's a lot of history there.

MR. COLLINS: And I don't think it's the intent of doing the same degree. I mean, you know, the Inspection Manual chapter 308 is this thick, speaking of 400 pages.

MEMBER ABDEL-KHALIK: Yes.

MR. COLLINS: Is it 308? I think it's 308. Which is a lot of the basis for the ROP. And I would not anticipate that degree of elegant explanation, but it depends; we may.

MEMBER ABDEL-KHALIK: Just a general comment.

MR. COLLINS: Understand.

MEMBER ABDEL-KHALIK: And hope you take it in the spirit in which it was offered.

MR. COLLINS: We know what the ROD did and we're trying to get to a good oversight process.

MEMBER BLEY: And it didn't happen in a day, and it didn't happen in one pass.

MR. COLLINS: True.

MS. BAILEY: Can I just sort of add to that a little bit? We are looking at the reactor oversight process, and to the extent that we can, we are looking at its elements and if we can do it, put it into fuel cycle oversight process.

I mean, for example, the concept of cornerstones. We're taking cornerstones. The cornerstones will help us decide where we focus our baseline inspection program. A significance determination process like the reactor oversight process has. We're looking at a significance determination process to help us determine the significance of inspection findings or violations. We are not at a point yet in figuring out what a significance determination process is going to look like or how an ISA might fit into it, but we know that the fuel cycle oversight process that we develop will have some sort of a significance determination process. It's going to have an action matrix similar to the reactor oversight process and we're going to look at also cross-cutting activity.

So, we are trying to take what's in the ROP and apply it to the FCOP, but we don't want to force-fit it. We want to make sure that, you know, it makes sense for fuel cycle facilities.

CHAIRMAN RYAN: Thank you.

MS. BAILEY: And I think we probably should have put the framework there, because the framework would illustrate to you maybe a vision of where we're trying to go. I think we started with cornerstones because right now we're trying to answer the mail. You know, the Commission told us to develop cornerstones and then to propose to them a path forward. So, that's kind of why we focused on the cornerstones now.

CHAIRMAN RYAN: Thank you.

MR. COLLINS: And with that --

CHAIRMAN RYAN: Thank you, Doug.

MR. COLLINS: Okay. Thank you.

CHAIRMAN RYAN: Mr. Henson?

MR. HENSON: Good afternoon.

CHAIRMAN RYAN: Good afternoon.

MR. HENSON: Name's Jay Henson. I also am a re-hired annuitant. I was a branch chief in Region II in the fuel facility inspection area for about seven years before I retired. I'm assisting NMSS with the Commission-directed actions associated with fuel cycle facility licensee corrective action problems, and I'm going to discuss what actions staff has taken in regard to the Commission's direction to consider how to best reflect fuel facility licensees' corrective action programs and the NRC enforcement policy.

What I'll do today is describe the Commission's direction to the staff regarding corrective action programs, discuss the staff's approach, status and path forward for the effort to provide incentives to licensees to maintain strong corrective actions, and discuss the approach for the effort to revise the baseline inspection program for creating licensees' effective problem identification and resolution programs.

Next slide. In the August 4 Staff Requirements Memorandum the Commission informed the staff that they should consider how to best reflect the fuel facility licensees' corrective action programs and the NRC enforcement policy. Commission stated that the staff's approach should provide incentives for licensees to maintain strong corrective action programs and should implement revisions to the baseline inspection program to credit licensees' effective problem identification and resolution programs.

MEMBER BLEY: Can I ask a question about the corrective action programs in these facilities? It turns out if one studies some of the more interesting abnormal events in reactors over the last two or three years; probably further back than that, we find some of the more severe ones at the heart of them have an ineffective corrective action program. Either things didn't get into the program or things sat in there and weren't handled the way they're supposed to have. Is that same situation prevalent among the fuel cycle facilities?

MR. HENSON: I think you'd find similar conditions.

MEMBER BLEY: Okay. So, it really is a crucial piece to making this work right?

MR. HENSON: Yes, and as you'll hear

later, I mean, both the industry and the NRC agree the strong corrective action programs are absolutely essential for these facilities.

MEMBER BLEY: Okay. Good.

MR. HENSON: So, next slide. So, the staff determined that the incentive for fuel facility licensees to maintain strong corrective action programs should be similar to that applied to reactor licensees. So, the NRC would non-cite NRC-identified violations of low significance, basically what are now severity level IV violations at fuel facilities, and enter these violations into a corrective action program that the NRC has determined to be strong and effective.

Now, an effective corrective action program is one that identifies, reports, evaluates, corrects, tracks and trends safety and security issues and routinely assesses its own effectiveness with this so that the safety and security issues do not recur and similar issues with similar causes are prevented. So, you want to prevent recurrence and you don't want to have similar issues that are a little bit different occur as well.

Next slide. Now to implement this incentive for strong corrective action programs the

NRC would revise the enforcement policy to include a provision that would allow NRC inspectors to not-cite NRC-identified severity level IV violations when specific conditions are met. The draft enforcement policy revision will be published for public comment this summer.

MEMBER BLEY: I have to admit some ignorance here. What's a non-cited violation?

MR. HENSON: Non-cited violation is if it's -- right now for fuel facilities, if it's licensee-identified and it's a low safety significance, severity level IV, and they have developed corrective actions that the NRC considers should be effective; whether or not they have had time to implement them, but at least they're effective. It's non-willful.

MEMBER BLEY: So, they found it and they're fixing it?

MR. HENSON: Right, we could non-cite it as an NRC inspector. So, what this would change then is if it's an NRC-identified violation -- which it can be the same violation as that 1Y-seed identified.

MEMBER BLEY: Right.

MR. HENSON: But in this case we

identify it. As long as they have a corrective action program we've determined to be effective, they put in that corrective action program. Again, it's non-recurring, it's non-willful, we think the corrective actions they've described to us should be effective, then we can non-cite it.

MEMBER BLEY: Oh, either way?

MR. HENSON: Right.

MEMBER BLEY: Okay.

MR. HENSON: That's what we're working towards. Now, non-cited basically means that we don't -- in our report we identify it as a non-cited violation. So, we don't cite them for the violation. They don't have to come back to us with a written response to that.

MEMBER BLEY: But there is a record?

MR. HENSON: But there is a record. And in some cases that is something that they would like to see go away, as well as the record completely disappear, that it not be mentioned at all in a report; and we've had discussions on that. But basically right now it would just be -- it would be what you call it. It's not a cited violation. It's non-cited, so you don't have to -- we're not going to issue the violation to you and you don't have to respond to us. We trust that you're going to take care of it, but we're going to verify in a later inspection that you've done it right.

MEMBER BLEY: I'd hope you don't leave the policy of recording it, because if you begin to get a lot of these, I would suspect that's a symptom of something.

MR. HENSON: Yes, a non-cited violation would tell you -- I mean, it's still a violation. It's not that it's not a violation. It's not that it can't be symptomatic of an increasing trend or problem, and that's why trending is so important.

MEMBER BLEY: But you think it's on the right track?

MR. HENSON: Yes.

CHAIRMAN RYAN: And I imagine, to get to Dennis' point, when you do have a non-cited violation you go back and look is that part of a pattern of other non-cited violations, or is it unique and succinct all of that.

MR. HENSON: Certainly.

CHAIRMAN RYAN: So, I think that --

MEMBER BLEY: And he did say it's not repeated.

MR. HENSON: Right, it's not repetitive.

And that again is one of the features of a strong corrective action program, is you put all these issues; non-cited as well as cited violations, in that corrective action program.

CHAIRMAN RYAN: I may be putting too much in your thought, but to me it would also mean not necessarily a repetitive thing, but something that was related to or should have been like the previous non-cited violation. Maybe not exactly the same, but in the same general area of fire protection or something else.

MR. HENSON: Yes, and we look at that, because again one of the things we expect to see is an extended condition, extended cause evaluation so that you do identify, you know, generic issues potential for this particular issue to reflect itself somewhere else in the plan.

CONSULTANT FLACK: And, Jay, how do you determine if it's low-safety significance?

MR. HENSON: Well, they again right now in their traditional enforcement, they have the supplements in the enforcement policy to tell us for a specific type of violation some guides as to whether or not this is a severity level IV. Inspector looks at that guidance, makes that determination based upon his experience and understanding of the policy. But then he also comes back and discusses it with his branch chief and they reach consensus that, yes, this particular violation is of low safety significance and it makes -- it falls in that severity level IV description or guidance in the enforcement policy, so therefore they agree it's a severity level IV.

CONSULTANT FLACK: So, there's no quantitative criteria? It's really expertise here that --

MR. HENSON: Right, it's expertise. And we're again referring to that policy where it gives you examples of what's a severity level IV violation. Sometimes you find the exact thing that the example represents. Sometimes it's not exact, but you can kind of discern it from a significance standpoint. It's in that same ballpark.

CONSULTANT FLACK: Okay.

MR. HENSON: Next slide? Now, of course the benefit of a strong corrective action program goes well beyond just the fact that you get NRC to non-cite a violation, or the fact that there may be some reduction in the baseline inspection program. And in our discussions with the industry, you know, we both recognize and agree that the true benefit of a strong effective corrective action program is the safety benefit to workers and the public that result from the identification and correction of safety and security issues before they result in serious safety and health consequences. So, there's great alignment there.

Now, all fuel facilities currently have corrective action programs. And as I will discuss later, the nature and scope of these programs varies from licensee to licensee. And with the current corrective action programs in place at each fuel facility, the NRC, as a part of the licensee performance review process, routinely concludes that the safety at the fuel facility is adequate. So again, they've got corrective action programs and we have not come to any conclusions their safety is not adequate. However, the staff uses Commission direction regarding corrective action programs as an opportunity to support continuous improvement of safety performance at fuel facilities by the creation of more comprehensive and consistent corrective action programs that are based on the most current knowledge and lessons learned from the implementation of the current program.

MEMBER ABDEL-KHALIK: Now, the corrective action program at these facilities is pretty much inward-looking. They don't look at operating experience at other facilities?

MR. HENSON: Oh, they do.

MEMBER ABDEL-KHALIK: Do they?

MR. HENSON: They do. Again --

MEMBER ABDEL-KHALIK: So, how much detail are actually shared amongst different licensees?

MR. HENSON: Well, there won't -- there is -- no, we don't find a lot with reactors, because these are competitors. So, there's been improved discussion among the group, certainly through NEI and stuff to have some discussions on what are our common issues and problems. And sometimes if they're non-competitors, like a uranium conversion facility, they're probably more open to have discussions with a fuel fabricator than they would be another uranium conversion facility, if there was another one. And they certainly learn from -- they look at inspection reports that the NRC does at other similar-type facilities. They look at the enforcement cases that are taken. So, they do apply operating experience.

And depending on the licensee, some of them actually have an operating experience person, who that's all he does is he looks and finds operating experience. Because again, they're looking not on the cross-fuel facilities, but the chemical industry. Because again, these are chemical plants basically. They have nuclear material. And so, there is operating experience considered --

MEMBER BLEY: Jay --

MR. HENSON: -- and the corrective action --

MEMBER BLEY: Internationally WANO has at least one now process plant member. Does INPO accept or have any process plant members?

MR. HENSON: They have service plants, and a lot of these plants are a member of that organization from that perspective --

MEMBER BLEY: Is it under --

MR. HENSON: -- support, so --

MEMBER BLEY: -- INPO, or is it something separate?

MR. HENSON: It's an INPO organization. And I don't know, Doug --

MEMBER BLEY: So, those same kind of

things? And this is one of the issues INPO likes to push, I know.

MR. HENSON: Right, and in some cases they've invited INPO to come out and look at their facility and do an inspection and give them some insight on where they might --

MEMBER BLEY: Is it common to be involved in that, or is that a rare case?

MR. HENSON: It's perhaps not as common as one would like to see it, but they're -- and again, we're counting that change. We're not moving towards that. And so, as they've seen what the reactors have done, as they've seen what there is to gain from being a little more cooperative and having that kind of relationship with that organization, you see more and more movement. And I'm not really sure on exact numbers.

MEMBER BLEY: Okay. Now, I've seen one place who kind of didn't think it was a good idea, even though they joined, because it's all reactor people, but after a couple of years and going out on inspection visits and the like began to say we're learning a lot.

MR. HENSON: A lot of times what you find is this especially becomes critical when they've gotten themselves in so much regulatory trouble --

MEMBER BLEY: Yes.

MR. HENSON: -- that they're looking for help. And so, they understand that INPO, although they are a reactor organization -- safety is safety and there's a lot of insight they can gain from them. And so, they have been moving towards that.

MEMBER BLEY: Okay.

CONSULTANT FLACK: Yes, just to follow up a little bit on that, I know they give you safety culture assessments every other year, I believe, INPO, nuclear facilities. Has anyone actually done a safety culture assessment at a fuel cycle facility?

MR. HENSON: Yes.

CONSULTANT FLACK: They have been done?

MR. HENSON: Yes.

CONSULTANT FLACK: But not INPO? I mean, a separate --

MR. HENSON: Not necessarily INPO, no. They may hire some separate organization, an independent organization to do a safety conscious work environment assessment as part of a safety culture assessment. Or at some facilities they've come and actually done a safety culture assessment and where they've hired an independent contractor to come in and do that for them, or they've established a team of independent individuals to come in and look at their safety culture.

CONSULTANT FLACK: Okay.

MR. HENSON: Okay. So, that takes us to slide 20. So, the first step in the staff effort to develop a process to determine if a licensee's corrective action program is effective was to develop what basically what we call a list of criterion associated elements that describe a comprehensive corrective action program. If they've appropriately implemented these criterion elements it should result in an effective corrective action program.

The basic attributes of a corrective action program included in these criteria were you describe your corrective action program and policies, programs and procedures. The staff are trained and encouraged to follow and implement the corrective action program, policies, programs and procedures. Staff identifies and reports safety and security issues as required without fear of retaliation or discrimination. Safety and security issues are assessed for significance using a graded approach to determine the method used to evaluate and identify contributing and root causes and to determine the necessity to conduct extended condition and extended cause evaluations.

Corrective actions are developed that address the identified contributing and root causes with an intent to prevent the issue of occurrence and are implemented in a timely manner. The completion of corrective actions is verified and their effectiveness is assessed before closure. Corrective actions are tracked to monitor corrective action program status and performance and corrective action program data is trended to identify the recurrence of issues, to identify conditions that may result in additional or more serious issues and to assess the effectiveness of causal factor analyses and corrective actions. And lastly, the overall effectiveness of the corrective action program is periodically assessed by an independent entity.

Now, we reviewed these basic concepts of an effective corrective action program in the first meeting that we had with the Nuclear Energy Institute industry representatives in March of 2011, and there was general agreement with these criteria as described. So, these basic criteria, everybody agreed that that's the skeleton upon which you would build an effective application.

The NRC provided a more detailed description of the corrective action program criteria and elements to NEI and industry representatives in preparation for a meeting in April of 2011. And the NEI and industry representatives expressed divergent views on some of these elements described in a more-detailed corrective action program criteria. And some representatives stated that the added detail resulted in creating elements that were either too prescriptive or were not performance-based. So, as you start hanging meat on the bone, then you start having some discussions on when is the right amount of meat and is it the right meat to hang there?

In the most recent meeting, based on what we've concluded with NEI and industry representatives, which was in June, that the description of the attributes of an effective corrective action program which will serve as the standard by which a licensee's corrective action program will be assessed for effectiveness should be completed to support the development of the effectiveness determination process. So, we basically need to come to a conclusion then on what is going to be the final description of a corrective action program that we consider to be effective in order to start using that as a tool to assess licensee programs.

MEMBER BLEY; The one thing that has cropped up a few times, and I wonder how you're dealing with that, is even though the program might look effective for things that are in it, this process by which things that happen in the facility end up being added to that list is sometimes flawed in the sense that items don't get on there because the person at the lowest level who finds them makes a decision that others wouldn't have agreed with. Is there something about --

MR. HENSON: There will be an inspection program process. We have one now --

MEMBER BLEY: Okay.

MR. HENSON: -- where in a current inspection procedure there is an element where you look at the corrective action program, but to a very small degree. It's an inspection procedure that covers six different areas and the inspector is given on average about 16 hours to complete that, so you're not spending a whole lot of quality time. So, you basically look at the corrective actions associated with a particular event or something as opposed to a comprehensive assessment. However, we have had one facility where we've gone out and we've done two inspections where we've used the inspection procedure 71.152, which is a problem identification resolution program that's used for reactors, and molded that around this facility because it had a lot of issues and problems.

MEMBER BLEY: Okay.

MR. HENSON: And we have looked at those kinds of things. We've looked at the willingness of people. Do they understand what they should report? Is it at a low enough level? Are you avoiding that process where now that's not important, you know? What you look for is -- if you have any concern about an issue, let's put it in the system. We've got a process to evaluate it and we'll determine with that process what we need to do about it. But the idea is to encourage everybody to report things at a very low level. So, and we have found some issues where people are either reluctant to report or they may make that assessment of, well, I don't want to be looked on as someone who's, you know, a whiner, so I'm not going to -- this is so minor, it's just not that important. I'll let it go.

And so, and we look at this particular licensee and the improvements they've made; and they are making improvements, and certainly the safety conscious work environment and the safety culture is much improved over what it was years ago. But again, it is a continuous improvement process. You never reach the destination; you're always on the trip.

So, and that's the kind of things we -- we're applying at this particular plant because they've had a lot of issues for the last few years, but we're learning how to apply that. That's one of the lessons learned we hope to incorporate in this --

MEMBER BLEY: One of the things I was getting at and wondering if any of the facilities have built it into their plans, you know, the fault that occurred a year-and-a-half ago at one place was an on electrical system. A light on the panel went out and they tried to replace it and it stayed out. So, the guy who was, you know, replacing light bulbs said that's not a big deal; and the light bulb wouldn't been. Trouble is the light bulb gets its current from the protection circuit. He didn't know that.

MR. HENSON: Right.

MEMBER BLEY: So, somebody at a higher level needs to take a look to who would understand how the systems interact to decide that a thing really had no importance.

MR. HENSON: And --

MEMBER BLEY: And they've adjusted their program, too.

MR. HENSON: Right, and they try to do that, trying to -- and in that particular case, if it's the one I'm thinking of, yes, that is something they addressed with their staff through training to inform everybody it's not just a light.

MEMBER BLEY: Yes.

MR. HENSON: There's more too it than that. But how do you identify every one of those potential cases and address them? Unfortunately, those are things you find more often through occurrence as opposed to before the fact. And so, but, yes, people, you know, they are recognizing those are things you need to consider.

MEMBER BLEY: Okay.

DR. DAMON: I know one of the licensees puts a blue tag on everything that has a safety significance.

MEMBER BLEY: Ah, so then whoever comes to it knows that they ought to pay attention to it?

MR. HENSON: Right, they put notes in their procedures to say, note: This is an item relied on for safety. You don't do anything to this, you know, without contacting this person. And as Dennis said, some facilities actually label every significant safety control or IROFS to make sure that's recognized.

So, that gets us to the next slide, 21. Now, the staff has determined that in order to apply the revised non-cited violation policy at a fuel facility the NRC must have reasonable assurance that the licensee has established and implemented a corrective action program that will effectively identify; again, report, document, evaluate, track and trend safety and security issues. And as a result will identify and implement corrective actions that prevent their recurrence.

Now, the current operating fuel facilities have described elements of their corrective action program in their license application and related documents. Now, the nature and scope and level of detail of each licensee's description of its corrective action program vary.

Now, the regular basis for a licensee's corrective action program is the description of the corrective action program provided in its license application it submitted in accordance with the guidance in NUREG 1520, which is the standard review plan for the review of a license application for a fuel cycle facility. In this guidance document the licensee is requested to describe its program for the development and implementation of corrective actions for issues identified in audits and assessments of incident investigation as described in its quality assurance program and as a result of failed items relied on for safety. The plan does not require the licensee to describe a comprehensive corrective action program.

So as a result, a licensee's description of its corrective action program in it's current licensing basis documents may not include enough detail and all the standard cap criteria we've developed and the elements to support a conclusion that a licensee has established at least an effective corrective action program.

Now, during the meetings held with NEI and industry representatives on the corrective action program initiative, they've stated that the procedures they have implemented at their respective fuel facilities provide much more detail and insight into their corrective action programs and are more closely aligned with the NRC's proposed corrective action program criteria.

As I've previously stated, the NRC's current fuel facility core inspection program includes a limited review of the licensees' problem identification resolution and incident investigation programs, but does not require a comprehensive assessment of a licensees' implementation of its corrective action program. So, we can't right now, based on the results of the current level inspection effort conclude with reasonable assurance that a licensee has indeed implemented an effective corrective action program. We just don't have that data.

So basically, there is no currently established means to assess a licensee's commitment to an effective corrective action program in its existing licensing basis documents or by NRC inspection. So, licensees who want the NRC to apply the revised NCV enforcement policy at their facility, will voluntarily agree to implement an effective corrective action program as described in the corrective action program criteria to be developed. And the challenge is for the staff to develop a process that will enable the NRC again to conclude with reasonable assurance that a licensee has implemented an effective corrective action program. Now, we may base this again on a description of a licensee's corrective action program in its licensing basis documents.

We could say, okay, we want you to amend your license to commit to all these things so we have a basis now to inspect and cite you, but could just say, okay, now we're just going to rely upon a revised inspection program that does a more effective look at your corrective action program implementation to come to some conclusion that, yes, you are effectively correcting issues, or there may be some combination of the two. So, that's one of the things we're having to work out. However, there may be some alternative process that we haven't thought of yet.

Next slide. So, basically to complete the effort to provide incentives to licensees to maintain strong corrective action programs, what we're in the process of doing is; one, completing and publishing the standard corrective action program criteria; we need to establish a process to conclude a licensee's corrective action program is effective; and to apply the revised policy of how we're going to roll that out. And then, once we've rolled it out and we've given that credit, we've got to establish an inspection program for the continued assessment of a licensee's corrective action program so that we continue to assess it's effective. And if it's not effective, do we make a decision to no longer apply that NCV policy?

So, these actions will be completed before the March 2012 publication of the revised NCV policy. So, we should be ready so that when that policy becomes effective we can roll this out and apply those credits.

CHAIRMAN RYAN: Jay, before the roll-out step do you have any work shops or other kinds of activities with licensees as a group to get together? I mean, not that you're going to pick on any one licensee in front of the room, but it's sometimes helpful to have them all there at once so you can get a range of views without having to try and synthesize that yourself.

MR. HENSON: Right, and we've had three meetings where we've discussed this whole process --

CHAIRMAN RYAN: Yes.

MR. HENSON: -- about the development of criteria. And I'm assuming we will continue to have these meetings and exchanges with them as we further define and refine this process.

CHAIRMAN RYAN: And once you kind of get to where you're comfortable you'll maybe have sort of a roll-out-kind of test drive with them and say here's where we are and we think we're going to be and --

MR. HENSON: And we'll do the same thing with Region II.

CHAIRMAN RYAN: Yes.

MR. HENSON: Make sure the inspectors --

CHAIRMAN RYAN: Oh, yes.

MR. HENSON: There may some insights inspectors have about this.

CHAIRMAN RYAN: Absolutely. Okay.

MR. HENSON: So, yes, we want to include all the stakeholders as we get closer and closer and develop this.

CHAIRMAN RYAN: One thing I think that

would help, as I'm thinking ahead to the full committee, is if you have a schedule of events and activities like that --

MR. HENSON: Okay.

CHAIRMAN RYAN: -- or you could maybe even tell us in as part of -- you know, two or three sentences or half a paragraph on what your objectives are for those major interactions with the various stakeholder groups, that would really help us understand kind of the whole picture.

MR. HENSON: All right then.

MEMBER ABDEL-KHALIK: Do you have at least the raw data as far as the number of condition reports that are written at each facility? I know it's kind of hard to compare because they're unique, but --

MR. HENSON: There again, it depends on the facilities. It will be in the thousands at some facilities.

MEMBER ABDEL-KHALIK: Yes.

MR. HENSON: At some facilities it will be less. Some facilities have -- they haven't integrated all their corrective action program -- you know, you may have this organization or this process that has their own corrective action program. And it doesn't get integrated, you know, rolled up into an overall database, so to speak. So like I said, there's a lot of variability. Others, they have a very descriptive program. They have a single tracking and trending process. They have meetings every day to discuss what's going on the corrective action program as a part of their daily operations meetings. So, the level of sophistication varies as lot.

Generally, you find that those fuel facilities that have a lot of reactor people on the staff, you know, were used to understanding what a corrective action program was. And those that have a very descriptive quality assurance program document, they have more detail and more process in the corrective action programs. Those that have been in existence for awhile that didn't come up through that, they have a less-detailed program and a little more disjointed perhaps as far as a single comprehensive program.

CONSULTANT FLACK: Jay, do they have techniques on how to prioritize corrective actions? I mean, what --

MR. HENSON: Yes, most of them will do that. They have a way, because they want to limit the effort in doing say a causal factors analysis. If you've got a very simple low-significance issue, you're not going to put together a whole investigation team looking at that.

CONSULTANT FLACK: Right, right, right.

MR. HENSON: You're going to assign it to one individual --

CONSULTANT FLACK: Yes.

MR. HENSON: -- because you're going to look at it and come to a conclusion as to what the root cause and contributing factors were. And so, they do that. They've got to determine reportability. So, they got to look at it from a significance standpoint there. Is it reportable? And there again, when they start developing the corrective actions, the effort going into that, it's also predicated on how severe or the significance was.

CONSULTANT FLACK: Okay.

MR. HENSON: I guess slide 23, the last slide there, again, well, the other direction of the Commission to the staff was that they implement revisions to the baseline inspection program to credit licensees' effective problem identification and resolution programs. Now, the staff expects the fuel facility's baseline or core inspection program to undergo significant revision as a result of the implementation of the fuel cycle oversight process enhancements associated with the cornerstones.

The staff believes that this is the most appropriate time to make changes to the fuel facility's inspection program to credit licensees' effective problem identification and resolution programs. And by that time the staff should also have some corrective action program inspection experience to inform the revision of the inspection procedures.

However, that does not preclude some benefits to the baseline or core inspection program as a result of the implementation of an effective corrective action program.

The staff also expects that the implementation of effective corrective action program supports a more effective an efficient conduct of various NRC core facility inspections and therefore may result in a slight reduction of the level of effort required for an NRC inspector to complete the related inspection procedures. Staff have also found that facilities that have a very good corrective action program, that's a great benefit to the effective and efficient conduct of an event-related inspection. If they've already got an organization that's looked into this and you see what they've got that helps inform us in what we're doing is part of our effort in that type of inspect. So, that concludes my part of the brief.

CHAIRMAN RYAN: Thank you, Jay.

I'm going to suggest that -- we didn't have a formal break, but maybe we ought to take a five-minutes bio break for everybody to just pause for a couple minutes. And we'll come back in about five minutes, at 20 after. Okay?

(Whereupon, at 3:12 p.m. off the record until 3:21 p.m.)

CHAIRMAN RYAN: Okay. Well, I guess all the participants are in place, so we'll go ahead and we'll reconvene and reopen the record, please.

Dennis Damon, I think you're up.

DR. DAMON: Okay. My name is Dennis Damon. My job is Senior Advisor for Risk Assessment and I actually cover all of NMSS. Actually, I've been assigned to all the divisions in NMSS at one time or another, but mostly I've spent most of my time in fuel cycle, and that's currently where I'm doing most of the work.

First slide, yes. I'm going to talk about the fuel cycle significance determination process; but I have to apologize, we did work on this as an un-budgeted activity back in 2009. But like I say, it wasn't budgeted and we weren't budgeted to work on it this past year, although, I mean, I can't help thinking about the thing once in awhile and talking to John Flack on the phone about it. But there's really not been any further development work that's been budgeted on this activity. And so, anything I say here is strictly my own views, my own thoughts, and we don't have any formal documentation of this stuff that's been reviewed by anybody other than me and Rudy Bernhard.

But I thought I'd remind everybody of a few things, is that of course in the reactor oversight program all the reactors have PRAs, and the staff has done these standardized plant models to standardize across the different designs. But fuel facilities don't have PRAs. They have these things called ISAs. And they do have quantitative information in most of them of some kind, but ISAs were not done to generate a risk estimate, and they don't even add up accident sequences to sum the risk to individuals or anything like that. And many of them leave controls out that they have and they just simply don't mention them. they don't invoke them and identify them as items relied on for safety, which is a concept that belongs to the ISA rule. And so, you have to be careful about using what's in an ISA to evaluate the significance of things.

And so, my view on this is we will have to -- also, the other aspect of that is consistency. I mean, one of the primary things that was started up front as to why we're doing this fuel cycle revision thing is to have a consistent way of judging what things are more risk significant out there. And what I realize that means is that you have to do things just as they did for reactors with standardized models. You have to use the same -- you're going to have to have a standardized way of doing these evaluations, because if you don't, if you rely on the licensees' evaluations and their inconsistent with one another, they you get the wrong answers.

But, as I see in the second-to-last bullet there, what we're proposing here as a result of this year's work is to propose to the Commission as a path forward that we pursue development of a significance determination process, and of course we don't know exactly how it will turn out. And so, like I say, anything I say here can't be held against me, because we may change it as we go through the development process.

So, the next slide, I'm going to just walk through what I envision as being the development process and that this would be done if the Commission approves our proposal to move forward in this area and of course provides budget.

The first thing you've got to do is develop criterion and guidance for a qualitative screening of inspection findings. So, there's a two-stage process here; a qualitative screening and then a quantitative evaluation if it's found to be necessary. And we did back in 2009 develop a set of qualitative criteria, and we applied them to all the inspection findings and criticality safety and chemical safety for the preceding five years to see if we thought we could do this. And I think they need a little bit of work, but we were able to march through and do a qualitative screening. So, we need to tune that up and try it again.

Then the next thing you need is metrics that you're going to evaluate and guidance as to how you're going to do a quantitative evaluation of risk significance.

And the third bullet there is to remind us of what was in the ISA-PRA comparison paper. In Section 5 there was an example of a significance determination for a criticality sequence. And what we're initially proposing here; or at least I am, is to use a metric that's essentially the same kind of a metric as is used in the reactor oversight program; and that is, the inspection finding is some kind of deficiency that results in an increased frequency of accidents for some period of time.

And so, you calculate that delta frequency, that increased frequency and you multiply it times the duration that existed. And that's a probability of whatever the outcome was that was incurred because of the inspection finding. And so, it's an exact analogue of what's done in the reactor oversight program, the difference being that we have multiple of these metrics. We have frequencies of criticality, frequencies of chemical accidents, and you got multiple receptors. You actually have multiple workers and then you have the off-site public. And so, you've got a lot of different ones to evaluate.

Now, it turns out in any given

deficiency typically it's quite clear which one of those metrics is going to be the significant one, and so you don't actually have to evaluate all these different metrics every time you get a deficiency. It's usually quite clear what you need to evaluate.

MEMBER ABDEL-KHALIK: But looking at the fourth bullet, presumably not all sequences are equally consequential.

DR. DAMON: Right, absolutely.

MEMBER ABDEL-KHALIK: So, how are you just multiplying frequency times and adding them up --

DR. DAMON: Well --

MEMBER ABDEL-KHALIK: -- to give you any indication of a meaningful assessment of risk?

DR. DAMON: Well, typically, I mean, the rule itself defines consequence categories. So, like I said, there are going to be multiple metrics. There will be one for fatality, you know, of a chemical fatality, a criticality fatality. And in principle you could have the next level down, which is irreversible serious or other serious long-lasting health effects. That's the phraseology of ADGL-2, which is a chemical consequence criterion, and it's actually imbedded in the rule that way.

MEMBER BLEY: I think the key is though you're applying this to a finding, right?

DR. DAMON: Yes.

MEMBER BLEY: You're not applying it to the whole plant?

DR. DAMON: Right, it's not a risk assessment. That's why I did that little example in the ISA-PRA comparison paper, because it is very typical; and that is, a deficiency typically affects one control and one process in a very small subset of accident sequences that are affected by that finding. So, in the example in the ISA-PRA comparison paper there was a system that criticality controls. The first one, it's a solution system and it's to keep the solution in the safe geometry that it's in and not let it leak out. And the next one is if it does leak out, there's a protective dike around the process and the leaking fluid would then assume a subcritical slab-type geometry. And so, that was the example. So, it was obvious, you know, it's oriented towards criticality safety. And it's very simple and there were just a couple sequences.

Now, sometimes it's not true. Sometimes there's lots of sequences, you know? But I'm saying in general you end up with very few. And you notice, I mean, there could have been all kind of other things that could have gone wrong with that process, like chemical releases and stuff that were -- might have had toxic chemicals in it. This is irrelevant if it's not affected by the finding. So, it's only those sequences that are affected by the finding.

MEMBER BLEY: You can't compare it to a base risk because you don't have one.

DR. DAMON: Yes, right.

MEMBER BLEY: But at least you have a delta, an add-on to whatever it was.

CONSULTANT FLACK: Yes, what is it though, whatever it was? That's the question. I know with the reactor it's CDF. You don't know what it is actually.

DR. DAMON: Well, in the case of the example, it was probability of a criticality which --

CONSULTANT FLACK: Okay. So, it's likely at a criticality. That's just one example though. I mean, you could have --

DR. DAMON: Yes.

CONSULTANT FLACK: -- chemical releases. What would it be? Likelihood of a chemical release, increase in frequency?

DR. DAMON: Right.

CONSULTANT FLACK: But then you'd have the consequences as well of that, right? So, you'd have to figure that in.

DR. DAMON: Yes.

CONSULTANT FLACK: And how you would measure that.

DR. DAMON: Yes, you would. The way I would envision it is you'd have a significance criterion for -- well, you could do it different ways, but let's do a simple one. The rule defines high consequences and intermediate consequences. And then presumably in some sense these things are coordinated. They really weren't in the following senses; and it actually says this in the Statements of Consideration, is biased towards a radiation safety.

CONSULTANT FLACK: Yes, right.

DR. DAMON: Okay?

CONSULTANT FLACK: Right, yes.

DR. DAMON: So, they're not exactly equivalent, but you could do it and make them equivalent. In other words, death is death, right? So, you could say chemical fatality, criticality fatality.

CONSULTANT FLACK: The environmental impact may be different though.

DR. DAMON: Right.

CONSULTANT FLACK: Correct?

DR. DAMON: Oh, yes.

CONSULTANT FLACK: I mean, very different.

DR. DAMON: Yes.

CONSULTANT FLACK: So, you have to go beyond then fatalities. You'd have to involve the environment as well.

DR. DAMON: You could. You could do that. We thought about it. We thought about should we have a collect risk criterion in addition? The rules is oriented to the individuals, you know, that are affected, right?

CONSULTANT FLACK: Right, right. I know that.

DR. DAMON: And see, that is the difference between fuel cycle facilities and reactor accidents. When you get a large early release, you get a large release and it contaminates the environment. But in a fuel facility you might get a large chemical release and it could be fatal to someone off site, yet it's not a permanent contamination. You know, it could be something that dissipates and goes away.

CONSULTANT FLACK: Or vice versa. You get a large release and contaminate the environment but not kill anybody.

DR. DAMON: Yes.

CONSULTANT FLACK: So, I mean, how do you measure that?

DR. DAMON: Yes, fuel cycle facilities, there's a variety accident scenarios and they're very different. Fatality and contaminations are usually disconnected. For one thing, most of the facilities except for MOX don't have highly radioactive material. They're uranium, right? So, in terms of radiation contamination like we traditionally would worry about, like with cesium and iodine in the environment like they're having in Japan, we don't have that for most of these facilities. Now, MOX is different, although it's located on a DOE reservation. And a reprocessing plant would be different. But the current licensees that are operating, they're all uranium and you just really don't have the radiological contamination issue that we worry about with reactors.

CONSULTANT FLACK: Yes.

DR. DAMON: So anyway, that's what I'm thinking, is you would have multiple of these quantities. When I say "delta frequencies," frequency of different things; frequency of a chemical fatality, frequency of a criticality fatality essentially. You could use, like I say, just frequency of high consequences and frequency of intermediate consequences, or we could come up with different things that were more aligned.

Like I say, the current system is kind of biased towards radiological and we could come up with stuff that's actually equivalent. So, you'd have fatality and then maybe acute radiation syndrome and the equivalent chemical. And then down below that you would have exposures to say radiological exposures that do not produce any acute effects but simply give you a radiation dose that, you know, presumably increases your risk of cancer. So, you're going to have to multiple metrics and it's not clear which ones you would want to use.

But like I say, the last bullet there, that there's a wide variety of accident types and consequences, and that's why you need the multiple metric. But, when you have a deficiency to evaluate, it usually only affects one type of accident because the controls are designed to prevent that particular accident. And it usually only affects a few accident sequences, which is why I believe that in most cases we would be able to do the evaluation of the risk impact at the time the violation occurs. And what it would require is that -- of course we're going to have to train people, we're going to have to have criteria and how to do these evaluations.

Next slide. I've already mentioned, there's multiple metrics and we both have workers and public, but usually it's quite clear which one of these is going to be the dominant one of significance.

And then the next step in the process is to develop risk significance thresholds for these metrics. And that is, for example, a quantitative value such that if you incur an increased frequency of say a fatality due to a criticality, well, at what level is that a high significance and at what level is that very low significance, and we have to pick those numbers. Rudy and I worked on this a couple years ago and we came up with some preliminary numbers, but we never did any evaluations. One of the things we found is we looked at the actual violations for the last five years, but the inspection reports don't have in them all the information you need to do one of these risk evaluations.

So, that's one of the pieces of guidance about what we have to develop is to train the inspectors on what questions and what information to gather at the time they're there doing the inspection so that you can do a significance evaluation. And one of the main things they have to ask is what other controls have you got in this process, because many of the licensees do not choose to identify all their safety controls.

And now, the next-to-the-last bullet is to test the -- and once you've developed guidance on how to do these evaluations; this is an important point, it's just test it on both past actual violations and then we'll have to make up some hypotheticals. Because what you find is in looking at past violations, most of them are very low significance. And so, you don't get enough of the high significance ones to really test out a methodology. You're going to have to make up some hypothetical ones that are more serious so that you see how they would shake out.

And the bottom bullet there is, you know, the outcome of this testing process is to see whether in fact the thresholds and the metrics and stuff, they really do what we want them to do. And what we want them to do is to sort out inspection findings in terms of their significance. And what we really expect of course is that we would want a lot of low significance ones and very few high. So, we just want to see does it do that? Do we believe the evaluations? And so, that's what I envision here, is that testing is a very important part because I think it would be I think a mistake to go in and just, okay, let's go out and develop some method of doing this and just go out and apply it to actual licensees, to actual future inspection findings before we did something more hypothetical like this just to see how it would shake out.

And next slide. And I'll just mention this concept of quantitative significance determination process is strictly for what we call the ISA-related cornerstones; that is, chemical accidents, criticality accidents, radiological accidents. That's what this is used for. We don't propose to do quantitative significance of any of these other cornerstones.

MEMBER BLEY: And then one other, right?

DR. DAMON: What?

MEMBER BLEY: You only have five, but you named three. So, there's only one missing. I forget what it was. Emergency preparedness.

DR. DAMON: Yes. And of course emergency preparedness -- I'll tell you a story. There was a violation years ago by one of the licensees and it was in the emergency preparedness area. And they submitted a risk assessment saying, hey, this is insignificant. Well, yes, that's the way it way it always works out for emergency planning, because you're doing a good job of preventing the accident. So, my own view is how you evaluate emergency preparedness should not be based on a risk argument because it's a defense-in-depth measure. Essentially you're saying, yes, you think the risk is low, but what if you're wrong, you know?

MR. COLLINS: May I make a point before we leave that? The two radiological cornerstones, some of that is ISA-related and would fit into your process. But some of that is Part 20-related, which is not ISA-related, and the risk there is based on dose. And so --

CHAIRMAN RYAN: Based more on ALARA though.

MR. COLLINS: On ALARA?

CHAIRMAN RYAN: Such as dose.

MR. COLLINS: Right.

CHAIRMAN RYAN: I mean, you have to perform under the ALARA requirements.

MR. COLLINS: So, some of that, some of the --

MEMBER BLEY: But wouldn't the scenarios that would expose you to those doses though be in the ISA?

MR. COLLINS: Not necessarily.

DR. DAMON: Not the planned ones.

MEMBER BLEY: Oh.

CHAIRMAN RYAN: Necessary, but not sufficient. Good point.

MEMBER BLEY: Probably only those. The others should be there, I would think.

DR. DAMON: Yes, the accident ones.

CONSULTANT FLACK: The accident-related ones.

DR. DAMON: Anything that's unintended exposure should be in there.

CONSULTANT FLACK: Unintended. Yes,

right. But are these conservative analysis or realistic analysis --

DR. DAMON: I mean, in doing the significance determination I'm proposing this is realistic. This is --

CONSULTANT FLACK: So, it goes beyond the ISA because the ISA --

DR. DAMON: Yes, right.

CONSULTANT FLACK: -- by definition is conservative.

DR. DAMON: That's what I'm saying, is that you have to be very careful. Sometimes you can use the ISA information directly because the licensee has included everything and it's realistic. But they don't necessarily have to be realistic, and often they're very conservative. So, it's the highly conservative ones I'm concerned about, where they leave a control out. I mean, there's two orders of magnitude right there. And doing worst-case weathers, the same thing. It's a two-orders-of-magnitude-kind of thing. So, if you don't correct for it, you get the wrong answer. I mean, we don't have to be extremely accurate with this stuff, but we have to be, you know, within an order of magnitude.

CONSULTANT FLACK: Close enough. Got it.

DR. DAMON: And this last bullet I think is very important; and that is, if you're going to move to the next stage, which is to try to actually do this in a trial, you know, pilot study or something, the inspectors are going to be the front line of doing this stuff. They got to gather the information and they got to take a first shot at doing this significance evaluation stuff so that they can determine what information they may be missing. So, there's got to be guidance and training of inspectors before we move to the next stage of this stuff.

MEMBER BLEY: All of the regions now have two or three risk analysts. They have a special name for them, but there are people who have been back here for a couple years and aren't --

PARTICIPANT: SRAs, yes.

MEMBER BLEY: -- that kind of stuff, so they could help out.

DR. DAMON: Yes, they do. The problem here is actually the same problem the licensees had when they did the ISAs. There tends to be a disconnect between the people who understand the processes and the design and risk analysts, you know? You don't have like the overlap is the problem. You have risk analysts that are very good at that, but they're all reactor experience and they don't understand very often even the -- you know, what the strategies are for designing, you know, making things stay subcritical or chemical safety and things like that. You know, we have a disconnect there. So, no matter which way you do it you have to -- that's when I say guidance here.

I should have said guidance for the risk analyst, too, you know? They either have to learn the process -- I mean, I have been around fuel cycle long enough so I do know some of the processes, but to tell the truth, it's the inspectors who know these facilities. They're the ones that go out there every year. And over time and experience of the inspector knows an awful lot about the plant that I don't know, you know? But, you know, I know crit safety because I worked in it, and I know the strategies they use, but I'm not intimately as familiar as an inspector is.

And so, you have this disconnect. We got to train the inspectors to know how to do, you know, at least some level of risk analysis and vice versa. We are in fact trying to create people like myself who are risk analysts who know about fuel cycle. I'll probably be retired before this thing is implemented.

CHAIRMAN RYAN: Dennis, has the industry done anything, you know, along the lines that you'd see at NEI or other industry, you know, groups --

DR. DAMON: Oh, yes.

CHAIRMAN RYAN: -- to address all this? I mean, what's coming out of their industry activities as a whole?

DR. DAMON: Well, I mean, from the very beginning, back when we were only in the stage of proposing a rule to require ISAs be done, the NEI developed a guidance document, they got working groups together and talked about --

CHAIRMAN RYAN: So, NEI is still active in this area?

DR. DAMON: Yes. And during the time frame when the ISAs were being done, there were work shops held regularly to discuss issues that came up. You know, what do we do about this? What do we do about that? So, there was a lot of information sharing, even though, as I say, some of these licensees are competitors with one another. So, they don't necessarily share detailed system knowledge, but they definitely shared with one another their lessons about, you know, what was involved in doing these evaluations.

Last slide. This is sort of a very crude top-level structure of what's in the significance determination process and what the inspector does. He starts with a finding that could be a violation, does a qualitative screening, and then if the finding doesn't screen out to a very low safety significance, then you might proceed to doing a quantitative screening that eventually is going to probably involve consultation with risk analyst. But I would like the inspectors to be able to do the first cut at things.

And one of the reasons for that -- well, of course it trains the inspectors; and gets buy-in, for that matter, but it also -- by trying to do the significance evaluation, that's how you're going to learn what pieces of information may be missing that you need to get while the inspector is right there at the facility. And that's -- like I say, when Rudy and I tried to do these significance evaluations of past inspection findings, we weren't able to do it because the inspection reports didn't have this information in it. And so, that's what we got to do, is train the inspectors to do that.

MEMBER ABDEL-KHALIK: Do you expect this structure to work regardless of the level of complexity of the facility?

DR. DAMON: No, I think if you run into something that's very complex to analyze, you may have trouble, because unlike the reactors where we did the PRAs in advance, you run into the problems and you can have time to overcome them. If we run into something complicated or there's some kind of computer code that we need that we don't have or whatever, I mean, you're just up a creek, you know? So, I don't think you can guarantee that you can do this quantitative significance evaluation stuff every single time. However, I've been around fuel cycle since the mid-nineties and because I am a risk analyst I automatically try to evaluate things, you know, from a risk perspective that happened to see what significance I think they have. And I find that most of the time you can do it, you know?

It's just once in awhile you run into something; you know, shoot, I don't have a -- for examples, I have not yet identified a computer code that does probabilistic weather, you know, probability-weighted chemical consequence evaluations. They've got ones that will do one weather condition. You input the weather and it will do the calculation. But what I want is something like the MACCS code that does all 300 different weather conditions.

MEMBER BLEY: Sandia developed just such a code for the Army for looking at the chemical weapons facilities.

DR. DAMON: But it's probabilistically-weighted weather?

MEMBER BLEY: I believe it is. Well, it's sampled. It's like they did for the nuclear power plants.

DR. DAMON: Okay. They sample?

MEMBER BLEY: Yes.

DR. DAMON: I think Monte Carlo --

MEMBER BLEY: Yes, and so does Monte Carlo. Yes.

DR. DAMON: Okay.

MEMBER BLEY: And since Sandia developed it; it was done for the Army, but I don't know, you might be able to get it from them.

DR. DAMON: Yes, that's what we need to get our hands on is something that will do, you know, UF6.

MEMBER BLEY: Yes. Now, they weren't doing UF6, but it's heavier-than-air, so I think it would probably have the models built into you'd need with the properties for the gas and --

CHAIRMAN RYAN: Sanjoy made some comments on some other models at a previous Subcommittee meeting.

MEMBER BLEY: Yes, there are --

CHAIRMAN RYAN: -- on, you know, heavier-than-air gases relative to a plant-related issue.

MEMBER BLEY: Yes. Well, that comment was that the code that was being used here didn't account for the --

CHAIRMAN RYAN: -- about something that --

MEMBER BLEY: He did.

CHAIRMAN RYAN: -- he was using instead.

MEMBER BLEY: And there is a commercial package, but this was developed for the Government, so it's worth looking at.

CHAIRMAN RYAN: Yes.

MEMBER ABDEL-KHALIK: But, you know, back to the question I asked, whether or not this process is applicable to various facilities and regardless of their level of complexity, based on your response, admittedly this process may not work for complex facilities, and yet it is these complex facilities for which we need to understand the significance of whatever events may take place. So, coming up with something that we know may be deficient for the very case or very cases that we would like to understand is probably not the way to go, is it?

DR. DAMON: Well, like I say, I've been around a long time and looking at things. Even when you have say a facility like MOX, it's complex only in the sense that it's got an awful lot of different processes in it. But often when you're talking about a deficiency, it's in one process, you know, and affecting one control, and the safety design of most of the facilities is not that complicated. I would say the dry conversion facilities tend to be more that way, more complex because they can make use of automatic controls. So, they often would tend to have like say three controls on a process parameter, or something like that; hardware, you know, controls. So, it adds a certain degree of complexity because they may have a diversity of these kinds of controls.

But an awful lot of process designs are very simple. Like criticality safety, for example. They usually keep it pretty straightforward, simple controls. Like I say, occasionally it's not true, you know? Some processes have a lot of sensors and stuff on them and they tend to start to get looking more like a reactor or whatever.

Well, that's all I've got.

CHAIRMAN RYAN: Any other last questions for Dennis?

CONSULTANT FLACK: Well, just sort of a comment. I think the issue that we're struggling with is really the difference between the ISA-PRA philosophy and just the way that's being done differently. I mean, if you look at the ROP and the way it's laid out, you're thinking PRA because you're looking at an initiating event, mitigating, barriers, emergency planning. It just naturally brings you into that kind of setting.

With the ISA, looking at discrete things, naturally it brings you to discrete cornerstones. And it seems like the real issue is the method that is being utilized to begin with. And if there was a way you could simply convert an

ISA to a PRA and then lay out the cornerstones like the ROP, I mean, it would just be a natural thing to do. I think that Said was kind of indicating why isn't the logic there? And I think the logic isn't there in this case because it is a different method that's being used from day one and now we're trying to make it something that it isn't. I don't know. That's the kind of feeling I get from --

DR. DAMON: Well, yes, I wouldn't say it's just the methodology of like ISA versus PRA. How do I put it? Reactors all have a very similar safety design philosophy. You know, prevent initiating events. You know, have safety systems to provide safety functions, and then have a containment. But each one of these in a fuel cycle facility, each process has a unique design philosophy that can be quite different from some other process. They just use completely different strategies for different things. And so, you've got a multiplicity of design approaches to safety. And so, like you can't come up with one-size-fits-all, you know?

MEMBER BLEY: Right, it's not a size. I mean, when we had that session here awhile back on ISA and PRA, we had the one fellow from one of the industry. And, my God, the worst thing would be if somebody tries to take part of an ISA and turn it into a PRA. The ISA is a big fraction of a PRA, near as I can tell. And, yes, if you're going to look at criticality, you certainly have different models that you have to apply than you would for if you look at some other process system. Most of the process systems though have; I'm probably going too far, but I don't think it's very far, a policy of containment of the material. And either through control by batches, so there's not much of it in one place, or by structure of the facility it's built to keep things inside and not get outside. And to get to the public you got to somehow break through this. So, it just doesn't strike me that the idea that each of the processes has a different design means that something like PRA can't be done. You still develop scenarios and they start somewhere and they go somewhere. And eventually either they affect people or they don't.

DR. DAMON: No, no. I wasn't saying you couldn't do PRA. What I was saying is the paradigm of initiating events, mitigating systems, barriers --

MEMBER BLEY: Yes.

DR. DAMON: -- doesn't necessarily fit everything, you know? Sometimes there's no barrier; sometimes there is.

MEMBER BLEY: Well, except I think it was Doug earlier saying we talk and we generalize about barriers, so there may be procedural barriers. Within the administrative barriers there may be other kinds.

DR. DAMON: Yes, they call them controls typically, or IROFS, you know? But, yes, the terminology of barrier in the sense of like shielding or containment structure, or anything like the automatic stuff. For example, they have filtered ventilation systems on the plants to keep -- you know, you don't want the uranium getting out even. But what I've been told is those things are not sized to like say contain -- if you had a liquid, you have six cylinder rupture, it wouldn't prevent that stuff from getting out. It's not designed for that.

MEMBER BLEY: Yes.

DR. DAMON: So, there isn't any containment of the --

MEMBER BLEY: So, you'd have a release and you'd track it, see what it ran into.

DR. DAMON: Right. I mean --

MEMBER BLEY: Yes.

DR. DAMON: -- there are barriers. Any time there's toxic material, there's obviously going to be a barrier.

MEMBER BLEY: Some kind of barrier, yes.

DR. DAMON: But like for criticality, you know, the facilities we licensed are not shielded.

MEMBER BLEY: I mean, it strikes me the big difference is very often, as you said in the beginning, the initiating event is the whole thing, I mean, in a lot of cases.

DR. DAMON: Yes.

MEMBER BLEY: But it's not true in all cases.

DR. DAMON: No.

MEMBER BLEY: But still you can use that scheme.

DR. DAMON: There are processes in the plants that are more analogous to what I would call a reactor-type of thing, and they've been analyzed kind of like that. They start with a process upset in a machine and then they got mitigative systems to contain or prevent whatever is the bad outcome. So, you've got just about everything in these plants in terms of the different safety designs.

CHAIRMAN RYAN: Okay? Thank you very much, Dennis.

Jonathan, I believe you're up.

MR. DeJESUS: Good afternoon. My name is Jonathan DeJesus and I am the project manager for the enhancement for the fuel cycle oversight process. And today what I will present is the staff's conclusions of this presentation.

And to conclude, the staff identified and is developing a set of cornerstones that could be applied to the fuel cycle oversight process. Again, the current approach on our cornerstones is criticality safety systems, chemical process safety systems, emergency preparedness, public radiation safety and worker radiation safety. And I just wanted to make clear, earlier we said that we have considered other approaches to cornerstones, but that doesn't mean that we cannot consider those approaches again. Just wanted to make clear.

And also, the staff is developing a process to give licensees credit for effective corrective action programs. And again, this credit is to disposition NRC-identified severity level IV violations as non-cited violations if, among other criteria, the violation is entered into the licensee's corrective action program. And this credit will be reflected in the NRC enforcement policy.

Next, the staff will provide the Commission with a recommendation for next steps in a SECY paper, and this SECY paper is due to the Commission in early October of this year. And if the Commission approves, the staff will develop and test a fuel cycle significance determination process to help assess the risk significance of inspection findings. And this recommendation follows this Committee's recommendation on the ISA-PRA comparison paper.

And that's all I had to say. Thank you very much for your attention.

CHAIRMAN RYAN: Any questions for Jon?

MEMBER BLEY: Not directly, but if I could --

CHAIRMAN RYAN: Sure.

MEMBER BLEY: -- just kind of a recount, since Jonathan did a recap?

Go to the second bullet, developing a process to give licensees credit. To me the CAP is really important. And certainly you need to account for it because it's a crucial piece of doing things right, I think, so, I'm really pleased to see that.

I can't tell you if your cornerstones make sense because you didn't show me this framework, and I can't see how that fits together and how the inspection scheme fits with the significance determination process. I got a hint of what an SDP might look like, and that kind of is certainly a good step, and might be the right one. The cornerstones are the thing that make me uncomfortable because I don't see how it fits together and I don't see an overall logic that's convincing and orderly, and I hope you can do something with that. And, you know, maybe the framework does it; I sure hope so, but I don't get it yet. That's about it.

CHAIRMAN RYAN: I think there's a second and a third on that. And it's not that I think we just need to see it laid out from what your perspective is, and maybe we can figure out a time to do that either in a short subcommittee meeting or as part of a full committee briefing down the line with us maybe having some paper copies to understand that.

MEMBER BLEY: We can do that before you send your paper off, because otherwise I think our comments on the paper won't be very helpful.

CONSULTANT FLACK: But I think that's the key question. I think from what I heard before -- I mean, it's the connection between the performance indicators on a cornerstone and its link to the action matrix. But I don't think you'll be there by the time the paper goes up to the Commission, will you? I mean, you said that's something that -- yes, so that piece is not going to be -- I don't think we're going to see that piece.

CHAIRMAN RYAN: They got a framework.

MEMBER ABDEL-KHALIK: But this is not a case of bring me another rock. We just want to see the logic, the structure, which doesn't come through.

DR. DAMON: Well, and I think one of the problems is we don't have an --

CHAIRMAN RYAN: Yes, I think we're not going to solve it today, but the idea is we didn't get that part. And we could maybe work together on what will get us that part, that would be I think a good way to just focus discussion on that aspect which Dennis and --

MEMBER BLEY: And if you don't that, I don't know how you'd sell this very well.

CHAIRMAN RYAN: Right. Yes, it's tough.

MS. KOTZALAS: We'll work with the ACRS staff to get that document and see what we can do to address your information gaps.

CHAIRMAN RYAN: Thank you.

MEMBER BLEY: Anyway, thank you for really good presentations. I enjoyed them and learned a lot from them.

CHAIRMAN RYAN: Said?

MEMBER ABDEL-KHALIK: No.

CHAIRMAN RYAN: And again, I appreciate the effort that went into having you all give us some good detail today and the insight and benefit of your experiences and your work, ongoing though it might be for some long time ahead yet to come. But we look forward to hearing from you as the process moves ahead. Thank you all very much for your excellent afternoon.

PARTICIPANT: Thank you.

CHAIRMAN RYAN: Thanks for the extra half-hour, too.

(Whereupon, the meeting was adjourned at 4:03 p.m.)

SUMMARY OF COMMISSION STAFF REQUIREMENTS MEMORANDA (SRM)

Presentation to the ACRS Subcommittee on Radiation Protection and Nuclear Materials

June 20, 2011

Margie Kotzalas

Acting Chief, NMSS/FCSS/TSB

SRM M100429

- Concise paper comparing Integrated Safety Analyses (ISAs) for fuel facilities and Probabilistic Risk Assessments (PRAs) for reactors

- ISA/PRA Comparison Paper submitted to Advisory Committee on Reactor Safeguards (ACRS) on December 15, 2010

- ACRS letter report on ISA/PRA Comparison Paper issued on February 17, 2011

- ACRS recommendation – Develop and test the use of focused PRA-like analyses to help assess the risk significance of inspection findings for fuel cycle facilities

SRM-SECY-10-0031

- Make modest adjustments to the existing oversight program to enhance its effectiveness and efficiency.
- Develop a set of cornerstones that could be applied to the fuel cycle oversight process (FCOP).
- Provide an assessment of the work accomplished and recommendations for next steps.

CORNERSTONE APPROACH TO ENHANCING THE FUEL CYCLE OVERSIGHT PROCESS

Presentation to the ACRS Subcommittee on Radiation Protection and Nuclear Materials

June 20, 2011

Douglas Collins

NMSS/FCSS

Cornerstone Selection

- Top-down approach using the NRC Strategic Plan
- Mission
- Strategic Goals
- Strategic Outcomes

Cornerstone Elements

- Objective
- Desired results
- Key attributes
- Scope of inspection activities
- Metrics

Cornerstones

- Criticality safety systems
- Chemical process safety systems
- Emergency preparedness
- Public radiation safety
- Worker radiation safety

Criticality Safety Systems Cornerstone Objective

- The objective of this cornerstone is to ensure that nuclear criticality safety (NCS) controls and items relied on for safety (IROFS) protect worker and public health and safety by preventing criticalities. This includes ensuring adequate NCS analyses and ensuring the availability, reliability, and capability of NCS controls and IROFS.

Criticality Safety Systems Cornerstone Key Attributes

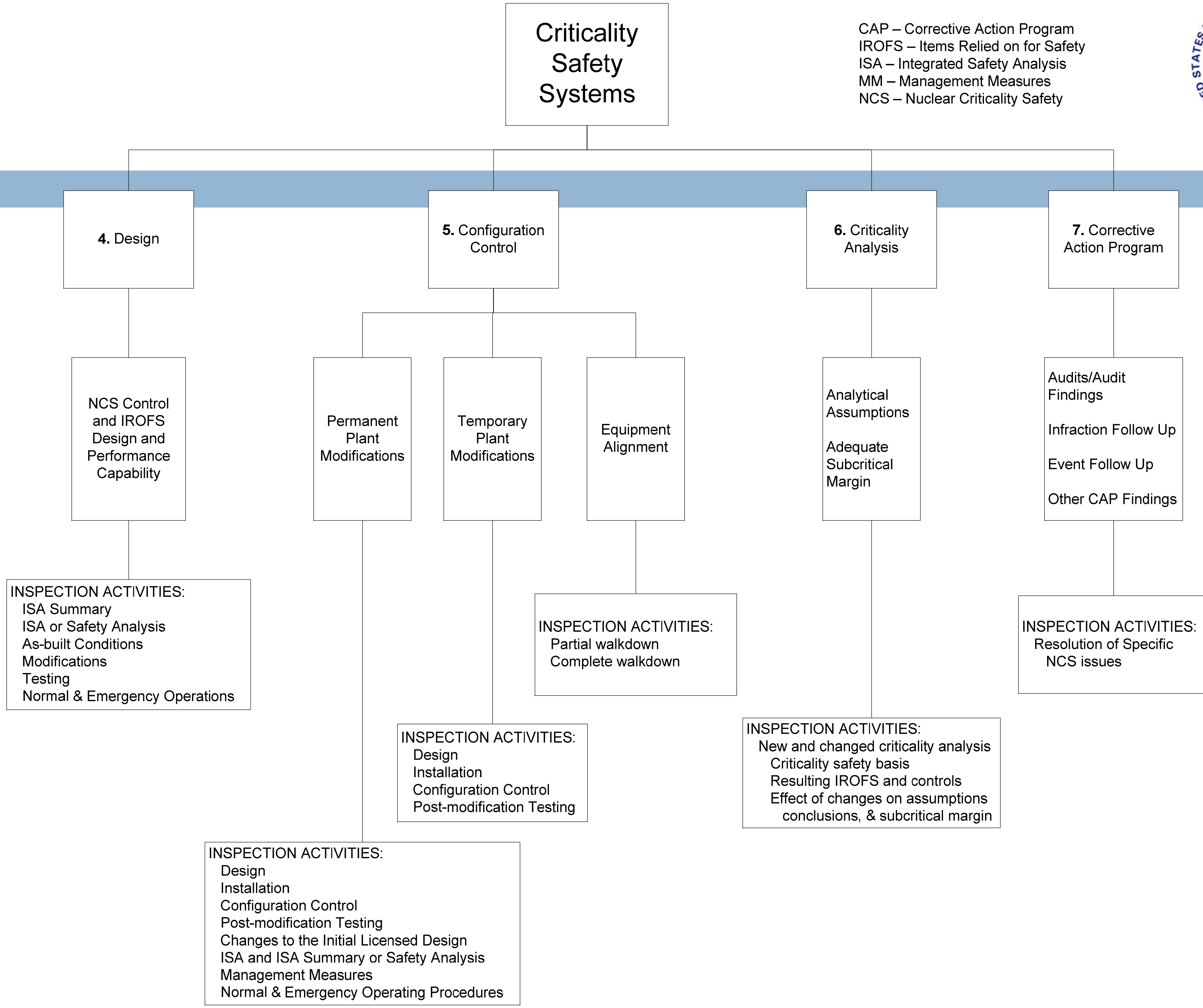
- Staff performance
- Procedure quality
- Facility and equipment performance
- Design
- Configuration control
- Criticality analysis
- Corrective action program

Criticality Safety Systems

CAP – Corrective Action Program
IROFS – Items Relied on for Safety
ISA – Integrated Safety Analysis
MM – Management Measures
NCS – Nuclear Criticality Safety

- **1.** Staff Performance
  - Staff Training and Qualification
    - INSPECTION ACTIVITIES:
      - Staff Performance
      - Staff Walk-through
  - Temporary Instruction
    - INSPECTION ACTIVITIES:
      - Staff Performance
- **2.** Procedure Quality
  - NCS Control and IROFS Clarity
    - INSPECTION ACTIVITIES:
      - Plant Procedures
      - Staff Performance
      - Staff Walk-through
- **3.** Facility and Equipment Performance
  - Maintenance Effectiveness
    - INSPECTION ACTIVITIES:
      - Application of MM
      - IROFS & MM failure evaluation
      - Maintenance activities
  - Surveillance Testing
    - INSPECTION ACTIVITIES:
      - Surveillance to determine readiness to protect NCS controls and IROFS from external factors
      - Surveillance Test Results
      - Ongoing testing
      - Test acceptance criteria
  - Post Maintenance Testing
    - INSPECTION ACTIVITIES:
      - Test procedures
      - Test activities
  - Fire Protection
    - INSPECTION ACTIVITIES:
      - **PHASE 1**
      - Ignition Sources
      - Control of Combustible Materials
      - Systems and Equipment
      - **PHASE 2 (in-depth review)**
      - Fire Protection of NCS Controls
      - Fire Protection of NCS IROFS
  - Flood Protection
    - INSPECTION ACTIVITIES:
      - Flood protection features
      - Procedures coping w/ flood
      - Measures during flooding or heavy rains
      - Flooding mitigation plans and equipment
  - Cold Weather Protection
    - INSPECTION ACTIVITIES:
      - Cold weather protection features
      - Procedures coping w/ cold weather
      - Measures during cold weather conditions
      - Cold weather protection plans and equipment

CAP – Corrective Action Program
IROFS – Items Relied on for Safety
ISA – Integrated Safety Analysis
MM – Management Measures
NCS – Nuclear Criticality Safety



Criticality Safety Systems Cornerstone Metrics

- Part 70 Subpart H
- License
- ISA summary and ISA
- Licensee procedures

Summary

- Developing cornerstones using a top-down approach using the Strategic Plan
- Currently have five safety cornerstones
- Seeking stakeholder input as the cornerstones are developed
- Will provide to Commission to support recommended actions

Questions?

RECOGNITION OF FUEL FACILITY CORRECTIVE ACTION PROGRAMS IN THE NRC ENFORCEMENT POLICY

Presentation to the ACRS Subcommittee on Radiation Protection and Nuclear Materials

June 20, 2011

Jay Henson

NMSS/FCSS

Commission Direction

- Consider how to best reflect the fuel facility licensees' Corrective Action Programs (CAP) in the NRC Enforcement Policy
  - Provide incentives for licensees to maintain strong CAPs
  - Implement revisions to the baseline inspection program to credit licensees' effective problem identification and resolution programs

Staff Approach for CAP Incentive

- Revise Enforcement Policy to non-cite NRC identified Severity Level (SL) IV violations if,
  - the licensee has established and implemented an effective CAP, and
  - the licensee enters the SL IV violation in its CAP for evaluation and correction

Enforcement Policy Revision

- Draft policy revision will be issued for comment this summer
- Wording and conditions the same as that for reactor licensees who currently have an Non Cited Violation (NCV) policy on NRC identified SL IV violations or green findings
- Final policy due for publication in March, 2012

Benefits of a Strong CAP

- More than NCV or baseline inspection program credit
- Identify and correct safety and security issues before they result in significant consequences
- Fuel facility safety is adequate with current corrective action efforts
- Opportunity to support continuous improvement of safety performance

Effective CAP Determination

- Staff developed CAP criteria and elements that are indicative of an effective CAP
- NEI and industry in agreement with description of basic criteria
- Divergent opinions on some items in the more detailed description of the criteria
- All stakeholders agree that standard description of effective CAP needed to proceed

Effective CAP Determination

- Staff is developing a process to apply the revised NCV policy to those licensee's who have voluntarily agreed to implement the defined CAP
- Challenge is determining if effectiveness determination should be based on
  - Licensing basis documents
  - NRC inspection
  - Combination of both
  - Some other alternative

Effective CAP Determination

- Path forward
  - Publish standard CAP criteria document
  - Establish process to conclude licensee CAP is effective and to apply revised NCV policy
  - Establish inspection program to continue to assess licensee CAP effectiveness

Baseline Inspection Program

- The revision of the fuel facility baseline inspection program to credit licensees' effective problem identification and resolution programs (CAP) will be addressed as the inspection program is revised as part of the cornerstone approach to enhancing the fuel cycle oversight process.

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FUEL CYCLE SIGNIFICANCE DETERMINATION PROCESS (FCSDP)

Presentation to the ACRS Subcommittee on Radiation Protection and Nuclear Materials

June 20, 2011

Dennis Damon

NMSS/FCSS

FCSDP

- Fuel cycle facilities have ISAs not PRAs
- Some ISAs have quantitative risk information
- But ISAs were not done to be a realistic risk estimate
- This means we do not know how an SDP development will turn out exactly
- All thoughts here are thus preliminary

FCSDP Development Steps

- These development steps will be carried out if the Commission approves
- Criteria and guidance for qualitative screening for significance of findings
- Metrics and guidance for quantitative screening of deficiency
- Delta frequency of x times duration summed over sequences affected by the deficiency
- Fuel cycle facilities have a wide variety of accident types and consequences, a deficiency usually only affects one type

FCSDP Development Steps

- Thus multiple metrics for workers and public
- Develop risk significance thresholds for metrics
- Develop guidance on what can be credited
- Test preliminary SDP on past and hypothetical findings
- Test: does the process do what we want?

FCSDP Development Steps

- Quantitative SDP is for ISA-related i.e. accident risk cornerstones
- Develop guidance and training for inspectors

Structure of an SDP

- Inspector SDP steps
- A finding that could be a violation
- Qualitative screening
- If proceed to quantitative screening:
  - Consult with risk analyst

CONCLUSION AND RECOMMENDATION

Presentation to the ACRS Subcommittee on Radiation Protection and Nuclear Materials

June 20, 2011

Jonathan DeJesus

FCOP Enhancement Project Manager

Conclusion and Recommendation

- Staff identified and is developing a set of cornerstones that could be applied to the FCOP
- Staff is developing a process to give licensees credit for effective CAPs
- Staff will provide the Commission a recommendation for next steps in a SECY Paper due in October 2011
  - Staff, if approved by the Commission, will develop and test a fuel cycle SDP to assess the significance of inspection findings