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NUCLEAR REGULATORY COMMISSION

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OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

DIVISION OF SPENT FUEL MANAGEMENT

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DSFM REGULATORY CONFERENCE 2019

(REG CON)

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TUESDAY

SEPTEMBER 17, 2019

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The conference met in the Crowne Plaza Philadelphia-King of Prussia, 260 Mall Boulevard, King of Prussia, Pennsylvania, 19406, Freedom II Conference Room, at 2:15 p.m., Daniel Mussatti, facilitator, presiding.

PRESENT

DANIEL MUSSATTI, Facilitator

MICHAEL LAYTON,

Director, Division of Spent Fuel Management

RAY LORSON,

Regional Deputy Administrator, Region I

Session I:

JOHN McKIRGAN, DSFM

CHRIS ALLEN, DSFM

BRUCE WATSON, DUWP

ROD McCULLUM, NEI

JOHN WISE, DSFM

Session II:

TONY DIMITRIADIS, NRC Region I

BRIAN GUTHERMAN, Gutherman Technical Services

RANDALL GRANAAS, Southern California Edison

KATHERINE WARNER, NRC Region I

JEREMY TAPP, DSFM

JEREMY RENSHAW, EPRI

ALSO PRESENT

HAILE LINDSAY, NRC Staff

CARLA ROQUE-CRUZ, NRC Staff

TOMEKA TERRY, NRC Staff

C-O-N-T-E-N-T-S

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

(2:15 p.m.)

MR. MUSSATTI: I hope everybody had a good lunch. We're about ready to start our second half. Just a short reminder as to the decorum for our forum. Make sure that your phones are shut off, so that we don't have any interruptions. When you do speak, speak directly into the microphone. State your name and your affiliation first. And above all, let's have a good time. I'm going to turn the mic over now to -- microphone to Mike, so that he can say a few words.

MR. LAYTON: Well welcome back. I promised that when Andrea Cook arrived, that I would introduce her. She will be the new director for the Division of Fuel Management. This is the combined Spent Fuel Program and Fuel Cycle Program. Andrea, would you stand up and wave so everybody can see who you are and come around and ask questions and things like that or did she step out?

UNIDENTIFIED FEMALE: I think she went to get her book.

MR. LAYTON: Curses. Foiled again.

MALE: You should have warned her.

MR. LAYTON: I did. That's why she went.

UNIDENTIFIED FEMALE: There she is. There she is.

MR. LAYTON: There she is. That's Andrea. Give her a big hand.

MS. KOCK: I feel like I'm standing --

(simultaneous speaking) MR. LAYTON: So with that, I'll turn it back to Dan.

UNIDENTIFIED MALE: We're just all happy that you could come.

MR. MUSSATTI: I'm just going to turn it over to these guys. They know what they're doing.

MR. DIMITRIADIS: Okay, good afternoon. I'd like to introduce next Mr. Randall Granaas. He is the ISFSI System Engineer and Program Manager of the San Onofre Nuclear Generating Station. Randall's also San Onofre's special nuclear material custodian. In this role, Randall is responsible for the safe storage of SONGS' spent fuel, both in wet and dry storage. Randall is a registered professional engineer that started his career in Nuclear Navy on a fast attack submarine and has over 35 years of experience working in Nuclear Energy Industry. Randall.

MR. GRANAAS: All right, okay. Good afternoon, everyone. So this presentation was

supposed to be given by our plant manager, Lou Bosch, but unfortunately he had to cancel. And since it's too late to ask for a refund, you're stuck with me, the B team. So sorry.

Okay, so the list of topics I'll be discussing are shim standoffs, multipurpose canister downloading event, and the associated canister weir assessment, the HI-PORT or Goldhopper seismic analysis, vertical cask transporter seismic analysis, which is what is commonly known as the belly band, lessons learned summary, and current status.

Okay, shim design. So the original and current shim design is shown on the left. And I say current because the original design was restored after broken and damaged shim standoffs were identified. So a shim standoff is 3-3/8 inches long, not including the 2 inch threaded portion there. And it's got a 7/16 inch diameter.

So what they're supposed to do is they're supposed to provide the same function as the cutout here in the original design, which allows helium to flow from the bottom of the shims to the flow holes in the bottom of the fuel cells. And this supports helium thermosiphoning within the MPC. Okay?

So there we have the shim and there's

another shim. So the shims themselves again besides providing a path for a helium flow, performs a function that's similar to the core shroud. So they translate the square fuel cells to the circular inner diameter of the canister as you can see here.

So the first broken shim standoff was discovered on February 20th, 2018 during canister receipt inspection. We have four SONGS. We have four MPCs that use the shim standoff design. And fuel is stored safely within the shim design MPCs even if all the shims were to fail nonmechanistically. And that's because the heat loads are much lower than the design and license loads.

So we've got canister downloading event. So on August 3rd, 2018, as a loaded MPC was being downloaded into a storage vault, it became lodged in the shield ring. For less than an hour, the MPC remained lodged and it was not suspended by the rigging. So the slings, which you're going to see here in a couple of slides, were completely slack. And they were piled up next to the base of the VCT.

So though unlikely, the canister could have fallen 18 feet to the bottom of the cavity enclosure container. Now the canisters have been analyzed to be able to withstand drops of up to 25 feet with a

substantial margin of safety. And during the event, there was no radiological risk to employees or the public. But of course this is not an acceptable event.

All right, so this shows the MPC, this graphic, lodged on the shield ring here and here. So the shield ring is 2 inches thick. It's welded in place. And its purpose is to reduce dose to the crew during MPC handling and reduce the shine coming out from here. And it also shields radiation coming from the MPC during storage.

All right. Okay, so in this photograph, you can see the HI-TRAC here or transfer cask. And it's attached to the mating device here, which in turn is attached to the cavity enclosure container --

UNIDENTIFIED MALE: We're unable to hear you on the microphone because you're facing away.

MR. GRANAAS: Okay. All right, I can do that. All right so, which in turn is attached to the cavity enclosure container which you can't see because it's embedded in the concrete. So to download an MPC, the MPC is first lifted a few inches using the slings here with the red arrows pointed. And that's done by raising these towers. So the towers are connected to the slings and it raises the canister.

So after the MPC weight is off the pool

lid, the air bags are air bagged to the side of the mating device drawer are inflated until they contact the pool lid. The pool lid is then unbolted from the bottom of the HI-TRAC here and the air bags are deflated and the lid is withdrawn from the beneath the HI-TRAC. As you can see here, here's the lid. And that's actually the air lines for the air bags. So then the MPC is lowered into the CEC by lowering the towers. The towers go down, slings go down, MPC goes down.

During the August 3rd download, the person observing the download did not notice the slings go slack. And the slings were piling up next to the VCT here and here. He did not recognize that condition. So when the event occurred, only the VCT operator and the single spotter who was not qualified as a rigger were present in the immediate work area. So the rest of the crew was about 150 feet away in a low dose area.

So when the rest of the crew got up there after the MPC was thought to be fully inserted, the MPC being hung up was identified by the rigger. He saw the pile of slings. He knew that wasn't right. And about that same time, the RP technician noticed that the dose rates were still really high. And that's because the MPC was still half in and out of the mating

device here and there's shine coming out of that drawer. And incidentally by the way, these things here are for lifting the entire HI-TRAC with or without the MPC.

Okay, so taking actions to address causes. So the root cause evaluation dug deep, touching on everything you see on this slide. So we revised our training programs. We revised equipment or added equipment, corrective action programs, oversight, and procedures.

So our procedures are much better now. They're much more detailed. The fuel transfer operation procedures were revised to identify critical steps such as the downloading process, record qualifications such as a rigger for downloading, load limits, and use of the new equipment.

Our oversight procedures were revised to improve review and acceptance of contract and procedures and training programs and fuel performance and fuel transfer oversight through use of task guides.

So training, we revised our training program and procedure. Increased detail and specificity. We retrained fuel transfer operations to personnel. And we retrained our oversight

specialist on oversight future changes and process of fundamentals.

Equipment. So we added cameras and monitors so we can observe the downloading remotely. The load shackles with remote indication. So that would be here. All right, and alarms. They're a valuable addition. So I would recommend you evaluate whether they should be used at your site. And we also added a robotic canister to verify the physical status during the downloading.

Corrective action programs. So we integrated the vendor into the SCE corrective action program for all problem identification and resolution associated with fuel transfer operations. Training was provided on the lessons learned from August 3rd and July 22nd, 2018 events. And all our staff was retrained on CAP use and requirements.

Oversight. So we enhanced our oversight organization with additional fuel transfer experience personnel. We performed a rigorous review of contracted procedures and training programs. And we also strengthened the SCE Senior Management Observation Program.

All right, so event reporting and actions to strengthen compliance. So the downloading event,

again it occurred on a Friday, August 3rd of 2018. And we informally notified the NRC the following Monday, the first working day on August 6th of 2018. But we didn't file a formal report until September 14th of 2018. We didn't report late because we hadn't considered whether the event was reportable. You know, as you may appreciate, the regulations can be a bit obtuse sometimes. And we, after careful consideration, we didn't think the event was reportable. But we got it wrong. So an important lesson learned for us is that you can always retract the report. And that's what we should have done.

Okay, canister weir assessment. So the Holtec UMAX FSAR states or stated, there's no risk of MPC scratching during download due to ample clearances. So this FSAR statement was revised using the 10 CFR 72.48 process. The NRC concurred with the use of the 10 CFR 72.48 process to make this change without prior NRC approval. But they did that based on the -- or supported by the data we collected inspecting eight MPCs.

Okay, so canister inspections. We use a provision digital borescope for this inspection, so there's a borescope here. And it's capable of measuring depth and length of indications, down to the

1/1000 of an inch or 1 mL. And we mounted this to a remote control robot here and here. And we could see 92 percent of the shell. And the only part we can't see is the lower 1 inch of the 3 inch thick base plate, which is blocked by the pedestal in which the MPCs rest. But most importantly, we can still see the canister to shell well, which is again the part that matters the most.

So SONGS' multipurpose canister design of fabrication features include the use of Type 316L stainless steel. We also use a 5/8 inch thick shell versus the standard 2 inch shell. We have laser peened wells to prevent chloride-induced stress corrosion cracking and a two pass well technique to minimize the introduction of heat. So the inspections concluded that incidental wear during downloading poses no safety significance. The wear marks will reform an outside layer to protect from corrosion. And an inspection and maintenance program will monitor over time.

So what the inspection and maintenance program is, is it's a commitment to the California Coastal Commission as a condition of the coastal development improvement allowing SCE to build and load the UMAX IFFSI. So it's going to be similar to an NRC required aging management program, but we're going to

implement it during the initial licensing period.

All right, quality transporter haul path. So there is the HI-TRAC on the HI-PORT as it's being transferred from the Part 50 area to the SSE. So SSE identified an issue with the HI-PORT transporter haul route. And this was captured as part of our broad review of the operations after the August event. And we found that the haul route was too close to objects such as fences and light posts.

We notified the NRC on December 19th of 2018. And we reanalyzed the obstructions and clearances. And then we completed corrective actions to improve procedures and develop guidance for establishing the haul route. And that would be such as painting lines around certain obstructions delineating the required stand-off distance. We filed a subsequent NRC report, which included results of the cause analysis, corrective actions on February 14th. And NRC accepted corrective actions via special inspection. We're on good time.

Okay. So the HI-TRAC with the cask restraint strap, which is collectively known as the belly band. So the NRC identified the seismic stability issue during inspection. So what they observed is as the belly band was being removed or

loosened before the HI-TRAC was lifted to clear the mating device. So SCE formally reported the issue to the NRC on February 2nd, 2019. We performed an analysis that demonstrated VCT operation without the strap has no adverse effect under design basis earthquake. We revised procedures. And we're going to maintain that strap attachment and tighten until the HI-TRAC needs to be lifted, lowered, or moved into position as it approaches the cavity enclosure container.

And then we retracted the NRC event notification based on the analysis, so that goes back to our lessons learned from a few slides ago where, you know, so when in doubt, report. You can retract later. This basically did retract. So lessons learned summary, I recommend you go and review SCE's downloading event, predecisional enforcement conference presentation for relevance to your site, potential changes to your site programs and procedures.

So the Peck presentation goes into much more detail on the corrective actions than I have today. Also, the NRCs November 8th webinar presentation goes into a lot more detail on the event itself. It's an excellent summary of the event.

Finally, Lou wanted me to caution you

regarding turn-key operations. In our opinion, there is no true turn-key operation. The licensee needs to remain engaged in the vendor's day to day operations, as well as the vendor's engineering and licensing activities.

We're almost there. Yeah, thank you. We got through it. Oh I'm not done yet, but thank you. I appreciate it. No, that's too early. Okay, and I threw in a couple of slides here because I knew we had two hours to fill, so normally I wouldn't, but I looked at that -- but we're almost done.

All right, so current status as of September 10th of 2019, since resuming the fuel transfer operations, we've downloaded four MPCs to the ISFSI, 40 remain to be loaded. And actually as of last Saturday, we loaded another MPC and it's currently being processed. And should go to the ISFSI by the end of the week.

And now I'm done. Thank you for your time and attention.

MR. DIMITRIADIS: Okay, our next speaker is Katherine Warner. Katherine joined the NRC in June of 2014. She started with the Agency as a Nuclear Safety Professional Development Program, NSPDP. And served as a project engineer in the Division of Reactor

Projects, which is where I came from recently. And she is currently a health physicist in the Division of Nuclear Material Safety.

In her current position, Katherine performs inspections of independent spent fuel storage installations as we call ISFSI and reactor and material sites undergoing decommissioning. And she also does reactor health physics inspections that operate in reactors.

She has a Bachelor's Degree in Nuclear Engineering from Missouri's University School of Science and Technology. She also has a certificate in decommissioning from Argon National Laboratories and Oak Ridge-associated universities. Please welcome Katherine.

MS. WARNER: Hi, everyone. Can you all hear me? Very good. My name is Katherine Warner. And I'm a health physicist in NRC Region I. I am part of the ISFSI, independent spent fuel storage installation enhancement team that we're going to talk about today.

The purpose of this presentation is to provide a status update of the activities on the ISFSI inspection program enhancement team. And an overview of some of our potential recommendations to enhance

the ISFSI inspection program. Our goal is to make sure that stakeholders understand the work of the ISFSI enhancement team, the team's approach to assess the ISFSI inspection program. And the thought process behind some of the potential proposed enhancements.

So first some background. The NRC transformation team was established in early 2018. It was focused on positioning the NRC to provide more effective and efficient oversight of new technologies. The Nuclear Energy Institute provided 27 recommendations to the NRCs Office of Nuclear Reactor Regulation in their September 2018 letter.

One of their recommendations, eliminate materials inspections of ISFSI, focus on the ISFSI inspection program, and stated in part that Inspection Procedure 60855, operation of an ISFSI should be eliminated as redundant to numerous other inspection activities.

Later on during the ROP, reactor oversight process public meeting in November 2018, the industry further clarified that instead of eliminating ISFSI inspection activities, the industry recommend reducing the number of hours to perform inspections at ISFSI's located with operating reactors. Industry also suggested that ISFSI inspections should be performed

by resident inspectors.

The NRC has a number of years implementing the current program. And have been discussing potential changes at our annual counterpart meetings, gathering feedback from program, office, and inspectors. We felt that by re-looking at our program that we could refocus our efforts on the most important items, while gaining efficiencies. We are currently evaluating the ISFSI inspection program and will propose recommended changes as necessary while seeking to improve the efficiency and effectiveness of ISFSI oversight.

A team of regional ISFSI inspectors and headquarters staff listed on the slide was created to assess the ISFSI program. The team consisted of one or two inspectors from each region, a couple of headquarters staff, and an SES or management champion. I'm the representative from Region I.

Our ultimate goal is to provide recommendations for a more effective and efficient ISFSI inspection program by way of a memo to our division of Spent Fuel Management in the Office of Nuclear Material Safety and Safeguards. You can find our working guidance using the ADAMS accession number on the screen.

So what was our scope? We couldn't do

everything, so we limited our scope to the most time-sensitive items which included inspections at reactor sites -- thank you -- which included inspections at reactor sites involving the ISFSI process starting at on-site component construction including ISFSI pad force to away from reactor inspections.

We did not look at transportation, vendor inspections, aging management, or security. Some of these items including transportation and aging management has separate efforts ongoing to improve these areas of inspection.

So what was our first step and where did we go from there? We started out by completing our charter, which I mentioned earlier. Once that was done, we could really start our work. It is important to mention that our mission was to start our process with a blank sheet of paper. We really wanted to take a fresh look at the program with minimal bias on how things have been done in the past, including how each region did the work. We were tasked with building this program from the ground up.

The first thing the team took on was to decide what focus or risk important areas that the program should focus on. You can see them listed on the slide. These were the six focus areas that we felt

captured the most important aspects of ISFSI operation for inspection.

As we were evaluating the program, we came up with a couple of areas for potential enhancement. One is on consistency on risk insights for ISFSI. Currently the probabilistic risk assessment or PRA models are incomplete. However, we found that some insights can be gathered from pilot PRAs to help develop the inspection program.

For our potential recommendation, we're going to recommend implementing a risk informed performed based inspection procedures derived from pilot PRAs, radiation exposure potential, defense in-depth philosophy, and subject matter expertise. For example, we are recommending adding guidance on inspection activities based on risk where priority Level 1 activities were determined to have the highest amount of risk, necessitating the greater level of inspection effort while priority Level 3 activities are determined to have a lower amount of risk, necessitating a lower amount of inspection effort. An example of Priority 1 activity is canister welding and NDE. An example of Priority 3 activity is transfer cask preparation.

Next up is frequency of inspections.

Currently for inspections at operating sites where inspectors visit a reactor site and generally watch loading activities, the frequency is currently every two, not to exceed three years. Our potential recommendation is to allocate inspection hours for a triennial period, reducing in total hours to 96 hours for Inspection Procedure 60855, operation of an ISFSI. This change in hours is based on actual effort currently spent and on inspector judgement through an exercise where we listed the risk significant items to observe and paperwork to review. And added up the assigned amount of hours.

Next is resources. Currently our resources are based on the Boger-Brach memo, which was a 2001 internal NRC memo setting ISFSI inspection requirements and resource estimates. It estimated 134 hours for initial loading and 100 hours for repeat loadings. For our potential recommendation, we're looking at having hours for minimum inspection requirement. And then having additional inspection if performance issues are found.

Last up is training. Currently we have a specific qualification program for ISFSI inspectors and one region utilizes resident staff. For our potential recommendation, the team is still evaluating

required training and qualifications for ISFSI inspectors. Again, this enhancement team is an ongoing effort.

So next steps. The ISFSI enhancement team's report with recommendations will be done in this month, September 2019. The ROP public meeting will be this fall in 2019. We have been and will continue to participate in ROP public meetings, but there will also be an ISFSI inspection program enhancement specific public meeting as well to solicit comments. After the public meeting, all information and comments gathered will go to NMSS management for decision making. That's it.

MR. GUTHERMAN: Do we have any hockey fans out there? Okay, I've got two of three Jeremy's up here. We got a hat trick of Jeremy's speaking this week. That's what struck me.

Continuing with NRC's presentations here with the oversight session, our next speaker's name is Jeremy Tapp. Jeremy joined the NRC in 2004 as a reactor engineer in NRR performing technical reviews related to BWR reactor systems before transferring to Region II in 2006. He spent the next eight years performing operating reactor, decommissioning reactor, and ISFSI inspections before transferring back to

headquarters and NMSS in 2014.

Jeremy currently performs inspections of dry cask storage and transportation packaging vendors and performs reviews of quality assurance programs. He holds a Bachelor's degree in Nuclear Engineering from the University of Illinois at Urbana-Champaign. Jeremy.

MR. TAPP: Thank you, Brian. I appreciate that. I didn't realize we had the three Jeremy's until you mentioned that. I knew we had two, but then a third, and I think we have probably a few more in the audience. So don't see that many Jeremys around that often, so it's good to see us out and about. So all right.

UNIDENTIFIED MALE: It's a very popular name.

MR. TAPP: Yeah, I didn't know so much. Yes so -- All right, so like Brian said, I'm a storage and transportation safety inspector in the Division of Spent Fuel Management. And I'm here today really to give you a brief primer of where we're at with inspection readiness and I should qualify that as commercial spent fuel transportation. Really what the NRC regulates.

But really the main goal of this is that we want to try to get some feedback from you, our

stakeholders during this time. Since we're really here in the very initial stage of assessing our current inspection program and where we need to be to perform focused, consistent inspections wherever those shipments in the future might be incurring.

So let's see, next slide. All right. All right, first I'll briefly go into, you know, some background on transportation inspections just for those who might not have a lot of information on top of their heads. And then the bulk of the presentation will be to discuss our initial assessment that our division performed. And then end with the next steps for the NRC. And then lastly, like I said before, like during the questions and feedback, I'm hoping to get some feedback from you.

All right, so the National Transportation Stakeholders Forum or the NTSF, it's a DOE meeting that includes participants from state regional groups such as Southern States Energy Board, Northeast Taskforce on High-Level Waste and Spent Fuel, et cetera. And also includes the Tribal Radioactive Materials Transportation Committee. This group meets annually and includes discussions amongst several ad hoc working groups. One being the one on rail transport.

So during the 2017 NTSF meeting, the ad

hoc working group raised the idea of point of origin inspections. The NRC did jump in at that time. And stated that we would be doing those inspections. And this is a change from the past. As it was envisioned in the beginning that DOE would be performing those shipments from our NRC licensed facilities. And therefore, they would be doing those inspection activities. But now the NRC licensees with these proposed CISFs or consolidated interim storage facilities would be performing those transportation activities.

So our typical -- I'll say typical inspection practice for transportation is really to look at the records of shipments that occur. If we're on site during a transportation campaign or during a time when one's occurring, then you know, we will normally sample that activity while we're out. But a lot of times, the inspections do not line up with those. So a lot of times it's really just a review of records. So in the future and you know with the high visibility that these transportation campaigns will have and the potential first use of different transportation packagings and different configurations, you know, we believe this needs to change.

So at least from one area I want you guys to take away from this slide from the last bullet here is that shipments of spent fuel, they're really just a Type B quantity and a Type B NRC approved package using an NRC approved certificate of compliance that needs to be met. And from a Department of Transportation standpoint, there's no special requirements or you know, markings, labeling, placards, anything that separates the spent fuel transport from any other Type B shipment. So I think that's really what point we want to get across.

And the regulations in 10 CFR 71.5, they tell the NRC licensees that when transporting licensed material outside the site of usage or on public railways, the regulations of U.S. Department of Transportation must be met. And that's really where the nexus comes between where the NRC gets its regulatory authority to inspect those transportation shipments.

All right, the initial assessment. So when I was asked to look at this, our current inspection program for transportation and really make an initial determination on where we are at, I thought I really just needed to go back and start with the basics. So you know, the where, the what, the how, the who. So

that's really what I did here. We did consider receipt inspections -- sorry, receipt of the transportation package at the receiving facility and also the transportation security, specific to spent fuel shipments. But in this scope here, we decided that both those areas would be excluded from this assessment. And I'll go into the reasons here.

First, for the receipt inspection, the transportation activity is considered to be complete when it enters the gate at the receiving facility. Really the site of usage when its off the public roadway. So therefore, the transportation regulations don't apply at that point in time. I'm not saying they won't be inspected or anything like that, but those inspections, the NRC can perform at the receiving facility. Those will be under the CISF inspection program.

And then with respect to security, the NRC as you know, has specially trained security inspectors and inspection procedures for that piece. So that part of the spent fuel transportation inspection process and the program itself will be reviewed and covered by the NRC's Office of Nuclear Security and Incident Response.

So I'll now go into a little bit of overview

of the results of our initial assessment performed. It was determined that spent fuel will mostly be shipped from three different types of facilities. And these are in no specific order. Away from reactor or AFR ISFSI, at decommissioning reactors, and also then eventually operating reactors. And who would inspect those?

So you know, corresponding with the bullets from above, the responsible inspection group of specially trained inspectors was determined to see, you know, what inspection program would be applicable to the spent fuel transportation activities? And so from the three different areas that I just discussed, they affected really all the regional offices.

In addition, there are three different program offices from headquarters were also affected. One being the division of spent fuel management, us. Our decommissioning division, as well as our Office of Nuclear Reactor Regulation for the operating reactors. So there is a lot of coordination and things that will need to go on for this.

Again, with respect to -- does the current program cover transportation adequately for commercial spent fuel shipments? Now corresponding again to the facility types above, it was determined that whether there is a current inspection program gap in what our programs cover. And one was identified in the areas of AFR or away-from-reactor ISFSIs, where our inspection manual chapter 2690, it states that

transportation inspections are optional. But gives no reference to an inspection procedure to perform any transportation inspections. So that would have to be addressed.

Again, decommissioning and operating reactors, they fully implement a transportation inspection program for radioactive materials, which includes Type B packages, which these spent fuel shipments would occur in. But really at this point, my question was and our question, were they adequate for spent fuel shipments?

Okay, as I discussed in a previous slide, the gap was identified for those inspections that would be performed at an away-from-reactor ISFSI. So if we would go down the route of using our current inspection program, the 2690 or inspection manual chapter for spent fuel, it would need to be revised to point to at least a currently available transportation inspection procedure or to one that we might update with that information.

It would also be recommended that the decommissioning and operating reactor inspection programs, they be updated as well. Because there are some unique aspects to transportation and spent fuel that will need to be addressed during the inspection. For example, the frequency and resource requirements should be modified to ensure that the NRC inspectors are on site for at least the first number of shipments

that occur. Until there's enough data to show that the frequency could be reduced.

In addition, initial shipments of the various different models of storage canisters should all be inspected as there can be differences in each. And this would be a change to the current inspection model and would not just be a paperwork review, you know, of the previous shipments.

The verification and the approved contents of the pact is also a very important aspect of shipment inspections that isn't specifically covered by all the transportation inspection procedures. With respect to spent fuel storage canisters and I think we discussed this a little bit at a previous session, was that the provisions of 72.48 allow licensees and CoC holders to make changes to the design without NRC approval under certain conditions. And what that means is those changes would need to be rectified with what the NRC has approved under our Part 71 CoC approved contents. So there is the potential for many 72.48 changes that would need to be verified whether the as-build canister meets all the Part 71 requirements.

In addition, we have storage-only canisters that might need to be unloaded into transportation packages so that entire process would

need to be reviewed and approved. And all of this should be incorporated into the inspection procedure guidance.

So last but not least is training. And you know, that would also need to be performed for all inspectors implementing the new procedures. So that brings me to a possible second solution, which should be, should we develop a new inspection program? And this would be a specific group of inspectors that would be designated for that. And would be trained and qualified to perform inspections of all the activities.

They would all be familiar before with transportation and spent fuel. They would be qualified by documented training and qualification program. And the Inspection Program Office, which is our current division, because we own the transportation inspection program for the entire NRC, would be the program office for this.

A new inspection procedure and temporary instruction would be developed and implemented by the qualified inspectors for each site, you know, at a set frequency. And this process of developing and implementing a new IP is not really something new at the NRC. You know, it's been successfully implemented

multiple times over the past ten years using this process.

This approach would provide, I think, consistency for spent fuel transportation inspections. And that hopefully come in with better efficiency in their performance. Having a few inspectors in this area that would need training and qualification, that would reduce those costs. But there is definitely the cost of needing to stand up the new inspection program. And that would take a significant time of effort and resources.

Due to the unique aspects of spent fuel transportation such as the canister modifications under 72.48 and possibly for needing to repackage spent fuel, having dedicated and knowledgeable inspectors would, I think be a benefit to both the industry, NRC, and the public with the greater knowledge, focus, and efficiency that they provide.

So next steps in moving forward, so after hearing our discussing today, we'll be developing some near and long-term actions. And then coordinating this effort with the other affected NRC offices.

NSIR, the Nuclear Security Incident Response Office is currently looking at its transportation security inspection program for spent

fuel shipments. And we understand it's a number of years before the spent fuel shipments have the potential to occur. You know, we're now thinking potentially from what we hear, 2022 or 2023 timeframe. But we identified it to be now to ensure that we have the adequate resources moving forward. And that we're ready to perform the needed inspections if that time does come. I believe that is it, yes. Thank you.

MR. GUTHERMAN: All right, our next Jeremy who we'll call Deuce hereafter is Dr. Jeremy Renshaw. Dr. Renshaw is the program manager for the used fuel and high level waste group at the Electric Power Research Institute. He manages R&D efforts focused on all aspects of the back end of the fuel cycle including used fuel, wet and dry storage, transportation, and eventual dispositioning. These activities include aging management of dry cask storage systems, dry cask inspection development, maintaining criticality margins during wet and dry storage, understanding high burn of planning performance and activities related to interim and final storage options.

Dr. Renshaw holds a Bachelor of Science degree in Mechanical Engineering, a Master's in System Engineering, and a PhD in Material Science and

Engineering, all from -- He's a Cyclone. He's a Cyclone -- Iowa State. That's awful. That was completely unintentional. Jeremy Renshaw.

DR. RENSHAW: Maybe if I went to Ohio State, we'd have a winning football team for once. Can you guys hear me. Yeah, that hurts right here man, right here.

All right, I like to push things to the limit with NRC, so I'm not going to stand behind the pulpit. I'm going to move around a little bit until Security, you know, comes and gets me and straps me down.

So I'm going to talk a little bit today about some of the inspections that we're doing at various sites, some of the developments that we've had, and the collaborations that have helped us get to the point where we are now. But not stopping there, we're also going to talk a little bit about the next steps of mitigation repair. What do you do if you were to find a flaw? So without further ado, we'll get moving unlike Iowa State.

So really quick, some background. As we all know, we have lots of canisters that have unloaded. Spent fuel pool has been filling up. So dry storage allows us the opportunity to have a passively cool,

safe system for storing nuclear fuel. But with many systems added each year and over 3,000 systems in operation, we need to make sure that they're adequately maintained to verify continued safe operation.

So part of what EPRI has done in this space is set up a collaboration program called the extended storage collaboration program or ESCP. And as part of ESCP -- is there a laser point on this? Okay, never mind. So as part of ESCP, EPRI has set up an NDE subcommittee or non-destructive evaluation. And through this subcommittee, we've been coordinating efforts across the industry to be able to develop inspection technologies.

And you can see some of the collaborations that we have going on in terms of NDE development, mockup development, and delivery systems. So we have a very good robust collaboration across all of the industry, not only with NRC and the regulators, but DOE and the national labs, the utilities, universities, vendors, and other organizations.

So through this collaboration, we've been able to develop very robust robotic delivery systems. We'll talk a little bit about that later. But one of the key developments that we've had is using 3D printing to be able to rapidly prototype a number of

different designs, test those, and get much faster development cycles for the systems that we have.

Now we've been developing a number of inspection tools, both within EPRI and the vendors, national labs, and other organizations. And we've been able to put these onto the robotic deployment systems to the point where now we're getting to a point where inspection is really more of a routine task. It's not new or novel. It's not a first of a kind or an nth of a kind. And finally, we'll talk a little bit about some of the ongoing mitigation repair collaborations.

So we've done a survey across the industry to identify what mockups and systems are available to be able to be used for inspection development and mitigation repair development. And we found over 124 mockups through different organizations. Some through the national labs, some through EPRI, some through others that are available for inspection. And over 100 of these are also available for mitigation and repair type activities, so welding, cold spray, friction stir weld, and things like this.

So we feel that there's a very good body of mockups that are available. And we've had -- As you can see with the huge number of systems that are available, some of these are very large scale. You

can see a full scale ring mockup here that's about 5, 6 feet in diameter, 2 feet tall. That counts as one mockup. So we have 100 of these that are available.

So next we're looking at what types of NDE systems have been developed? So we showed this graph about four years ago. This kind of a qualitative assessment of the state of inspection technologies. And since that time, there's been a lot of developments and this graph will populate itself a little bit. We focused most on the top four rows as you can see here. These were the technologies that were seen as the most likely to be useful and fulfill all of the different boxes that will need to be checked.

So you see visual, eddy current, ultrasonic, and guided wave are the four technologies that we've really honed in on for inspecting broad storage canisters. And you can see, we brought them from the state that was a mixed bag at best, to where today, we could deploy a number of different systems, either now or very soon for high quality inspections.

So we want to show a little video of some of the development work that we have. This is on the eddy current array system. You can see that there's

a flexible backing. And we actually printed the eddy current coils on a printed circuit board material that is flexible as well, so this can adapt to the surface as it goes. So as our robot climbs the canister here, you can see we get good contact all across the entire surface so we can inspect a very wide swath of material at the same time.

What we see here is a deployment that we had at PNNL or Pacific Northwest National Laboratories, where again this is one of the mockups that was available. And they build an overpack around that to where we could develop -- or we could test one of the developed robotic systems. And you can see that traversing the canister here with an eddy current array system. They also had in this case a horizontal and a vertical overpack that we could use. And we're able to go and test not only the eddy current system, but also a laser-based ultrasound form fit and function system. That system wasn't ready to go at that time, but it is now. So lots of things are going on in this development cycle.

So on the eddy current, we were able to take data with the laser UT system. We have since taken data at EPRI, not the PNNL. So we're continuing to develop these different tools and inspections, not only

in-house, but with many of the other organizations. In this case, the laser UT system was funded by a DOE/SPIR effort. So again, collaboration across the industry is helping us to get to the goal of inspections.

So what do we see? In this case, we have some of the eddy current data that we found of flaws. So these were flaws that we had intentionally put in the mockups to then develop and test to make sure that if there were to be a flaw there, that we could find it. So you can see here, we have a very high signal-to-noise ratio for detecting various different flaws. They're very easy to detect if present using these systems. So we can inspect very small flaws, very shallow flaws if we need to. But we can also differentiate between small and large flaws of something that may be inconsequential to something that hey, we need to pay attention to this.

So next, similar with the robotic systems, several years ago, this was the state of the robotic development three years ago. So we have four different styles of robots that we've been developing with a company called Robotic Technologies of Tennessee. And since that time, we'll go ahead and update this graph, there's been a lot of development on the robotic side in concert with the inspection side to the point where

we're almost done. There's not a whole lot left to do on the robotic development side.

The big thing right now is more field tests. That's one of the things that we're really trying to push for. Because you can do all the development you want inside of a laboratory, but if you're not doing it in the field, you may be missing something. And what we found from the field trials is you can never 100 percent replicate what you have in the field in the lab. So that's why we say we -- even though the robots we feel are either ready or very near ready, we still want more field time with them to make sure that they are.

So I talked about the importance of field trial, so here's a summary of the field trials that we've completed to date. These are the first seven. So we had AREVA, Palo Verde, McGuire, Maine Yankee, Southern, Maine Yankee again because they loved us so much and they were so helpful. PNNL was the one that was in the video. Then our graphic runs out of space, so then we went to Trojan, went to Vermont Yankee, SONGS. And because SONGS also loved us so much, we went to SONGS again.

So to date, there have been 11 deployments of the robotic systems inspecting 13 loaded canisters.

And in total, EPRI's been involved with 14 field deployments, inspecting 19 canisters. And that's just what we've been involved in. There have been a number of other inspections outside of what we've been involved with. So there's a lot going on in the inspection space, not just within EPRI, but across the entire industry.

So what do we see? We had a unique opportunity at Vermont Yankee to inspect a canister that had been loaded six months previous to the inspection and one that had been loaded 10-1/2 years previous. So they were loaded almost exactly ten years apart. So we wanted to take this opportunity to see what changes in ten years? So we took a bunch of pictures of different areas of the canisters and we're comparing them here for you. So on the left side, we see a freshly loaded canister. On the right side, we see one that had been loaded ten years previous. Not really much of a difference.

Next one, we're looking at some of the welds. On the left, we had a different welding process. This is a vertical seam weld that was ground flush. On the right side was a horizontal weld that was not ground flush. But again, not a whole lot of difference. We do see a little bit more radiation snowing in the

picture on the left. Just because there was more radiation coming off, the picture looks a little bit fuzzier. But overall, once you see the video, the inspection surfaces are essentially the same. And finally just looking at some of the base material, again other than maybe some lighting differences, essentially the same surface.

So not a whole lot has gone on in terms of aging over ten years. In this inspection, we only found one thing that was even remotely interesting. This is a very small rub mark, if you will. And so what we did is we went in with the visual inspection cameras that Randall was talking about earlier and we characterized this little mark. And what we found is the area was about 0.32 square centimeters and the maximum depth was about 305 microns. The average depth was maybe about half of that.

And so we have a quick video that we'll show if this goes of that inspection happening. So this is the robot going down and looking at the surface. And then we see off on the side, something that looks a little bit different. So then we go in with our characterization camera. And we can draw a box around that. And we used this box to verify what the surface is that we're inspecting from.

So you can see we draw it a little bit outside of the range. So we're actually overestimating the area when I said 0.32 square centimeters. And then we can go in and characterize the depth of what's there. So you see the very middle is slightly deeper. And you'll see that here. So here in this case, depending on where we draw that line, we can say that the maximum depth is 12 thousandths or 11 thousands. We took the deeper of the two, just because we like to be conservative.

And so you can see that actually the maximum depth of that mark is similar in scale to the waviness of the material itself. So really there's almost no depth at all to that mark. So then that goes on. And in the interest of time, I won't bore you with the entire video. Never mind, I just did bore you with the entire video. So we'll move on to the next one.

So one of the items that was brought up earlier today is what are the temperatures of these canisters? There was some questions that we had from the public that seemed to be concerned with what are these temperatures? I was trying to text one of the speakers and say hey, we're going to talk about that later, so cue them up.

So these are some of the temperatures.

In this case we had a 16 year old canister that was about 4.3 kilowatts. And you can see the temperatures range from about 28 to 45 degrees Celsius. And you can see kind of the different temperatures at different orientations and heights of that canister. And then another one that was much younger and much hotter, this was a 1.5 year old canister at about 28 kilowatts, you can see it ranges from about 50 to 95 degrees Celsius. Very different from the number we heard earlier today, which was 200 or 300 Celsius. We're seeing, even right at loading, they're really not terribly hot. And this is very good news for our inspection and mitigation equipment because then it doesn't have to withstand those very high temperatures.

So moving on, so that's all that has happened in the ESCP committee. We also have a mitigation and repair subcommittee that's looking at what are the technologies that we need to develop to deal with a flaw if we were to find one. So we do have a meeting where we'll be demonstrating one of these technologies. You see that at the bottom of the slide on November 8th. That will be at EPRI in Charlotte.

Since we are getting low on time, I do want to show one of the videos of one of the technologies being deployed. This is a cold spray system that was developed by VRC Metal Systems out of South Dakota. And this it being deployed on top of one of these inspection robots. So we're multipurposing some of these robots to be able to deploy mitigation repair tools. So this is one of the initial feasibility studies in a laboratory. That's why you see some of these wooden mockups and coupons. This is not an actual canister.

There's actually wonderful music that goes with this, but we muted it just to be, you know, nice and subdued. So here in just a minute, the robot will get down and will start spraying on this you see at the bottom of the image. So there you have it from several different angles. This is in situ mitigation repair technology that can be deployed on a canister.

So in the interest of time, we'll just talk about some of the other technologies that are developed. So that was one. We also are looking at modified TIG welding processes, cold spray, non-metallics, friction-stir welding, and other surface stress improvement technologies. So these are all housed under the EPRI/ESCP program and the mitigation repair subcommittee. Gary Cannelle and John Tatman are leading that subcommittee. So maybe next year, we can hear from them once they've, you know, done all this development work and have wonderful things to show you. So this is just kind of a taste of where are we going from here.

So finally I want to highlight two reports that we put out. One was an industry collaboration report. This was on inspection. You can see the number here is 3 billion 2 million, 10,000, 617 with eight zeros in front of it. That's an EPRI report on a number of collaborations that have happened on inspection.

We also have another report which is 3 billion 2 million, 13,130 also freely available to the public from the EPRI.com site. And that is talking about mitigation repair collaboration. So if you're interested in either of those, great nighttime reading. Hundreds of pages each. And you can learn all you would love to know.

So finally we wouldn't be here today without the

collaboration of many different organizations; NRC, DOE, vendors, universities, labs, and others. So we thank them for that. There have been a lot of NDE systems developed, as well as robotic platforms for delivery. And finally mitigation repair is coming. So we're very excited with what the future holds for these technologies. And with that, I'll stop.

MS. ROQUE-CRUZ: Okay, this is our favorite part. I mean we love the presentations. Don't get me wrong. But we love the part where we can ask questions. I just want to remind everybody, please, please state your name when you're going to give us your comment or your feedback or your questions. Speak clearly, speak to the mic. We know some of these subjects we're passionate about them because we know about the subject. Because it's close to home. But please let's stay on topic. Let's give everybody an opportunity to ask questions. And with that, do we have any questions here in the room?

MR. GUTHERMAN: I have a question for Katherine. I wasn't clear on where you ended up with respect to residents inspecting ISFSI operations and operating plants. Is that off the table or is that still being considered?

MS. WARNER: We're still evaluating what kind of qualifications the inspectors would need to do ISFSI inspections. We're not looking at exactly who will do it, but what qualifications they'll need. So not necessarily off the table, but we're not directly looking at that.

MS. LEBLANG: Suzanne Leblang from Entergy. And my question is also for Katherine. There was an effort a few years ago, not too long ago to try and put ISFSI into the ROP. So it is currently in

traditional enforcement. And I didn't see that addressed in there. Are you not looking at that again? It will continue to remain in traditional enforcement or that's also something that you're looking at again?

MS. WARNER: That's correct. We are not looking at that at this time. Thank you.

MS. LEBLANG: Thank you.

MR. RICHTER: This is Mark Richter with NEI. My question is for Jeremy uno. Uno, not deuce. Jeremy Tapp. Okay, question for you relative to NRC inspections for transportation systems. There's been a lot of discussion recently. And we'll touch on this tomorrow when we talk about our tabletop. But the so-called private shipment model versus a DOE shipment model. From your perspective, do you see any differences in what you inspect, how you inspect it, division of responsibilities? Or is that something from NRC's standpoint that would be transparent relative to the shipment model?

MR. TAPP: So I'm trying to -- are you saying from a DOE shipment that we would be inspecting or they are doing the -- I'm a little confused.

MR. RICHTER: Yeah, we're looking at the possibility of a so-called private shipment going from, you know, one of several sites to the consolidated --

MR. TAPP: Right.

MR. RICHTER: -- and then the storage facilities. Do you see your role as different or different boundaries and responsibility how you would go about undertaking what you need to do, you know if it's a private versus a DOE type shipment?

MR. TAPP: So if it was a DOE type shipment, my understanding from in the past is that we would not be inspecting those transportations from the NRC as DOE would be taking responsibility and licensed ownership of that material for the shipment. So with the private model, it's still NRC licensee ownership and, you know, license, they have responsibility for that material. So therefore, NRCs inspection process and oversight would need to cover that shipment.

So it was more -- if it was the previous way, we would -- you know, my understanding is we would not be inspecting that transportation activity. But now that it's the private model, we will be. So that's what we're trying to ensure that we're ready to do, if and when that does occur.

MR. RICHTER: Okay so just for clarification in the so-called DOE shipment, if NRC is not inspecting, who will be doing the inspections and to what inspection regime and requirements would be followed?

MR. TAPP: My understanding is it would be DOE. When it's their shipment, at least in that case, would not be the regulatory authority for that material. So it would be up to DOE and how they would -- they do their self-regulation.

MR. RICHTER: Thank you.

MS. ROQUE-CRUZ: Any other questions in the room?

MR. WALDROP: Keith Waldrop, EPRI. Katherine, a question for you. If I understood this right, so in looking at trying to have an efficiency approach, you, I understood kind of had some risk insights in developing certain -- you came up with categories to go focus on. But one of your categories was criticality, so I would -- just a comment that I would argue, criticality is not risk insight. If you look at a lot of old EPRI reports, criticality is extremely, extremely low risk. So just a comment.

MS. WARNER: Thank you.

MS. ROQUE-CRUZ: Thank you. Before we go to the phone, anything from Skype? No. Okay. Oh, we have one here in the room?

MR. PHEIL: Ed Pheil from Elysium Industries. I took from -- Katherine made a comment about the reducing time spent in inspections. And then Jeremy Renshaw mentioned that hey, our temperatures are really low compared to what the analysis originally said. Are we look -- my definition of the different levels of improvement in cost for all these is if it's less than 10 percent change in cost, it's glacial change. And if it's greater than factor of 10 or close to a factor of 10, then it's transformational cost savings. If it's in-between, then it's incremental change.

Where are we trying to target the cost savings on these?

Like if you have the temperature one for instance, it's well below what the base analysis was. Can you reduce the inspection periodicity for the casks?

MS. WARNER: At this point, even though there's different heat loads for different casks being loaded, we're looking at the same inspection frequency for all the casks at different sites if that answers your question.

MS. ROQUE-CRUZ: Okay. Let's go to the phone lines. Any questions?

THE OPERATOR: Yes. As a reminder, if you would like to ask a question, please press star and the No. 1 from your phone. Our question comes from Donna Gilmore. Your line is open.

MS. GILMORE: Okay, thank you. Can you hear me okay?

MS. ROQUE-CRUZ: Yes. Yes, we can.

MS. GILMORE: You can? Okay, great. On the Edison presentation, there's some serious items that were left off. The workers are at a real disadvantage loading those canisters because there is no way they can visually see the canister going past the guide rail. And the NRC, it matches unavoidably being scraped and gouged the entire length of the canister wall. And that's an unfixable problem. And I'm very concerned that the Division of Spent Fuel Management has chosen not to deal with Holtec on this issue because it was out of compliance with their license.

And it is a big concern in our community. And it's totally missed on that presentation and very downplayed. And the fact that we have no Plan B here, I mean a canister that drops over 11 inches according to the

Holtec specifications, has to be open to inspect the contents. And there is no way to do that. And no one's talked about a time or a plan. It keeps getting avoided. Today the only inspection technology we truly have is the radiation monitoring for if it's releasing too much radiation. That's it. All these other things are not real inspections. You're not inspecting for microscopic through-wall cracks. Eddy current is only good on defects that are known. You know, so there's a lot of holes in this whole process. And I don't expect to get any good answers from the NRC on this because I've already gone round and round. But anyway, that's my comment.

MS. ROQUE-CRUZ: Thank you for the comment. Any other questions on the phone?

THE OPERATOR: Yes, our next question comes from Kayleen Walker. Your line is open.

MS. WALKER: Yes. Regarding Randall Granaas' presentation from Edison. We followed the multiple problems with the Holtec system during the loading of the first 30 canisters. And I'm wondering why the NRC never held Holtec to task. All of the problems were Holtec system related. And Edison scrambled to try and fix the system. It was a Holtec system. Holtec was subcontracted to do the loading. And you know, all of these serious problems that could have been extremely serious, Holtec was never held accountable.

They were able to -- You know, Edison filled out a 72.48 to allow the scraping and gouging when Holtec guarantees in their FSAR that there will be no metal to metal contact while loading. So since Holtec is

proposing this consolidated storage system, enough to store the entire country's nuclear waste, take responsibility of that. And they don't even have a plan to build a hot cell to replace a bad canister. I just feel there are really significant gaps in the overall NRC regulatory policy with the dry storage.

And also so there are a lot of questions in there, but that was my comment. Also Jeremy Tapp quickly referenced with transportation, the possibility for fuel repackaging. But again, there is no system available in the country. There is no plan for a system as far as I know -- for a facility to be able to repackage canister fuel. There's no hot cell facility in existence. And this is extremely concerning to any of us who are following this closely. Thank you.

THE OPERATOR: Thank you. And thank you for taking the time and listening in and commenting. We really appreciate it. Let's go back to the room. Any questions here in the room?

MS. ROQUE-CRUZ: Come on.

UNIDENTIFIED FEMALE: We have one.

MS. COOPER: Paula Cooper from Region II. So my question is for Jeremy deuce, duo. So your presentation focused a lot on the robotics of the eddy current examination technique. Generally I normally don't see that as a critical variable for eddy current. But there seems to be a little bit of a focus on that. So when we see this technique potentially going into implementation, would we expect to see that robotic mechanism to be a critical variable in the actual technique itself? Or can a performance demonstration by Z-Tech or other groups that develop their own robotics be

enough in order to qualify that technique?

MR. RENSHAW: That's a good question. So there a couple of answers to that. So first of all, the reason that we've focused a little bit on eddy current here is that was one of the items that EPRI led. The vendors led the visual inspection development. We showed that in the past. And really one of the things we've identified there is there's really no additional needs or new developments for visual inspection technologies for dry storage canisters. So we haven't focused a lot there.

On the flip side, some of the developing technologies are the laser-based ultrasound because we don't want to put couplants and materials like that on canisters. So those aren't quite ready for prime time yet. But they're in the late development stages. We had a deployment at EPRI earlier this year to evaluate the status of that technology. And we identified a couple of additional modifications that are needed.

And then on the deployment side, I would say yes, in terms of robotics, you could use many different forms of robotics. One of the challenges is that this is a very unique environment where its high temperature, high radiation, difficult entry and access points intentionally where you have sometimes tortuous paths or narrow annulus spaces.

So the robotic development actually is a very important piece. And it's taken us a number of

years to get it just right. One of the things we're trying to do is develop a universal platform where anyone can come in and use this RGT robot or set of robots and put on their own inspection tools that they develop or mitigation repair tools. So we're trying to make it so that it's easy for other organizations to not have to spend a lot of money to develop systems that we can develop and then generically deploy for a wide range of applications.

MS. ROQUE-CRUZ: Okay, we're going to go back again to the phone lines. Any comments from our stakeholders?

THE OPERATOR: There are no additional questions in queue at this time.

MS. ROQUE-CRUZ: Any questions here in the room?

MR. PIER: Don Pier out of Fort Calhoun Station. Question on the inspections. How is it proposed to do the inspections on those areas that are blocked by structure such as the rails? I'm sorry, Jeremy.

MR. RENSHAW: Two Jeremys, two inspection topics, so sorry. Yeah, so there a couple of different options. Both of the best ways I would say are ultrasonic-based because you can use a guided wave

ultrasonic technique, which is a long range ultrasonic. It's a wave that provocates in the structure. So it uses the structure as a wave guide for the acoustic energy. So you can get under rails, under supports and things like that.

On the same token, you can also use a shear wave ultrasound where you can bounce the beam at an angle to get under there. One of the other things that we've seen -- so those are for rails. You really need a UT-based system, whether it's shear wave or guided waves.

For some of the vertical systems where you have support structures, what we found is even though they may contact the support structure, there's generally a gap where you can look in and see. So even with some of the visual techniques, we can see a fair distance into those somewhat occluded regions. And we also have -- and I didn't show this today -- a low profile eddy current. A ray probe that can go off the side of the robot to get into, you know, as few as, you know, 6 or 7 millimeter gap. So we can get into very tight spaces. But if there is full on contact like with the rail, then ultrasound is the way to go.

MR. PIER: Thank you. I have one more question as for transport. If we're developing a new

transport inspection program, how's that going to impact the present Part 71s that are already under the CFC freeze for transport?

MR. TAPP: Affecting the users you mean?

Mr. PIER: Yes.

MR. TAPP: So really it would just be a supplement to what we currently have out there. From our inspection program, it will not change as we currently had it for your routine shipments that you normally would make. It would only be if whoever would be shipping spent -- you know, commercial spent nuclear fuel to a CISF or to maybe another depository if something ever changed, that would be where that would be a reason to be implemented just because of the uniqueness of the spent fuel shipments.

And again that would -- that's really just -- Again, initial stages at this point of assessing what would need to go. I mean there's potential paths both ways. Like I mentioned in the presentation, we could do that -- you know, have that special inspection procedure or I mean, there's still the option that we could have the inspectors that currently do transportation do those inspections too, you know, as part of either a normal or a supplemental inspection procedure or something to that effect.

So yeah, we're looking for your feedback on what you think, you know, which direction you could see it going. You know, we're definitely open to that. And that's a big shout out to everyone here now if anyone else has any feedback on this, we're definitely looking for your thoughts and opinions on which way you think we might want to go. Did I answer your question?

MS. ROQUE-CRUZ: Okay, let's go once again just to check, anything from Skype? Anything on the phones?

THE OPERATOR: There are no questions in queue.

MS. ROQUE-CRUZ: Last calls here in the room. Okay, so before I let you go and before we give a clap -- Hold on, stay with me one moment. We have a section from 6:00 to 8:00 and this is different. Right? We usually have our working hours, we go home. But this is exciting because we have a section from 6:00 to 8:00 p.m. Please, please, please be here at 6:00 so that we can start. It's the external engagement and outreach. And we have four presentations -- very interesting presentations prepared for you. So please be here at 6:00. And with that, let's give a round of applause to our presenters. Thank you very much.

(Whereupon, the above-entitled matter went off the record at 3:33 p.m.)