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NUCLEAR REGULATORY COMMISSION

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TECHNICAL SESSION - T4

SECURITY CORNERSTONE: ADEQUATE PROTECTION

NOW AND IN THE FUTURE

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TUESDAY,

MARCH 8, 2022

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The Technical Session met via Video-Teleconference, at 1:00 p.m. EST, Samuel Lee, NSIR, presiding.

PRESENT:

SAMUEL LEE, Division of Security Operations, NSIR/NRC

SCOT SULLIVAN, Senior Security Specialist, Security Oversight and Support Branch, Division of Security Operations, NSIR/NRC

JEFFERSON CLARK, Chief, Security Performance Evaluation Branch, Division of Security Operations, NSIR/NRC

WILLIAM (BILL) GROSS, Director of Incident Preparedness, Nuclear Energy Institute

DOUGLAS OSBORN, Distinguished Member of the Technical Staff, Sandia National Laboratories

P R O C E E D I N G S

MR. LEE: -- this discussion is to hear perspectives from the representatives of the NRC, the U.S. Nuclear Industry, and the Sandia National Laboratories on some of the physical security programs initiated and implemented in recent times at the U.S. operating reactor sites and how they have ensured adequate protection at the sites.

The panel will also discuss its views on how best to ensure adequate protection for future commercial reactors.

I just want to pause and remark NRC is closely tracking the evolving situation in Ukraine. We are in contact with our U.S. Government and international counterparts and we are receiving regular updates.

The NRC stands in solidarity with our counterparts in Ukraine. The International Atomic Energy Agency is closely monitoring developments relating to nuclear facilities in the region and is in contact with the State Nuclear Regulatory Inspector of Ukraine. The IAEA is publishing regular statements on its website. Slide please.

We will use slides to help guide the

Panel's discussions. After my opening remarks I will introduce our panelists for this session. As suggested by our session title, there will be two parts under this umbrella topic. First part, that is the Security Inspection Program now ensuring adequate protection.

The discussion will focus on three areas. One, security baseline inspection during Covid-19 public health emergency; second, force-on-force inspection program during the public health emergency; and third, the concept and application of reasonable assurance of protection time, a new concept that was introduced in the NRC Staff's policy paper SECY-20-0070 that recognizes existing layers of protection from both safety and security standpoints that support the nuclear power plants continued defense against threats up to and including the design-basis threat.

For the second, ensuring adequate protection for future commercial reactors, the Panel will discuss security related to new reactors under construction with the focus on security-related inspections before commercial operation.

In addition, the panel will also delve

into physical security considerations for future commercial reactors. Next slide please.

I will now introduce our panelists. First is Mr. William Gross who is currently the Director of Incident Preparedness at the Nuclear Energy Institute. In this capacity, Mr. Gross supports NEI's efforts related to physical and cybersecurity, emergency preparedness and access authorization, and fitness for duty. He engages industry, the Nuclear Regulatory Commission, and other federal agencies such as the Federal Emergency Management Agency, Department of Homeland Security, and the Department of Energy on matters of policy affecting the nuclear industry.

Mr. Gross is the Secretariat of the Nuclear Sector Coordinating Council and facilitates both the industry's security and emergency preparedness working groups. He will be providing industry perspectives on the topics of discussion today. Welcome Bill.

Our next panelist is Dr. Douglas Osborn who currently is a distinguished member of the technical staff at the Sandia National Laboratories. Dr. Osborn has worked at Sandia for more than 17

years, and has led projects for various nuclear safety and security efforts across a diverse set of domestic and international entities. He has been a nuclear engineer for almost 30 years in educational and research fields, and he also has operational experiences including his time in U.S. Navy.

Dr. Osborn also served as the U.S. Department of Energy Light Water Reactor for sustainability programs physical security pathway lead. In this position he engages the U.S. nuclear power industry's physical security community to help address physical security issues through novel advancements across many disciplines such as risk, sensors, barriers, response force, strategies, and modeling simulations.

Dr. Osborn will be providing his perspectives on the topics, but he'll be presenting a short set of slides later focused on risk informed physical security using dynamic force-on-force modeling tools. Welcome Doug.

Our next panelist is Mr. Scot Sullivan who is currently a Senior Security Specialist in the Security Oversight and Support Branch in NRC's Office of Nuclear Security and Incident Response. Since

joining NRC in 2008 he has performed oversight of the security baseline and core inspection programs. His work has encompassed developing inspection programs, significance determination processes, and maintaining the security inspection program for new reactors, operating reactors, decommissioning reactors, materials licensees, and fuel cycle facilities.

Prior to joining the NRC, Mr. Sullivan worked in the nuclear industry holding various positions related to the protection of nuclear power reactors ranging from response team leader to a security shift supervisor.

He will start off the panel discussion today by sharing NRC staff baseline security inspection experiences during the public health emergency. Welcome Scot.

And finally I'd like to introduce Mr. Jefferson Clark who is currently the Chief of the Security Performance Evaluation Branch in NRC's Office of Nuclear Security and Incident Response.

He and his staff are responsible for conducting NRC-led force-on-force inspections at U.S. nuclear power reactors and also at Category 1 fuel

cycle facilities.

Mr. Clark has over 35 years of experience in the security field with 13 years at the NRC serving as an inspector and team leader for NRC force-on-force inspections. He retired from the U.S. Air Force after serving 23 years with distinction.

Mr. Clark will share the NRC Inspector's experiences with conducting force-on-force inspections during the public health emergency. Welcome Jeff.

And again, I'd like to welcome all of our panelists and the audience who have joined us. And at this time I'd like to kick off the panel discussion by going to the next slide and ask Scot Sullivan to share his views on NRC Security Baseline Inspection During Covid-19 Public Health Emergency.

But before I transfer the microphone to Scot, I'd like to inform the audience that as you listen to the panelists share their views, if you have questions for the panel to address, to elaborate further on a point, or to clarify prior statements, please submit the questions via the virtual environment. The session coordinators will relay the questions to us and we will do our best to work in

your questions to the panel's discussions as we go forward. With that, Scot.

MR. SULLIVAN: Thank you Sam. So right now I want to talk about what we've seen in our baseline security inspection program as a result of the last couple years with Covid-19 public health emergency.

So inspections at operating power reactors continue. As we've seen with the variants that have come up in the U.S. and across the globe, it's been a dynamic process. You know once we get through one stage of the public health emergency, another variant comes up and we've had to deal with that.

So fortunately, we built in flexibilities within the program to address various conditions that may arise. The Covid-19 represented one of those conditions. And so I'm going to talk a little bit about some of the flexibilities that we had previously implemented in the program, and then some of those flexibilities that we implemented as a result of Covid.

So the flexibilities allowed the NRC to develop and use the right approach for each licensee.

You know based on localities, licensees have different impacts. Some areas are impacted more than others. And so the flexibilities have allowed us to really target areas of the country where we needed to, and implement various aspects of our program that mitigate in some cases risks to NRC inspectors and risks to licensees.

So it also has allowed us to look at how we inspect. We've evaluated how much we need to be onsite; how much we can do in a remote capacity. Other things that we looked at were really looking at and inspecting the most risk-significant activities while we're onsite.

So we have reg guides that were developed as a means to provide additional guidance for licensees as they implement their programs. Those reg guides, as I said earlier when they were developed, provided latitude to deal with various situations that potentially represent a safety issue or hazard to inspectors or licensees.

And what we've seen especially in certain areas for licensees is that they're implementing the provisions that are allowed under these reg guides to ensure the safety of their staff. So one of those

areas has been specific to training. And evolutions that require a large number of staff to participate, those are areas that we've really kind of targeted. We've seen licensees employ these flexibilities whether it's a simulation in an exercise or maybe an increased artificiality in an exercise because we didn't want to see a large number of people congregate in singular areas. And probably the biggest area that we've seen these flexibilities really help utilities and us as regulators.

So some of the feedback that we've actually received from NRC inspection staff and industry has been specific to those flexibilities that licensees implemented regarding their annual exercises.

One of the comments that we received back was that it allows a more inclusive drill and exercise for all participants even those who may not see action during an exercise or drill.

You know, one of the other challenges that we've seen is how do you get to the range. How do licensees conduct range work when you've got many people in closed areas. And we've seen some licensees really be innovative in how they approach

those types of training activities.

How much of that we'll see carry on, you know, I think that's dependent upon one, how long the public health emergency lasts, how long certain areas are impacted by these types of issues. And you know, obviously positivity rates and things like that; new variants that potentially come out. But some of the other things that we're really trying to do is look at what we've learned from the last two years and determine where we can implement some of these things whether it's an efficiency that we've been able to identify, or whether maybe it's just a better way of a licensee evaluating something and it gives us, from an inspection standpoint, another method to verify compliance with the regulations. And we want to learn from those things.

You know we continually assess our programs for lessons learned, and that can be leveraged in a manner that facilitates changes to strengthen the efficiency and effectiveness of our programs.

So with that, Sam, if we've got a question or if another panel member would like to add in something, I'd really like to hear those comments.

MR. LEE: Sure. Thanks Scot for those comments. I appreciate that. Bill, before I go to you to seek your thoughts from an industry perspective, one of the questions I wanted to ask Scot is, is that as you recounted the flexibilities that were applied in the recent years due to the Covid impact, can you talk a little bit more about the elements of the Security Baseline Inspection Program that you thought were most important to preserve during a public health emergency and why?

MR. SULLIVAN: Yes, so and I'll speak specifically from a regulatory perspective in that open communications with licensees and understanding the challenges that they were faced with, and whether it was meeting the specific regulatory requirement based off of a, you know whether maybe they had to implement. I know at different times they implemented a pod-type environment where they limited the number of people that could be in certain areas. That really challenged licensees and how they're going to meet some of the training requirements.

And it was through that open dialogue whether it was between the utility and headquarters or utility and a regional inspection staff that

enabled us to understand the approach that the licensee would take. And we could then look at the regulatory requirements, determine whether that was something we would find acceptable or not, and of course documentation. We would receive documentation when we were onsite.

We were really focused on the most risk-significant areas that licensees were implementing, and that allowed us to really make sure that the most risk-significant things were continuing to be met, even faced with the challenges that utilities had. So obviously communications and then focusing on those most risk-significant areas.

MR. LEE: Thanks Scot. Bill, did you have any thoughts from an administrative perspective on how the security-related inspections in recent times have gone from your perspective?

MR. GROSS: Sam, I think they've gone well. And as Scot mentioned in his remarks, communication between the NRC and the site, I think if we try to think about how we as an industry would respond to a pandemic, and how the NRC would continue to perform its oversight activities. If we had performed this in 2018, we never could have foreseen

the scope of impact, the types of impacts, or the inter-connectivity of those impacts from different groups at the sites. And the communication has been vital between ensuring that the site understands what the expectations are, how they exercise or inspection would be conducted, and then work with the NRC to find the way forward where the NRC could inspect the elements that need to get inspected in a way that recognizes the need for both the plant and the NRC to protect its people against, you know, potentially contracting Covid-19.

That communication piece has been vital. We saw it not just at the baseline inspections but also with the NRC evaluated force-on-force program and making sure that those oversight functions could continue to be performed. So I think it has gone well.

I think the ability for the utility to send material to the NRC to review in advance where historically maybe that activity would have been done onsite has been good. It helped us keep our folks from getting together too much and providing that information where you guys could review that while being not onsite is good.

I think that when there are elements that have to be done onsite, you know, walk-downs or observations, and kind of cordoning off those into must do onsite versus can be done someplace else, I think the right balance as really struck them.

MR. LEE: Thanks for that Bill, and I recall the attorney's remarks from this morning, what do you call a contact sport, you know, likening the inspection efforts to such analogy and appreciate the acknowledgment that the balance was practiced and continues to be.

Scot, you mentioned in your remarks that we refer to some of the lessons to be gleaned from this. I'll turn to Scot first and then to Bill and others who would like to chime in. What are some lessons that were gleaned from these experiences that could help inform the future of the baseline security inspection going forward? Anything that you could share that we could envision as to how they could be applicable in the future?

MR. SULLIVAN: Well I think one of the key elements is, and Bill kind of alluded to it, you know what things do we truly need to be onsite for? You know what can be achieved maybe in some type of

remote activity? A lot of the paperwork reviews, you know verification of paperwork was done in a remote capacity.

We also looked at the number of training evolutions and how those were conducted, and you know, is there something there that we've seen that benefits protection at the site that maybe the regulations were maybe overly stringent. You know maybe there's room that we can eliminate some conservatism and still maintain margin.

Those are the things we're continuing to evaluate. Obviously, you know, we've been in this condition for a number of years. We're really starting to come out of that. And until we get through a period of time where we've implemented the program as it was prior to Covid, that's still our lessons learned period. We're still evaluating, hey, is there a decline anywhere.

I would say maybe after a year of full implementation when we get back, we'll really have a better picture of were there efficiencies and is there any negative impact. We'll have a better view of what we can do and what we potentially can do. So it may be premature to say, hey, we definitely see

this and we need to change that.

MR. LEE: Any other thoughts by anybody else on the panel?

MR. CLARK: Yes, Sam, I just have one. You know there's a change in the paradigm on conducting the force-on-force inspections in regards to the length of the day that's involved with conducting the exercise. There are several different briefings that have to take place, you know, for control of the exercise, for safety briefings for the controllers and the players that are involved with the exercise.

And once we did change our format, you know, we looked at conducting some of these meetings virtually in a computer-based training module that, you know, the individual licensee and the individuals could take, you know, and not be in the presence of a large group that we were trying to avoid. And the caveat with us was as long as it did not reduce the margin of safety that's involved, it looked like it would be a good efficiency.

And this is something that we're evaluating on, you know, to carry on in new future cycles for the force-on-force. Because not only is

it a reduction in time that the licensee individuals have to be onsite, you know, the time taken up, it's less time that the inspectors actually have to be there in all these meetings. So I think it's a benefit for both.

MR. LEE: Thank you Jeff. We appreciate that.

MR. SULLIVAN: If I could add into that, Sam?

MR. LEE: Go ahead.

MR. SULLIVAN: So Jeff, that was one area that we not only saw on the force-on-force, you know, specific to NRC trying the old force-on-force, but we also saw licensees implementing their own programs. You know they were doing some modules that typically were done the day of in a CBT-based module. For example, how they deal with miles and some miles training evolutions.

It really, in my mind, was an efficiency and really -- I don't want to say burn reduction -- but it allowed the NRC inspection staff to focus on things outside of just your normal everyday single occurrence that many of these licensee officers have seen you miles, and operated with miles for years.

We view that kind of probably not as a risk-significant area and we've allowed us to focus on other areas.

MR. LEE: Thanks. Good discussion. And speaking of force-on-force, at this point I'd like to shift now from discussing baseline security inspections to force-on-force inspections.

Force-on-force inspections started as a capstone evaluation of licensees' ability to use their security resources to detect, assess, and respond in an integrated fashion to a threat. So at this time, I'd like to go to the next slide and give Jeff Clark of NRC and opportunity to share his perspective on NRC-lead force-on-force inspections during the public health emergency. Jeff? Jeff, I think you're on mute.

MR. CLARK: Second year in a row I've done that. The -- to cap on what you said, Sam, that the force-on-force being the capstone is integral, you know, part of the inspection program, you know, to provide assurances that the licensees have developed adequate protection in protecting their site.

So, you know, for 2020 was a challenge.

We started off the year with one complete inspection and then had to pause the program while we were trying to develop a new inspection procedure, a completely new inspection procedure that would evaluate elements of the strategy and taking in all the mitigative measures to reduce the number of people that were involved, maintaining the safety of the licensee personnel as well as the NRC inspector personnel.

And I think that Scot and Bill both said it well that communication was key in this because the schedule was constantly changing, the conditions at the sites were constantly changing, and the communications between the teams and the licensees was an integral part of being able to get out and get onsite and to do this.

But with that inspection that only look at the limited scope tactical response drills, we were not able to get an assessment of the licensee strategy, which is what, you know, we are tasked to do. So starting in 2021, what we did was we developed a modification to our force-on-force inspection procedure that allowed us to be able to evaluate the strategy using the minimum number of people involved.

And what we did was along with that, we

developed what we called a temporary staff guidance that identified criteria for the sites to use to be able to justify not being able to conduct that inspection procedure and to revert back to the inspection procedure that used the limited scope drills.

For 2021, you know, again the way that the states, you know, conditions changed, the regions' conditions changed, you know, we had a mix of both the force-on-force modified in the inspections and a limited scope drill inspections.

But we felt that, you know, 2022, you know, it was time to try to start to return back to normal, and in alignment with memos that were sent out by NRR and NMSS, we established another tier to this that if the licensees could safely conduct the full force-on-force exercises, then we were going to implement the full force-on-force inspection program. And with the allowance to revert back to the modified force-on-force inspection program and justify hardship criteria, go back to the limited scope drills.

Communication was key in, you know, any of these inspections, any of these transitions that

went from the force-on-force to the limited scope drills, the licensees needed to understand what needed to be submitted to us for approval. And, you know, we've had all of them used over the last two years now.

So, we found merit in using the limited scope drills. Typically a successful force-on-force exercise, the licensee may not have to use a lot of their personnel. Based on the way that the site is configured, their layers of defense, they may be able to eliminate the adversaries very early on.

The limited scope drills allowed us to look at the other elements, you know, that were deeper into the site, you know, other concentric layers of their defense, key engagements that we felt were crucial for the defense of the site. So it has been very beneficial for us to use those, you know, when we haven't been able to evaluate the strategy for the site.

Again, you know, we hope that, you know, this year that with some of the relaxing of some of the mandates and the increased number of vaccines, the safe conditions. The safe conditions are going to allow us, you know, to get back to the full force-

on-force inspection program, you know, so that we can say that we have adequately assessed the sites and we are fulfilling our regulatory oversight.

And I will ask for Bill's comments.

MR. LEE: Thanks Jeff, I appreciate that. Bill, I don't know if you had some comments that you wanted to make from your perspective. I do have some questions so would you like me to go with the questions first or would you like to make some comments first?

MR. GROSS: Let's go with the questions.

MR. LEE: Okay. So one of the questions that I wanted to ask, Jeff, that if you could just, you know, help us, the audience, to go in a little, zoom in on the actual activities that you and your team perform during these exercises. So you mentioned, you know, the various scope of inspections that were conducted depending on the site conditions. What were some of the techniques that the inspectors used to reduce the scope of the exercises while still maintaining the ability to assess the effectiveness of the licensees' protected strategy?

And I know you mentioned that the limited scope drills, you know, had some limitations there,

but can you at least compare between the full exercise and the modified exercise that allows you to glean that information?

MR. CLARK: Sure. So the force-on-force inspection is heavily dependent on site inspection because of the level of sensitivity to the information that's involved in, you know, we need to have hands-on of looking at the site profiles and everything that's involved.

But some of the efforts that we did were, you know, reduce the number of individuals that were involved in different activities such as presentations for a new protective strategy, table top drills, trying to glean down only the minimal number of people that needed to be involved with that for us to be able to successfully complete that inspection objective for the limited scope drills. You know, picking out, you know, the smallest number of people that needed to be involved with that.

And then when the modified force-on-force, only looking at those individuals that, you know, would have the engagements necessary to provide the assessment of the strategy. So there was a delineation there of you're either looking at

elements of the strategy or being able to look at, you know, the entire strategy.

The challenges with this were of the site layout, you know, the site strategy structure. So we had to look at these individually. There is no cookie cutter for this that we could go out and say that we're going to do X for each of these sites. You know we had to go out onsite, be able to communicate with the licensees on who needed to be involved with this for either being able to, you know, conduct this assessment of their strategy or understanding the challenges involved and reverting back to the limited scope drills.

For the inspection activities themselves, really nothing changed as far as, you know, our planning week activities, you know, everything that we went out there to do to look at the building blocks that we need to develop the scenarios involved for the exercises. If the exercises didn't come to fruition, we took the elements from that exercise and we made drills out of those.

And then going back to the full force-on-force with all of the site individuals involved,

we just added up, you know, more people.

MR. LEE: Thanks. So chime in any time, Bill, whenever you want to. And also I would ask though, I wanted to ask a couple of questions, a couple of series of questions, and one is, Jeff, you talked about the efficiencies in the tiered approaches that you described. Were there any elements of the modified inspection formats, whether it's the modified 0-3 or the limited scope inspections, that actually enhance your assessment capabilities? Were there any parts that -- so let me just stop there. Were there any elements of the exercises that actually enhanced your assessment capabilities?

MR. CLARK: So, you know, I would say that there were but there were also added artificialities that challenged the ability for the licensee to be able to demonstrate their strategy. As a team leader onsite, if you're using only a limited number of personnel when you would have more personnel that you would have to be able to respond or interact with, it put an added burden on them that was separate from what their training and experiences were.

The licensees did a really good job of doing lessons learned and bench marking and being able to understand that as the year went on. The added benefit to doing, you know, like I said with the limited scope tools, you know, we were able to look at the individual tactics. We were able to look at the individual responses for some of the licensee personnel that we wouldn't really get to see if we conducted the full force-on-force, you know, exercise. And we're limited that by either the engagement itself of, you know, where it takes place onsite or the oversight that we have for the inspection personnel onsite, the controls.

MR. LEE: Thanks for that. Before turning to Bill, and maybe even Doug, and I'll just ask the question and then give you the opportunity to think about this. But I'll put the burden back on you, Jeff, to maybe address this first and then we'll turn to Bill and Doug.

So, you know, based on these experiences and the benefits of the tiered approach that have been applied, are there any elements from the modified approach of conducting the inspection that you believe should be considered for inclusion in the

force-on-force inspection program in the future?

And the question that I'll just have for Doug for him to think about is, is there anything from your perspective that could be used to enhance the assessment capabilities of the inspection staff when the ability to observe a full-scope exercise is limited?

So with that, I'll turn to you Jeff first. Anything that, from these approaches that you believe could be considered for inclusion in the future of the force-on-force program?

MR. CLARK: Yes. You know I stated before the way that we've restructured the briefings in the meetings, you know, that's a reduction in burden for the licensee and the inspection staff. One of the things we're looking for is a long-term carryover to the program.

And, you know, having the caveat to -- for the site to be able to get the full assessment of their strategy when all the personnel can't be involved in the exercise, it's not something that we look at doing as a routine basis. It's not what we're tasked to do. It's shown that we can do it, you know, if the individual, you know, conditions

come up. You know there may be similar conditions that we may see in the future that may challenge the site from being able to post all of their individuals. And we would have to look at that, you know, again. It's such a site-specific basis that I really couldn't give a full answer. You know it's something that we would look at wholesale across the program.

MR. LEE: Thanks Jeff. Bill, any thoughts from your perspective there?

MR. GROSS: There's a couple things. Jeff, in the early part of his presentation, talked about the different -- maybe I'll call them tiers. There are different methods the NRC could use to conduct the force-on-force throughout Covid-19. That was arrived at through a lot of back-and-forth with the NRC and the industry, and I think we ended up in a really good place. A place that I mentioned earlier allowed the NRC to do kind of much as they could do safely recognizing the conditions that are in place.

And that continues to be the place now as Jeff talked about. We were able to conduct a full three, or the full NRC evaluated force-on-force exercise this year for the first time since early

2020. And I think the industry and the NRC are both looking forward to getting back to where we're doing those exercises. It is a good exercise for the licensee to demonstrate the full capabilities of the protective strategy in a way that's very difficult to view, as Jeff talked about, if you're using limited scope exercises to perform that.

And one of the elements I think that has made this program successful over the last two years is that continued engagement that the evaluated exercise, there's a lot of moving parts. It takes a long time for both the NRC and the industry to prepare for them. And you know, you can't rely on the fact that site conditions are going to be as you intend them to be when it comes time for the exercise.

So I really want to compliment the NRC on having periodic check-ins with the site as you get closer to that inspection so that the exercise can be appropriately tailored to sort of be the maximum that they can do, recognizing the need to maintain the safety of the plant and of the people. So that's been very good.

I think there are some administrative elements to how we kind of prepare for these exercises

that can continue to be included, and Jeff talked about one of them. But I think it's also important to recognize that the important role that the evaluated exercise performs, which is to recognize the full scope of the licensees' protective strategies. So it is important that we strive to get back to the most realistic exercise possible. The fewest number of simulations, the fewest number of limited scopes where we can, and recognize that that protective strategy is designed for a specific function and we need to check that function.

The last is, you know, we have spent a lot of time considering what have learned over the last two years relative to a proposal that's in front of the Commission now related to changes to the evaluated force-on-force program. And while there are maybe some administrative elements that we could incorporate into how that's implemented, we don't think changes are needed after what's I front of them now. I think the program that's proposed there is still solid and sound, and if that were to be implemented, we could over time take a look at further enhancements to that program.

MR. LEE: Thanks for that, Bill, and I

appreciate your complimentary words on NRC staff's continuous engagement with industry. And I recall when the tiered approach wasn't panned out initially and we were looking for how best to conduct these exercises, I remember just internally within NRC how we were trying to apply principles of good regulation as the Chairman described this morning as to how we would apply those and how we would conduct force-on-force in these uncertain periods.

And then we came up with those tiered approaches which I think is serving well today, and so -- and we appreciated the interactions we've had with all of the stakeholders to get feedback and how our strategies were developed in concert there. So thank you for that feedback.

Doug, did you have any thoughts that you wanted to share from your perspective on this, or did you want to save your remark until later?

MR. OSBORN: No, I can go ahead and comment. Thank you, Sam. So a lot of what both Scot and Jeff both talked about has applicability over in the Department of Energy, specifically through DOE's office of security. I do like the idea of developing lessons learned. Hopefully the NRC and DOE's Office

of Security can provide maybe a lessons learned sharing capability, again covering things how range activities were done to looking at these limited force-on-force exercises. Department of Energy has been doing limited scope performance tests for quite a while now. They're very well established over there. It's a great way to actually go and test out a force-on-force protective strategy. But again, nothing ever replaces the full scope force-on-force exercise to go and again provide that validation point within the (inaudible).

MR. LEE: Thank you, Doug, appreciate that. Thank you, Jeff and others for that informative discussion.

At this time I'd like to transition to the third and last area under the umbrella of ensuring adequate protection today theme. And that third area is the concept of reasonable assurance of protection time.

As I mentioned earlier at the beginning of this session, this is a concept that recognizes that there are many layers, existing layers of defense from both safety and security angles that work together for protection of the site. And this

framework allows for a specified time that supports the licensees' continued defense against threat up to and including the design-basis threat.

So let's go to the next slide, and I'll ask Scot Sullivan to elaborate further and provide his perspective on the development and implementation of reasonable assurance of protection time.

MR. SULLIVAN: Thank you, Sam. So Sam led off on reasonable assurance for protection time. That's something we've actually talked about at a previous reg. But that was back during some of the developmental phase of it. We had just kind of really explored the concept and had defined it at that time. And what we've been able to do since then is make adjustments to our regulatory guidance, specifically reg guide 576. We issued a revision to that reg guide in November of 2020 that really incorporated the RAPT, and again that's the Reasonable Assurance of Protection Time.

And as Sam noted, it does recognize the existing layers of protection available to sites along with how the safety and security of the site would evolve over the time following the initiation of an attack.

So the RAPT reflects the determination that, you know, the licensees' physical protection program meets the general performance objectives identified in 7355(B)(1), which is to provide reasonable assurance that the site can defend the public health and safety, and that they can do so independently for a timeframe of at least eight hours.

But I think what we all recognize is that at some point in time there's going to be added resources that will come into play, and I'm not going to say that it's always at that eight-hour mark. It's likely much sooner than an eight-hour mark. And what I'm talking about there are, you know, law enforcement engagement.

So law enforcement's going to respond to the site. They bring a certain level of assets along with them that can support the site in defending it against potential DBT-type attack. The site has other capabilities whether it's recalled security officers, you know, that they can supplement the onsite response force.

So there's other elements that went into the RAPT. I'll speak a little bit about some of

those as I go through those. You know one of those is licensees' implement flex equipment. And flex equipment, when I'm talking about that, it's diverse and flexible coping strategies. Some of that came into play after Fukushima, and as a result of some B5B work that was completed.

But what that does is there's additional equipment that licensees have access to that they could use to potentially mitigate and can utilize to maintain long-term cooling, spent fuel cooling, and containment integrity.

They also, licensees also have the ability for operator actions where operators are able to realign various components systems to ensure continued cooling as well.

And lastly, one of the things we really thought about is your DBT adversary. Over time their capability likely is going to decrease. You know the assets that they have available to them, whether it's ammunition or whatnot, is likely to decline. So while you see a decline in adversary capability, you're seeing an increase in what the site's capability is.

And so when we look at that and we looked

historically back at, you know, where industry and where they've performed through our force-on-force, we've got multiple cycles of force-on-force data to pull from. You know we determined that, you know, licensees are in pretty good shape. And they're demonstrating that they can defend against the BDT.

So in understanding that, the RAPT enables licensees to refine their protective strategies in a risk-informed manner. Industry stakeholders have expressed that the RAPT concept adds a greater level of regulatory clarity because it provides a consistent framework for target set development.

While implementation of the RAPT might require some revisions to site documentation, it does not require any additional commitment beyond the current regulatory framework.

And so while we put a lot of work into developing the RAPT and having it issued in the reg guide, what I'm starting to see is that licensees are starting to submit whether -- I don't want to say ALARA, but you know different program documents that are starting to incorporate the RAPT into their program. And we're having an opportunity to evaluate

that, and I would anticipate over the next several years those things will increase over time.

So this was one of the major changes in my mind over the last probably decade that we've made regarding a real risk-informed approach to security.

So with that, I'm really interested to hear from Bill on this topic and glean his insights

MR. GROSS: If I thought it was appropriate, you'd probably see me get up and dance. I really feel like RAPT is a significant step forward in the NRC's regulatory framework regarding nuclear power plants.

You know, Scot talked a lot about the rationale for why RAPT is reasonable. Utilities as far back as I can recall, including just after 9/11 and post-9/11 ASMs, started developing and maintaining relationships with their local law enforcement and local federal enforcement, so maybe the FBI. And they have been building and maintaining those relationships ever since.

And as Scot alluded to it, it is absolutely the case that if a site calls, people are going to come and help us with that response and it's reasonable to recognize that. Not only have

utilities been building and developing and maintaining those relationships, but the capabilities of local law enforcement and the FBI have greatly increased across the country after 9/11.

And not only do we see RAPT as being a great way to sort of recognize the relationship, but we also get the benefit of the fact that there's been a lot of advancements in homeland security since 9/11. 9/11, we didn't even have the Department of Homeland Security; that's a post-9/11 creation. The Office of the Director of National Intelligence. A lot of additional capability has been brought to bed to help secure the homeland, and I see RAPT as just a great way to connect all of that stuff together.

Scot, one of the other elements you talked about was you're seeing paperwork related to licensees evaluating or making changes to their protection programs based on RAPT. And I just -- that's of course very good news, but just take the moment to emphasize maybe to your listeners that when licensees make changes to the plan, those happen in a transparent manner through one of two vehicles. Either the licensee performs an evaluation and determines that the change does not decrease the

effectiveness of the program, and they're able to make that change without prior NRC review and approval. However, they are required to submit some information to the NRC about the change, and the NRC is able to inspect those changes, the technical basis for those changes, and determine whether or not the licensee made adequate determinations there.

The other path of course is a case where the NRC prior review and approval is needed, and of course you have visibility into that. So, you know, it's not like RAPT comes out, we can make all of these changes no one ever gets to see, it all happens, you know, behind the iron curtain. That's all inspectable.

And then ultimately in the end, what we've been talking about this morning are the NRC's baseline inspection program which includes the licensee-conducted NRC observed annual exercise and the capstone force-on-force exercise really is the test of whether or not the changes the utilities have made continue to ensure the capability to adequately protect the plants.

MR. SULLIVAN: Bill, thanks for that. You know, and that's an important piece. I'd like

to just take a minute to talk about that as well. So we actually revised our baseline inspection program a number of years ago to include an inspection procedure where we look at those plan changes that Bill alluded to.

And that procedure gives us the ability to, when a licensee makes a plan change, to go in, look at the plan change, evaluate the basis of the change to determine whether there is a potential for a reduction in effectiveness, and you know we can take action at that point if we identified something like that.

So, you know, I think that's a key element to our oversight program is that, you know, licensees provide us those documents as basis as to why they're making the changes, and we have the ability to inspect it which ensures continued protection of public health and safety.

But one of the key things that I wanted to talk about with, you know, Bill talked about a lot of those relationships that licensees have with law enforcement. And in my mind, the implementation of the RAPT and just really -- I don't want to say codifying -- but you know the concept that we actually

applied it and have it in regulatory guidance. I think it strengthened that desire for licensees to maintain those relationships and foster them more than what they had already done, and I think we're all better served for that.

MR. GROSS: Yes, Scot, that's a great observation. We -- I'm firmly aligned with you. It certainly creates a positive incentive.

MR. LEE: Thank you for those exchanges, Scot and Bill. One of the questions that, you know, that we get time to time, and it's kind of generic in nature, is you know we -- there's a lot of buzz about risk-informed and what risk-informed actually means, and what it looks like.

So in physical security space, what are the practical approaches for risk informing, and with respect to this concept of RAPT, how do you ensure that the site protective strategies focus on the most important risk systems, and how are any efficiencies gained in the risk space? Can you speak to those?

MR. SULLIVAN: So from an inspection perspective, you know we've actually risk-informed our inspection program. So what we do is we would have the regulations, we've constructed the

inspection procedures to look at the most risk-informed regulations at a higher frequency or periodicity than lower risk-informed areas.

From an overall perspective related to oversight, I think what we've really done and I think the RAPT kind of led toward that, is you know previous to where we were before the RAPT, and really when we looked at reasonable assurance, the regulations talk about high assurance and security. But what does that mean? Does that mean that there's zero risk or does that mean that there is some inherent risk applied when any licensee implements the regulations.

And I think what we really meant was that we're looking for reasonable assurance of protection. And that doesn't necessarily mean that it's zero risk, because there's always risk associated. And so we've tried to model our program in a manner that, you know, we all understand that there's some assumed risk, and for the RAPT we set a timeframe of eight hours. That's pretty conservative.

I could sit here and tell you that we all know that there's going to be more support for the site provided by external agencies before that eight-hour mark. But that's some of the risk that we are

applying in our program now. You know, where is it, do you look at it from a zero risk mentality, you could almost say the licensee would have to defend the site indefinitely for however long. And we all know that's just not a reality.

So Bill, you may be able to add in and I would assume Jeff, you may have something as well in a force-on-force perspective.

MR. GROSS: I'll add a couple of things before Jeff. You know this term risk-informed is, when I hear that term, when I have conversations with folks, everyone sort of hears that term through a specific set of lenses. You know, when I talk to Doug Osborn about risk-informed, it means something very different to him.

What I see in RAPT and the work for example we're doing with Sandia on unattended openings or penetration, crawling through small spaces, or the industry's worked to put together guidance on how to develop more realistic adversary timelines, the word I like to use is realism. And Scot even talked about it when he was doing his overview of RAPT. It's realistic to assume offsite response is going to come.

To me, that's much more of sort of a tangible way to talk about how we can further integrate elements into how we do these exercises or how we evaluate the plan says what's really likely to happen in the real world. And to me, that's a little different than risk-informed. So I prefer the use of realism as a better term for that type of engagement.

MR. LEE: Thanks, appreciate that. So I wanted to turn to Doug at this point. Doug, are there any similar approaches or concepts that you've seen from your line of work, and how it is integrated into the planning processes? Have you seen any concept like this before applied?

MR. OSBORN: No I have not. This is, I think you guys are absolutely leading the way in this area. I've heard from other regulators in other countries with great interest in seeing how RAPT is being applied at the nuclear power plant sites. Again, the basis of risk in the security world really is the design and basis threat, right. At or below that is the accepted risk that the site must take. Above that is the risk that the country takes in ensuring protection of that facility. So that's

simplistically enough that the design basis threat is an actual risk statement in and of itself.

To take and apply a time limit, again, it's very reasonable to assume the eight-hour time limit that's being suggested. And the thing is, when you look at the safety security interface, this isn't just a security silo, you know physics still applies. It still takes time to blow down the reactor, to heat up the core, to go through all the various types of steps that would be needed in order to achieve the actual radiological sabotage. And being able to consider and credit those signs is really what you're looking for. And I know that's kind of a weave into my presentation terms, but you know, that's where we're really seeing the NRC as a leader when it comes to developing such a concept as well.

MR. LEE: Thanks Doug, appreciate that. And just to, you know, speak in different words here, you know, so Scot, when you talked about coming up with eight hours as the reasonable assurance protection time, but that eight-hour timeframe, this is not to say that at eight hours everyone sits down or the response person sits down and quits fighting. But at eight hours it is reasonable to assume that

the site will have additional resources to defend against threat, and whether this be recalled off-duty personnel, or law enforcement, and/or the use of beyond design basis strategies.

At the same time, regardless of what the time to core damage calculation may be, the protection of your most risk-significant systems like the front line systems and any supporting systems with a prompt functional fire that could result in core damage, those still are being identified as target sets to be protected. And so I just wanted to reinforce that when you speak of risk, you know, it's just not one sided. It's not just reducing unnecessary conservatism, but you're also making sure that what needs to be protected is kept protected.

MR. OSBORN: Exactly.

MR. LEE: And at this time, what I'd like to do, so thank you Scot and others for chiming in, and this is -- it is a rather very innovative concept that is being applied here, so thank you for that.

MR. CLARK: If I could just add in just one more thing, Sam. You know this goes also back to, you know, the individual site-specific layout and location that not one response is applicable to

another. So you know it's important that the licensees take this, you know, into account of where they are as far as the capabilities.

And I know back even early on is the development of the 2003 DBT orders. You know we were trying to consider the balance between the licensee responsibilities and the responsibilities as a local state and federal government. So, yes, it's up to them to look at those and, you know, coordinate. And as Bill said, you know, it may be a catalyst to establish and keep those relationships.

MR. LEE: Thanks. Thanks for that, Jeff. One last question before we move on, Scot, and that is one of the questions from the audience is, why and how eight hours? Why not keep it open with no limits?

MR. SULLIVAN: Yes, so you know I can tell you we had numerous discussions of where we felt that happy medium was, and you know, a lot of data was reviewed. We looked at, I couldn't tell you how many exercises that we looked at, whether it was force-on-force space type exercise evolutions. We looked at a lot of information from utilities and had a lot of engagements with our law enforcement

community, FBI, and really tried to understand where we felt was a good timeframe with some margin built in that, you know, we knew that there would be offsite support. We knew that licensees could take certain actions. You know, we knew that licensees would be able to identify those important systems and, you know, we knew that licensees could get those off-duty security response force members back and actually integrate them into the response that they have.

And so it was a lot of data assessment and evaluation that we reviewed to come up with that determination and that eight hour was a good timeframe.

MR. LEE: Thanks Scot, appreciate that.

MR. SULLIVAN: But we didn't keep it open because we wanted to at least draw a limit on it. And I think that's an important thing, you know, you do have a box.

MR. GROSS: Sam, I'm just going to add a little bit to that. We do appreciate the box. It's always nice to have to have an irrefutable, you know, kind of hard line in the sand that you can all get behind. But the NRC has considered and it's still considering a methodology that would allow a site to

do a site-specific assessment that could result in a less than eight-hour security bounding time.

That's not final yet. It's still something that the NRC is considering, but it does recognize that different plants are in different places, and the capabilities of the offsite and the time limits to response could be different. So having a method that could allow you get less than eight is reasonable to consider, but it is nice to have something that's set in stone.

MR. LEE: Thank you for that. Appreciate that. At this time, and boy we're so far into the time here, we have about 20 minutes left in this session. What I'd like to do now is to go to the next slide and switch gears to focusing on security inspection program ensuring adequate protection for future commercial reactors. And I'll turn to Scot to kick us off by sharing his experiences and perspectives with a focus on security inspections related to new reactors under construction, and then we'll turn to Doug and get his take. So with that, next slide and Scot, please.

MR. SULLIVAN: So I've been fortunate to be involved in this effort from the development of

the new reactor construction inspection procedures, whether it's inspection procedures that look at the test and acceptance criteria of components, you know, various security components and whatnot, to their operational program inspections.

So I'm going to be specifically referencing Vogtle Units 3 and 4 as they're being constructed here domestically in the U.S. So as Vogtle 3 approaches commercial operations, NRC has been inspecting its security program. And again, that includes the installation and functionality of all the security systems and components.

It also includes the inspections of operational programs. And those are the programs that the licensee will implement to meet part 7355 of the Code of Federal Regulations.

You know one of the really interesting areas revolves around plant designs for these new reactors. You know here domestically, after 9/11 you saw a lot of sites be retrofitted with physical security design features, whether it was adding hardening or various things like that.

But these sites, they were designed with those things as a forethought. So they're extremely

robust. That's the one thing that I've really taken out of my time onsite watching it. I was out there when it was just a dirt field. And as it's been coming up, you watch different security features actually built into the design. And that's been one of the most interesting elements of my time going out to the site.

And so we've put in, I want to say there is over close to 700 hours of inspection activity just in the design segments of the inspections at site Vogtle. From the physical, you know, protection perspective, we still have a number of inspections that are outstanding, well a couple that are outstanding. But they're getting close for unit 3.

And then obviously through this evolution we've had a lot of learnings that will apply as we look at Unit 4 as well. This was a brownfield site, not a greenfield site. When I talk about a brownfield site, it's encompassed within a, it'll all be in one contiguous PA so it'll be Unit 1, 2, 3 and eventually 4, whereas a greenfield site would have been a stand-alone reactor without an existing unit.

And I think there were some benefits there in that the utility, you know, their programs

for unit 1 and 2, whether it was training, you know, various programs were already constructed, so there was some, definitely efficiency that they gained from there.

Seeing that we're to some extent short on time and I know we've got a couple other presentations, I'll stop there and I'm very interested in any questions that anyone may have.

MR. LEE: Thanks Scot. And what I'm going to do is hold off the questions related to what you just discussed and really turn now to Doug and give him an opportunity to present his slides.

MR. OSBORN: Thank you.

MR. LEE: And Doug, go ahead.

MR. OSBORN: Thank you. So we've been doing work over at Department of Energy's light water reactor sustainability program now for about three years with the focus on providing some technical solutions --

MR. LEE: Can you hold on for a second? I'm not seeing the slide. Can we get the -- there it is, there it is. Okay, thank you, appreciate that.

MR. OSBORN: And one of the things that

we're looking at is developing an approach to look at linking safety and security modeling in such a way that we can evaluate various types of safety systems and potentially credit those within a protective strategy. Go to the next slide please.

So this work is actually being done out of Idaho National Laboratories. They're one of the national labs involved with the open risk program and physical security. And what they're looking to do is use an existing dynamic event tree tool that's used over in the safety analysis and link that with reactor system response, thermohydraulic response, and security model or (inaudible) model, and look at how crediting additional operator actions inside the plant, additional emergency response equipment or built-in level 1, level 2 types of flex equipment that are onsite and see how those could potentially be credited within an actual sabotage attack. Go ahead to the next slide.

What you see here is really kind of a timeline that lays out how you would look at an overall attack, and how you would -- and after the act of sabotage occurs, what types of emergency response could be brought to bear again to mitigate

that sabotage event in such a way that you want to preclude radiological release. Go ahead to the next slide.

And lastly, what you're doing is you're looking at the thermohydraulic response after the effects of a sabotage event, looking at the timing, more importantly the timing. That's one of the big things that everybody likes to talk about risk-informed approaches using security PRAs. PRAs do not do a very good job at capturing the uncertainties associated with them, that's why we're looking at other types of risk techniques to better address that. And this is one of those using dynamic event tree model to capture those uncertainties in timing and better apply reactor physics, thermohydraulics associated with the after-effects of a sabotage event.

This is really what you see here is kind of that linked safety security modeling where the security aspects will be over in minutes, and then the thermohydraulics and system responses will be the point of the flex (inaudible). That's the last slide.

MR. LEE: Thanks Doug. Just staying on

the topic, with many new reactor designs focusing on efficiencies relative to resources, are there any innovations or technologies that you're seeing in physical security area that could lend to a more efficient program?

MR. OSBORN: Yes, absolutely some of the work that we're doing within the light water reactor sustainability program is looking at how to use security sensors in such a way that you're able to add two complementary security sensors to better detect and assess an adversary.

Looking at uncertainties associated with adversary timelines, risk-informed timelines, we'll not only look at uncertainty with the timelines but also what's the likelihood of success across to the past, and how does that look as far as an adversary pathway.

Other technologies we're looking to evaluate, a major force multiplier is obviously a remote operated weapon system and how you would evaluate those and incorporate those into protective strategies. And then applying these within a security by design approach. I know Scot brought this up when we were talking about the Vogtle site

and the build, but how you actually divide that forethought of adding security technologies, adding security features to your design in such a way that it makes it a lot easier to defend against a radiological sabotage event.

You're going to see that moving forward in any future reactor design. The larger reactors or even the more advanced small modules.

MR. LEE: Thanks Doug. If I could go back to the discussion on construction sites and the inspections and the lessons from there, Scot and others. First, a two-part question. One is can you, because you listed on your slides, you mentioned both the ITAAC which is Inspection, Tests, Analysis and Acceptance Criteria program, as well as the pre-op security inspection program. Can you talk a little bit more about the distinction between the two? And really the second part is is that compared to when construction first started, has the NRC's approach to completing ITAAC inspections in the security area and in the pre-operational security inspection program changed as the first of the two new reactors near completion? So two-part questions there, Scot.

MR. SULLIVAN: Sure. So first, ITAAC is

really the place setting and constructing of the security equipment and components. So in other words, the licensee builds it or their contractors build it, put it into functionality, so it's got to be in place or constructed as designed, and it's got to function as designed. So that's really what ITAAC looks at.

Your operational program inspections now take that and incorporate it into your overall physical protection program. How does your physical protection program use that in defending against the site? Do you have a maintenance program that understands how to test it, calibrate it, maintain it in a manner that it performs its intended function for you.

Other aspects of your operational program inspection has to do with physical protection. Where are your officers trained in the performance of their duties? Do they know what to do, whether it's at the search area, access control, access authorization, the different elements of that. So that's kind of the difference between those two areas.

Now you asked if, you know, we'd had any change of how we inspect things. I can tell you that

it's been very interesting to watch. You know one of the things that we, when we initially really kind of built this program as of part 52, support was -- we viewed it that the licensee would construct the site, we would do some ITAAC as it was being constructed, finish those up, and then we would have an opportunity to do the operational program inspections likely at a hard cutoff. That didn't happen. That hasn't happened.

So we were fortunate that when we developed the ITAAC inspections, the operational program inspections, we did understand that we would likely be looking at maybe some paperwork for your procedures and processes under the operational program inspection, so we knew there might be some overlap, but there's been a ton of overlap. So we're still closing ITAAC out. We still have operational program inspections that are going on. So what we learned was that they're going to happen at the same times. Now you may have a lot more ITAAC early on, but there's a ton of overlap.

The second piece of that, when we originally designed the program it was 100 percent. We tested every single element, every detection zone,

every microwave head, any IDS element that was there we tested every single one of those.

And what we did, you know, we took a step back and kind of looked at that, and so we determined that the licensee is testing those. There's acceptance testing that goes into play, comes into play. And so what we came back with was we're going to sample these programs. Obviously, if you run into an issue, we increase the sample. There have been times when we've had to increase the sample.

But those were changes that we were able to implement as we kind of went through this process. It has been a learning process for us. I would anticipate that we'll likely see changes. The program really was designed more for greenfield sites, I kind of talked about what those were before, not necessarily our brownfield sites.

So in other words, there are ITAAC that look at a licensees' central and secondary alarm stations. If those central and secondary alarm stations are already constructed, why do you need to verify that they've been constructed appropriately when they're already there. We know they already meet regulations. Is that something we need to look

at if it's a brownfield site? Likely not, right?

Now you want to ensure that the alarm capability, the communication capability crosses over to the new reactors, but not necessarily do I have to verify that the walls are of such a thickness and whatnot.

And so those were things that we were really looking at now. How can we learn from what we did here and apply that as we move forward? Is there a program, do we need to integrate the ITAAC and operational program inspections together and have one program moving forward? You know do we need to have something that distinguishes or separates between a brownfield site and a greenfield site because they're going to be different. And so those are some of the lessons learned that we're looking to take out of this.

MR. LEE: Thanks Scot, appreciate that. Bill, did you have any thoughts that you wanted to share from your perspective?

MR. GROSS: Now Scot, well, yes. Scot, you made a number of good observations. Now at the moment we've got one data point, one set of new plans under construction. And I know they're learning a

lot of lessons you're learning too. When there's overlap, there's opportunities for efficiency. And you know, I think the NRC we've talked about looking at where you could optimize or look for overlap and then kind of plan and prepare.

I think the utility has to do the same thing and be smart with their use of resources, right. If they're going to go out and do a surveillance on something, can they do just a little bit more and take credit for two different things at the same time. If they think of these things completely in isolation, there's inefficiencies on both sides, on our side and of course on your side.

One of the things that I think is relevant is now when we have the operating reactor fleet, we have lessons learned realtime. I mean it happens all the time and it's great. Here we're collecting an awful lot of lessons learned I think regarding how to do this at this advanced, you know, this new reactor that's being constructed, but there's not another one in the pipeline where we can easily apply those lessons learned.

So I know we are going to be looking to how do we work with the utility to try to glean as

much of those lessons learned and catalog them so they can be available for future use before all of that institutional knowledge goes away. You know if there's not another one kind of ready to go where we can apply that knowledge, it fades over time.

MR. LEE: Thank you, Bill, and I appreciate that perspective and the timely conclusion to our discussion. We're two minutes out. Let me just pause here and I'd like to thank each of the panelists for your willingness to be on this panel and share your perspectives today. I'd like to thank the session coordinator, Jared Justice, for spearheading the production of this technical session who is himself a security specialist in our oversight branch, and he will be serving as a panelist on technical session W20 on NRC oversight and inspection during periods of site inaccessibility.

I'd like also thank Jeanette Curry who is the security assistant who provided support. And let me also thank everyone who attended this session. Thank you for your attention and your questions. I hope this session was informative and that you'll enjoy the remainder of the conference.

I'll just note that the last slide is the

contact information for all of the panelists, so please feel free to reach out to us. And I know we didn't get to a couple of the questions, but if you reach out to us, we'll be happy to address them.

So thank you all again for a stimulating and informative discussion.

(Session Ended)