

## **WEBINAR TRANSCRIPT**

This document provides the transcript from a public meeting (webinar) that was held on November 8, 2018, to discuss preliminary observations of an NRC special inspection that was conducted at San Onofre Nuclear Generating Station in September 2018. The inspection was conducted in response to a situation that resulted in the misalignment of a multi-purpose canister loaded with spent fuel at the San Onofre Nuclear Generating Station.

### Hosts of Webinar:

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Patricia Silva, Chief  
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- This is Troy Pruett, with the NRC  
in Region IV, and we're going to commence today's webinar  
on the results of the San Onofre special inspection.  
Thank you for joining the webinar.  
NRC speakers will present information related  
to the August 3rd, 2018 misalignment  
of a multi-purpose canister loaded with spent fuel  
at the San Onofre Nuclear Generating Station.  
This is the NRC Region IV's first use  
of the webinar format to provide information  
to the public on a special inspection.  
There's are pros and cons  
for conducting a webinar public meeting  
in place of a face to face meeting.  
Ultimately, we decided that the large number  
of people from across the United States  
that were interested in learning more  
about this event made the webinar the best option.  
During the webinar, we will present information  
explaining photographs and bullets shown on the slides.  
The photos we are referencing today are  
from downloading operations that occurred prior  
to the August 3rd event.  
The slides are also available from the webinar handout tab,  
as well as the NRC Spotlight Section  
on the NRC public webpage at [www  
.NRC.gov](http://www.nrc.gov).  
From the Spotlight Section, click  
on SONGS Cask Loading Issue, and from there,  
you'll see a variety of documents available for your review,  
today's slides being one of the options.  
During the presentation, you may submit written comments

and questions via the webinar chatroom feature.

NRC staff will collect items, and refer them to today's panel, the NRC panel will answer questions and respond to comments as time allows.

The webinar is scheduled to end at 5:00 p.m. Central Time, or 3:00 p.m., Pacific.

If, for some reason, the NRC loses internet connectivity, we will dial into a telephone bridge line, and continue the presentation.

The backup bridge line may be reached by dialing 888-469-1677, and the passcode is 247-1451.

And again, we will only use this bridge line if the internet connection for the NRC fails during the webinar.

We are recording the session today, and plan to make the video publicly available.

Today's NRC panel has three members, myself, Troy Pruett, and I'm the Director of Nuclear Materials Safety in Region IV.

The Region IV office is located in Arlington, Texas, and my division oversees the inspection activities at San Onofre.

Also on the panel is Eric Simpson.

Eric is the Special Inspection Team Leader for the event we are presenting today.

Eric is also an inspector in NRC Region IV.

We also have Patty Silva, Patty is a Branch Chief

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from the Division of Spent Fuel Management,  
in our headquarters office in Rockville, Maryland.  
Patty was also a member of the Special Inspection Team.  
Patty joined the panel to provide responses  
to some of the questions or comments you might have  
that are beyond the scope of Eric's special inspection.  
Supporting our presentation,  
we have technical staff monitoring the chatroom  
for questions and comments,  
and communications staff monitoring  
and adjusting the audio and video.  
Via, our webinar capability will only host up  
to 500 participants,  
and my staff has communicated  
to me that we have hit the 500 registered limit,  
and so, just as a reminder, if you encounter somebody  
that's not able to log in to the webinar today,  
remind them that the presentation will be publicly available  
after the meeting, once we get the recording transcribed,  
and posted to the public webpage.  
So Eric will provide most of the information  
regarding the misalignment event at San Onofre.  
Eric will begin with background information  
on the independent spent fuel storage installation  
at San Onofre, he will then provide an overview  
of a typical downloading operation.  
By downloading, I mean the operation  
that lowers the multipurpose canister into the storage vault  
at the independent spent fuel storage installation.  
Eric will then cover what happened on August 3rd, 2018,  
during the downloading operation.  
After he explains the event,

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Eric will outline the NRC's regulatory concerns,  
and our next steps.

While the misalignment event at San Onofre is serious,  
at no time was there an actual load drop,  
and at no time was there a release  
of radioactive material from the multipurpose canister.

Once Eric has completed his presentation,  
the NRC panel will begin responding  
to questions and comments, when multiple questions  
and comments on a similar topic are received,  
the NRC staff monitoring the chatroom will provide  
the panel a representative question or comment.

I'll now turn the presentation over to Eric.

- Good afternoon, I am Eric Simpson,  
a Dry Fuel Storage Inspector of the NRC Region IV office,  
here in Arlington, Texas.

Before we discuss the August 3rd event at San Onofre,  
I would like to acknowledge the other members  
of the NRC Special Inspection Team  
that are not sitting on the panel with us today,  
those members being Marlon Davis, NRC Headquarters Inspector  
for the Division of Spent Fuel Management,  
Chris Smith, a Region IV Engineering Inspector,  
my Branch Chief, Dr. Janine Katanic, and Mr. Lee Brookhart,  
our Senior Dry Fuel Storage Inspector, who has been working  
behind the scenes throughout our efforts.

Let's start with an overview of the  
San Onofre Independent Spent Fuel Storage Installation.

You will hear me refer  
to Independent Spent Fuel Storage Installations as ISFSIs  
for short throughout this webinar.

what you see is an overhead schematic of the San Onofre ISFSI, north is to the left, which places the Transnuclear horizontal ISFSI on the eastern side, and the Holtec UMAX ISFSI on the west, or bottom of the map. The design is a horizontal storage module. San Onofre has 63 horizontal storage modules on this eastern ISFSI pad, 51 of which are loaded with spent fuel in Unit One reactor waste, the other three are empty, to the west of the horizontal ISFSI is the Holtec UMAX ISFSI, spent fuel is stored in stainless steel canisters called multipurpose canisters, or MPCs. Today we will refer to the MPCs simply as a canister. The canisters are stored vertically in the UMAX ISFSI vault. San Onofre has room for 75 canisters in its UMAX ISFSI. San Onofre had about 2,668 spent fuel assemblies stored in its unit two and three spent fuel pools. Currently, about 40% of the spent fuel has been transferred to the UMAX ISFSI. This photo shows what it's like looking down into a UMAX storage vault, what you see are the features of the divider shell, we will discuss this in more detail later, but for now, make a note of the shield ring. During the August 3rd event, a portion of the canister was resting on the shield ring. San Onofre personnel and Holtec contractors failed to note the misalignment, and that the weight of the canister was no longer being supported by the important-to-safety lifting equipment.

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This photo shows a Holtec canister. Spent fuel is placed into a canister while it is inside the transfer cask. The transfer cask is then placed to reduce radiation exposures to workers, and it is also used to help move the loaded canister out onto the ISFSI pad.

This photo shows a shield cone. After loading, the canister of spent fuel contents are dried and welded shut, the shield cone is installed on the canister as an additional help to reduce radiation dose to cask storage workers.

The green slings are for retrieval of the shield cone after the canister has been lowered into the storage vault.

The yellow slings are important-to-safety, and are intended to hold the canister weight during downloading operations.

This photo shows the flat bed transporter with a transfer cask meeting up with the vertical cask transporter.

The transfer cask, with the canister inside, is moved from the fuel building to the ISFSI pad used in a flatbed transporter.

A vertical cask transporter is used to move the transfer cask into position on the ISFSI pad, the vertical cask transporter is also used to align the transfer cask and the canister for downloading operations.

This photo shows the mating device used to connect the transfer cask to the ISFSI vault.

The mating device has a hydraulic door

to allow access from the transfer cask into the ISFSI vault.

As you can see, the mating device is open in this photo.

This photo shows the vertical cask transporter being aligned to the mating device,

the vertical cask transporter is positioned over the mating device, properly aligned, and then they're bolted together.

The mating device door is closed during this process.

This picture shows the spotters, those are the people in the lift baskets, pulling the slings through the sheaths on the vertical cask transporter crossbeam.

The important-to-safety yellow slings are connected to the canister through lift cleats in the shield cone, and anchored to the vertical cask transporter.

This photo shows the canister ready for downloading, the vertical cask transporter lift beam has been raised, and the full load

of the spent fuel canister is being suspended.

The mating device door is open, allowing the canister to be downloaded into the ISFSI vault.

So, what exactly happened on August 3rd?

This slide shows a schematic of the ISFSI pad, and the location of the low dose waiting area.

The slide also shows a photo of the view from that location, as you can see from the photo to the right, the low dose waiting area has an obstructed view of what is happening out on the pad.

Before downloading, all oversight staff, other than the spotter and the vertical cask transporter operator, are moved to the low dose area.

From this position, none of the management or supervisory oversight staff from San Onofre or Holtec could observe the downloading of the canister. San Onofre oversight staff did not have radio headsets, and did not monitor communications between the cask loading supervisor, spotter, and vertical cask transporter operator. This slide shows photos of the vertical cask transporter, and the control panel.

The vertical cask transporter operator attempted to lower the canister into the vault by lowering the vertical cask transporter lift beam.

The NRC identified numerous deficiencies involving the operation of the vertical cask transporter.

First, the training program did not ensure the vertical cask transporter operator was capable of performing the canister download.

Second, the vertical cask transporter operator is seated behind shielding, and cannot see the canister being lowered into the vault, third, cameras are not used to aid the vertical cask transporter operator, or oversight staff during downloading operations.

Fourth, the vertical cask transporter operator did not monitor data available on the vertical cask transporter control panel during the download.

As a result, the vertical cask transporter operator did not identify a decrease in hydraulic pressure, which in and of itself is an indication of a loss of mode condition.

Fifth, procedures did not provide adequate instructions

for the monitoring of critical parameters during the download. Lastly, the August 3rd event was the first time for the vertical cask transporter operator to download a spent fuel canister into the vault, and no supervisory oversight was available on the vertical cask transporter. This slide shows a spotter in position to observe the download, the spotter was the only person capable of observing the canister being downloaded during this event. NRC identified numerous deficiencies involving the spotter positioning, first, the training program did not ensure the spotter was capable of performing a canister download. Second, procedures did not provide adequate instruction for monitoring of critical parameters during download processes. Third, the August 3rd event was the first time for the spotter to download a spent fuel canister into the ISFSI vault, and no supervisory oversight was available in the lift basket. Fourth, no cameras were provided for management and supervisory oversight to observe the download. Fifth, once the downloading was in progress, the spotter moved the lift to the side, where he could no longer directly observe the canister's progress into the ISFSI vault, and lastly, the spotter did not know how to determine the important-to-safety slings for slack. Communications during the download were informal, and failed to relay critical information,

for example, during the download, the spotter communicated that the canister was four feet down.

Management and supervisor incorrectly believed this meant four feet below the mating device, it did not.

The VCT operator fully lowered the vertical cask transporter crossbeam, and communicated that the canister was fully loaded, lowered into the vault.

A radiation protection technician noticed the dose rates were significantly higher than expected, and alerted the cask loading supervisor.

Station personnel observed that the slings were slack, and that the canister was not downloaded.

At the direction of the rigger in charge, at the direction of the rigger in charge, the vertical cask transporter operator raised the lift beam to regain load of the canister.

The canister was properly aligned, and then lowered into the ISFSI vault.

The canister load was unsupported by lifting equipment for approximately 53 minutes.

This slide shows a photo of the installed canister in the ISFSI vault.

Before starting downloads of lowered canisters, San Onofre trains staff using test equipment.

The training canister was smaller than the actual canisters used at San Onofre.

The training canister provided about three quarter of an inch more clearance, this made the lining and lowering the training canister much easier than would be experienced during actual downloading operations.

Staff conducting downloading operations were not trained on the differences,

when training does not match the actual conditions, we refer to this as negative training.

During downloading operations,

San Onofre frequently experienced the bottoms of canisters getting caught on the shield ring.

San Onofre never identified the misalignments as conditions adverse to quality, consequently, San Onofre never implemented actions

that would have prevented the August 3rd event.

On August 3rd, the canister made contact,

and rested on the shield ring, if you look closely at the picture, you can see contact surface wear, paint scrape, but no deformation of the shield ring.

San Onofre has not inspected the bottom of the canister, their preliminary analysis indicates negligible wear on the canister.

The NRC will evaluate San Onofre's analyses, and San Onofre's plan to monitor the canisters, as part of their Aging Management Program, when completed.

The NRC does not believe there is an immediate canister integrity concern, so, what's been done since August 3rd?

We'll look at San Onofre's activities since August 3rd, then we'll look at NRC's actions.

We will discuss San Onofre's notification to the NRC Operation Center, we'll briefly touch on San Onofre's causal evaluations, and lastly, we'll touch on San Onofre's proposed corrective actions.

The canister involved

in the August 3rd event was successfully lowered

into the UMAX ISFSI vault, we call this canister MPC 29 because it was the 29th canister loaded at San Onofre.

After MPC 29 was lowered into the ISFSI vault, San Onofre immediately put a halt to all spent fuel activities on site.

There was a spent fuel canister that was being processed in a Unit Two Fuel Building, that canister was fully processed, meaning it was dried, helium back-fill operations were completed, final welding of the closure rings were performed, and it is currently in the Unit Three Fuel Building.

It is seismically restrained, it is placed in a transfer cask, and this is a condition that is acceptable for the canister, and its spent fuel contents.

NRC's involvement, we were notified of the August 3rd event on the afternoon of August 6th.

We then initiated daily oversight communications between San Onofre, NRC headquarters, and ourselves in the regional office.

On August 7th, San Onofre committed to an NRC review, before resuming dry cask loading operations.

On August 17th, we decided to conduct a special inspection. If you go to the Spotlight Section of the NRC website, our charter is available for review there.

We arrived at San Onofre to initiate our special inspection on September 10th, we were onsite the entire week, reviewing procedures, records, and talking with former and current employees.

The inspection continued offsite until we formally exited with San Onofre on this past Thursday, November 1st,

which brings us to our findings.  
We have two preliminary violations that are being considered for escalated enforcement, those being a preliminary violation for the event itself, San Onofre's license requires that during downloading operations, the canister, MPC, be handled with redundant drop protection features to prevent uncontrolled lowering of the load. Contrary to the requirement, during MPC transfer, when loaded with spent fuel, the licensee failed to ensure the lifting equipment had redundant drop protection features to prevent uncontrolled lowering. Specifically, San Onofre inadvertently disabled the important-to-safety downloaded slings, when personnel lowered the vertical cask transporter crossbeam to the fully seated position, while the MPC was suspended by the shield ring, approximately 18 feet above the fully seated position in the vault. The second preliminary violation being considered for escalated enforcement is the notification requirement.

10CFR

72.75(d)(1)

requires that a licensee notify the NRC within 24 hours when important-to-safety equipment is disabled, or fails to function as designed. Contrary to the requirement, San Onofre failed to make proper NRC notification of the August 3rd event to the NRC Operation Center, until September 14th, they were prompted by us to make the required notification during our inspection.

We are also considering three preliminary violations of lesser severity level to San Onofre, a violation for inadequate procedures, a violation for failing to acknowledge conditions adverse to quality for entry into the site's corrective action program, and a violation for inadequate training of personnel operating important-to-safety equipment. It is important to note that management oversight weaknesses contributed to each of the preliminary violations being considered by NRC. Southern California Edison and Holtec have both performed causal evaluations related to the August 3rd event. Preliminary root and apparent causes are lack of adequate procedures, lack of adequate training to support the procedures, lack of adequate licensee oversight of contractor activities. Some of the preliminary corrective actions at San Onofre revolve around enhancing the training requirements, procedure enhancements, and equipment enhancements to give more positive indication of a loss of load condition. San Onofre is also looking at improving its performance in the oversight role. NRC will perform an inspection at San Onofre to fully assess its corrective actions, prior to them resuming fuel handling operations. A word or two about the event, and its significance. San Onofre was not required to have a drop analysis for this type of event because the license required redundant drop protection features at all times.

That's why this misalignment event is so very significant.

San Onofre provided preliminary analysis of a canister drop from 19 feet into the vault, that analysis is still under review by NRC experts.

The San Onofre analysis document that the canister must still maintain confinement, and that no breach would occur, however, the analysis does describe that some fuel assemblies would likely fail, due to the drop.

However, the San Onofre preliminary analysis describes that the canister would still be able to perform safely, it would still meet all thermal, pressure, criticality, and confinement criteria.

This part of the analysis is still under review.

NRC plans to issue its special inspection report before the Thanksgiving holiday.

Next steps involve dispositioning the escalated enforcement findings, which means moving through the NRC enforcement process, along with San Onofre, to disposition with preliminary violations and severity levels to be assigned.

The timing of that process begins once we issue the inspection report.

Having moved through the events of August 3rd, and having discussed NRC and San Onofre's next steps, I'll hand the presentation back over to Mr. Troy Pruett.

- Thank you, Eric, I'm going to, I'm going to pause for just a second, and, and ask a couple of questions to you.

- Okay.

- That, that we've been receiving through the chatroom.

- All right.
- One of the questions involves redundant drop protection, and so what was the redundant drop protection?
- Okay, as I mentioned earlier in the presentation, I pointed out two yellow slings, each of those slings can fully support the weight of a loaded canister, that is to say, the weight of a loaded MPC, and since there are two slings, that counts as redundant drop protection. Again, they can both completely support the weight of the loaded MPC, if one fails, the other one is there to provide that redundant protection.
- Right, so Rachel, could you pull up slide 10?
- There we are.
- Right, so slide 10 is the picture of the shield cone, and as Eric mentioned earlier, there's a photo there showing the two yellow slings, that is the redundant drop protection, so.
- Yes, and the event revolves around inadvertently disabling both of those slings by having the crossbeam in the fully lowered position, while those slings were completely slack. If there had been, in the event of a drop, those slings would have been rendered completely incapable of stopping that drop.
- And then there were another set of questions, was, just, just how much does one of these canisters weigh?
- Well, they're analyzed to weigh up to 113,000 pounds, but I think the MPC in question was roughly around 100,000 pounds, so 50 tons.
- Okay, and then, and then

about how many fuel assemblies does the canister hold?

- Each fuel, each MPC 37, as named,  
will hold 37 spent fuel assemblies.

- Okay, thank you, so I'm going to,  
I'm going to conclude the, our meeting presentation,  
and then we still have some more questions that my staff  
that's monitoring the chatroom is sending me,  
and we'll jump into the questions in just a minute, so.

So I bet the take aways are,  
this event could have been prevented  
with effective management and supervisory oversight  
of important-to-safety operations performed at San Onofre.  
Management oversight weaknesses led  
to inadequate training of the staff,  
the failure to provide appropriate procedures,  
not identifying and correcting conditions adverse  
to quality, and not providing appropriate supervision  
at job sites, these deficiencies converged  
on August the 3rd, resulting in a failure  
to provide redundant load drop protection,  
during the downloading of a spent fuel canister.

As a result, the NRC has increased the regulatory oversight  
at the facility to ensure that the root  
and contributing causes are understood,  
and that the corrective actions will prevent another loss  
of load event, so with that,  
that's going to wrap up our formal part of the presentation,  
and we're going to transition into responding  
to the questions and the comments  
that we're receiving in the chatroom.

So one of the,  
or many of the questions

and comments involve the retrievability of a canister. And I know, Patty, this was something we talked about yesterday, would you like to touch on what the, is a licensee required to be able to retrieve a canister, and maybe Eric, you can jump in if you, if you hear something that needs to be said.

- well, if you like, I can start off on this, and-- - Okay, all right.

Fair enough. - well, 10CFR72

.122(1)

requires that storage systems must be designed to allow ready retrieval of spent fuel, high level waste, and reactor related grade and class C waste for further processing of disposal, and each licensee must demonstrate the ability to retrieve a canister, for taking back into the spent fuel pool, if it's available.

And licensees are also required to demonstrate the ability to cut open a canister to allow them access to the spent fuel contents inside.

Now, saying this, I will tell you all that each licensee, generally, does not have to display the ability to cut open a canister, we allow for the vendor to demonstrate the ability to cut that canister open at their facility, the belief being that if the licensee ends up in the position where they have to retrieve a canister, and take it back into their spent fuel pool, the vendor can provide them with the equipment to cut that canister open.

And Holtec has demonstrated

that they can cut open an MPC 37, or an MPC 89 canister, which are other types of canisters that are licensed for storage in the UMAX vault.

- And then, and then, Eric, I'm going to send this question to you, as well. - Okay.

- Was there actual damage to the canister in question?

- We don't believe there was damage to the canister in question, or at least not to the extent that its safety features are being disabled, however, we think that the Aging Management process will be able to go in and inspect these canisters because San Onofre is part of the Aging Management, we will be inspecting the canisters for degradation, beginning within five years.

- And what, if this canister really dropped, as a result of this misalignment event, what do you perceive the consequences would have been?

- Well, as it stands now, we do not believe the canister would have been breached. It would have ended up being a question of the contents. If the contents were designated as undamaged fuel, certainly everybody who's been looking at these drop analyses pretty much concedes that the fuel inside the canister will no longer meet the criteria of undamaged fuel.

It would end up being a question as to whether we, they want a license amendment to allow them to remain in the stored position, and damaged fuel, or whether or not we would be asking them to retrieve the canister to remove the spent fuel contents, to repackaging in a damaged fuel canister.

- Okay.

And isn't, isn't the August 3rd event exactly the same as the event that happened in July?

- It is not, the event that happened in July, one of the reasons I think that it did not make its way into the corrective action program is because I think that they believed that during that entire extended time it took them to download the MPC into the UMAX vault, for the record, there was an event on July 22nd, where San Onofre experienced an abnormal delay in downloading operations, what should have taken 15 minutes ended up taking an hour and a half because they failed to get the MPC properly aligned for downloading for over an hour and a half. Again, this should have taken place in 15 minutes or less, during that time, never was the MPC, or the canister, not suspended by the slings, every time they attempted to download, they caught the loss of load condition. The VCT operator actually caught the loss of load condition using his monitoring devices on the vertical cask transporter screen, something that did not happen on August 3rd, where the VCT operator was not monitoring these proper parameters on his vertical cask transporter screen. So they were always within procedure during this event. We feel, however, that the event being captured in what was known as a production traveler, it should have also been recorded, and it's part of their corrective action program. So at no point were the redundant safety features

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completely disabled for the July 22nd event,  
and they were always in procedure during that event.

- So perhaps you can clarify what we mean by disabled.

So the slings, I mean, the slings were always okay.

- The slings were always okay.
- So what do you mean by a disabled sling?
- what I mean by disabled sling, well,  
I wish I had a picture, that you guys could look at it.  
well, if you refer to the picture  
that's being displayed on the webinar right now,  
you see the MPC is being suspended  
by two yellow slings, now,  
when those slings are no longer supporting the load,  
it's called a slack condition, to use the parlance  
of the Holtec procedures.

During the downloading event of July 22nd,  
they never completely lost the load from the slings.

- Just a second, Rachel, let's try slide 16.
- Yeah, there we go, so the slings were always supported  
in the load for July 22nd event.

Contrasting that event, we don't actually have a picture  
of what happened on August 3rd,  
but if you can visualize with me,  
on August 3rd, the crossbeam that you see  
in that picture there was all the way down  
in the completely lowered position,  
and the slings on either side of that high track canister,  
they were completely bunched up on the ground,  
supporting no load whatsoever.

And at that time, that MPC was resting  
on the shield ring on top of the divider shell inside  
of the ISFSI vault.

If that MPC had slipped, or the canister had slipped somehow because of vibration, or some other mechanism during that time, those slings, in the completely slack and bunched up position, were in no condition to capture and arrest that drop.

That MPC would have dropped to the bottom of that canister with no slings being enabled to suspend the load.

That's really what I mean by the July 22nd event.

On the July 22nd event, the slings were never rendered completely disabled.

- Okay, thank you for that clarification.

And then, earlier you had talked about a Aging Management, the Aging Management Program. Patty, is that something you want to talk to?

- Sure. - Okay.

- So Aging Management Program is required upon 20 years, upon the 20 year license renewal of the storage system.

The licensee's Aging Management Program requires it will inspect during the, requirements will be inspected during NRC's routine inspections.

Some licensees have performed in-service inspections of their canisters as part

of the license renewal applications, also the Electric Power Research Institute studies on methods for inspecting, and through implementing Aging Management Programs.

No breaches of canisters have been identified, no chlorine induced stress corrosion cracking has been identified.

So that's the Aging Management Program.

- For, oh, when you, might have, no indications of cracking have been identified, that's during the non-destructive exams at other facilities?

- Correct, that's, they usually use what they call a crawler with a camera, usually, or other NDE, non-destructive evaluation equipment.

- Okay, thank you for that, and I think you heard Eric mention earlier that San Onofre is a little bit different than the rest of the industry. So other utilities have to initiate an Aging Management Plan, as part of license renewal for the ISFSI, which occurs at year 20. San Onofre actually has an agreement with the California Coastal Commission, and they're actually required to submit their Aging Management Plan for review by the state, I think it's by 20--

- November, 2020. - November of 2020.

So that's an important distinction at San Onofre. And then, just to clarify, for the August 3rd event, there was no damage to any of the fuel assemblies and the canister, and there was no damage to the canister itself. And then we, and we have also had several questions regarding the drop analysis, and so, just to clarify one more time what Eric said, San Onofre was not required by their license to have a drop analysis for this condition that existed on August 3rd, so they're not required to analyze for 18 foot drop of a canister. And the reason for that is, is that their license requires

that they provide redundant drop protection throughout the movement of a canister.

And that's what makes this event so serious, is that, is that not only did they lose one method of drop protection, they lost all methods of drop protection, so that's what makes this event so serious.

The corrective actions coming out of this will be to, to beef up the controls at the site to ensure that they don't lose redundant drop protection in the future,

and Eric touched on a few of those earlier, but there are many procedural enhancements that are taking place, there's additional training, the workforce that's taking place, the standards for job site presence by supervisors and managers and quality assurance are all being revised, and then there's actually some engineering changes.

- Yep. - That are being considered.

I think there's a possible addition of a load cell indicator. - Correct.

- And I think there's a couple of more.

- Oh, yeah, they're talking about having alarms in place when a certain loss of load condition is met, an unambiguous alarm that will let everyone know that you need to come back up on the beam to regain load, they also have cameras that they're investigating using to assist in the process. And there's some even somewhat lower tech methods they're using to make sure, but they are putting in place procedure enhancements and equipment enhancements

to sort of ensure that they never end up  
in this situation again.

- All right, and still more clarifications  
on the drop analysis, so when we said,  
I think you said, clearly the fuel inside the canister  
would no longer meet the undamaged criteria,  
but, so, so we're going to have damaged fuel.  
What do you mean when you say damaged fuel?

- Well, what I mean, technically damaged fuel is fuel  
that, it cannot be moved by normal means.  
You can't grapple it with a regular spent fuel  
tool, and move it about,  
is essentially what it means, I mean--

- I don't think-- - That's about all I--  
- I don't think we believe there would be  
a complete disintegration of the fuel assemblies,  
there would be some rupture of the cladding,  
there could be some pellets that are released  
in the lower portions of the fuel assembly,  
but not a complete destruction  
of the fuel assemblies within--

- No, no, not at all.

- And we don't believe there was damage  
to the fuel assemblies  
because the canister was slowly lowered when it made contact  
with the shield ring, and was resting on the shield ring.  
So there wasn't a drop of the canister,  
such that it made an impact that would have caused damage  
to the canister, or the fuel ...

- No, no, not in this unit.

- So Eric, I keep calling on you, but.

- That's fine.

- But how about a little more specificity on the, when we issued the report, what kind of timeline are we on for, between today and let's say the final enforcement action that might be taken?

- Oh, my goodness, I don't have any sense of that at all. We enter into the enforcement process, I think the first bar that needs to be crossed is, I think San Onofre has to answer as to what route they want to take with this enforcement action within 30 days--

- All right, I'll help you out, you want me to help you out with it?

- Yes, please.

- I'll help you out a little bit.

Okay, so, so we have to, we had an exit meeting on?

- November 1st.

- November 1st, and so by our own procedures, where we have to issue the inspection report within 45 days. - That's right.

- So that would put us out the mid-December, worst case, we're targeting some time before the Thanksgiving holidays, we will issue the report with something, something we call a choice letter, and essentially they're going to have a choice of, of coming in for an enforcement conference, or for a negotiation through the alternate dispute resolution process. They'll have roughly 10 days to make that decision on what they want to do at that point, and then we will schedule whichever path San Onofre wanted to take, the enforcement conference,

or ADR, from the time they make that decision to the time we actually have that conference, it's about another 30 days to get to that point. And then it takes the NRC roughly two to four weeks to issue a final action, following the conference. And because we are considering escalated enforcement for two of the preliminary violations, that does mean that there is a possibility of a civil penalty, but that's, that's two or three or more months down the road, before we're in a position to make that final determination ...

Did I miss anything?

- Thank you. - All right.

So Eric, any thoughts on whether or not this is a generic industry issue?

- well, this issue, it would only have applicability at one other site in the United States, and that's the Callaway Nuclear Station out there in Missouri because there are only two Holtec UMAX ISFSIs currently licensed.

So, and I think we were out at Callaway after this event happened, and they were already putting corrective actions in place. There was lots of supervisory oversight, lots of licensee oversight at Callaway because everyone was very much aware of what was going on out at SONGS, so. The existing body of affected users knows very well what's going on, and they are very aware of what they need to do to prevent it from happening at their site.

- And, and

why was the NRC not notified,  
following the event?

- Well, that's a very good question.

I believe that it came down to an interpretation,  
and San Onofre simply didn't interpret the event the way  
that we did because it took for us to prompt them  
before they made the proper NRC notification.

And several times in conference calls  
and other venues, we asked them, you know,  
why aren't you making a notification?

And it took that prompting to have them to do it.

So I think it boils down to interpretation.

- And then we're, so there's a few more questions  
on inspection of the canister itself.

Currently San Onofre is evaluating,  
through engineering analysis, the, the,  
what needs to be done, in terms of inspecting the canister,  
or can they, or immediately, or can they do it as part  
of the Aging Management Program.

And we're, we don't believe there's an immediate concern  
with the canister, so there's time to allow San Onofre  
to do the appropriate engineering review work here,  
and then they will turn that, they'll submit  
that back to the NRC, and we'll take a look at it,  
to see if we agree, or if we think something else needs  
to be done, in terms of inspection of that canister.

That's an item that's on our plate  
for our future inspection, I think,  
so in the future, we're thinking in December timeframe,  
before fuel handling is resumed,

the NRC will send a team out, the focus of that team will be to review the adequacy of the root and causal evaluations that have been completed by the licensee to ensure that the corrective actions have been implemented, and then to complete our review of the analysis to support this canister in particular, the inspection of this canister.

And I don't think, and so, so fuel loading campaigns won't restart until we've completed our inspection, and that inspection won't occur until early December, at the earliest.

Then there's several questions, Eric, on what, what are the specific regulatory requirements? So, like, for the, I don't know if we brought that with us, so the--

- Regulatory requirements-- - 10CFR.  
- well, all the regulatory requirements exist in 10CFR part 72, but in particular, what is--  
- I think that's what they're looking for, is the citation, so the failure, the failure to report-- - Oh, that's, failure to report is 10CFR, part 72 .75(d)(1), is the particular one we're, we're considering escalated enforcement on.

- Okay, and the failure to provide redundant drop protection?  
- well, that goes back to their original licensing. They are a general licensee, so that would have been part of the 10CFR 72 212-- - Body of--

- Regulations, I think 212(b)(3) is the one.
- Okay, but they actually had the, what's referred to as a Certificate of Compliance.
- That's right.
- which required them to implement provisions under technical specifications.
- Exactly right.
- And the technical specifications themselves, I believe that was, it's Tech Spec 5-- - 5.2. whatever, yeah.
- In section 5.2 of the tech specs, requires that they maintain redundant load drop protection during movement of a canister, that's the specific citations for the redundant load. And then the procedures, corrective actions and training program requirements all reside in 10CFR part 72, there's a specific sub-paragraph for each and every one of those.
- Yeah, and I can tell you those, that would be 72.150, 72 for the, for the procedure parameter, 72.190, the training requirements, and 72.172 for the corrective action portion of their violation.
- And there are some questions regarding asking clarification on how was the canister misaligned?
- well, and Rachel, if you could go back to the, the slide that has the picture of the, looking down into the ISFSI vault, I'd really appreciate it.
- You want this one, or you want--

- No, it's-- - This one?

- There we go. - Slide 8, Rachel.

- Slide 8.

All right, if you look down, at the picture we're looking at now, that's looking down into the UMAX ISFSI vault.

What you see there is a divider shell.

Now, when the MPC, or the canister is moving down into the divider shell, ultimately to rest

at the bottom of that cavity,

there's very little clearance, there's

about a quarter of an inch clearance

on either side of the canister,

so thinking about it, you're putting a round peg

in a round hole, but that hole is very close

in diameter, the hole is very close in diameter

to the round peg, so as you can imagine,

you have to have that round peg lined up pretty good

to drop it right into that hole.

Now, luckily you have redundant drop protection

that allows you to sort

of manipulate things until you get things just right.

This violation revolves around inattentiveness.

They weren't paying attention to what they were doing,

so instead of paying attention, and getting

that round peg lined up just so, and down into the hole,

they fell asleep at the switch,

and that round peg ended up resting on that divider shell.

- Figuratively. - Figuratively speaking.

- Right, and so,

and so how do they make the alignment adjustment pad,

to get it perfectly centered?

- You know, the VCT operator is key to this

because once you get initial alignment,  
there's still some manipulations you typically have to do  
because the ISFSI pad isn't completely level.  
There's a little bit of a grading of the ISFSI pad,  
it's leaning a little bit in each direction  
because you want rainwater to run off of it.  
So the VCT operator oftentimes has  
to position the VCT a little bit to the north,  
or a little bit to the south, position a little bit  
to the east, or a little bit to the west  
to get it perfectly lined up, and in this case,  
they thought things were proceeding smoothly,  
and you need vigilance, you need the rigger,  
or the spotter to be paying attention  
to the MPC going down, and you also need the VCT operator  
to be vigilant in looking at his indications  
because he would notice a loss of load.  
You've got two people there, and both  
of them failed open in this case.  
- So I think there might, Rachel,  
there might be a better picture  
that shows that alignment, I'm looking real quick.  
Maybe slide,  
let's try slide 16.  
Right, and that kind of shows the stack up  
of how, how, in the, the VCT rig,  
and how the operator has to position  
that entire rig. - That's right.  
- To get it perfectly aligned--  
- And also, this VCT, the operator,  
he can make very fine adjustments

with the vertical cask transporter,  
he can bump this thing a half inch,  
an inch in one direction, a half inch,  
an inch in another direction, you know,  
he has a lot of degrees of mobility there,  
where they can get these things aligned.  
So if you have a good VCT operator,  
and someone who's aware of what's going on,  
you really shouldn't have a problem downloading these MPCs  
into the ISFSI vault.

- Thanks for that, and Patty, are you able  
to address chloride stress cracking corrosion, NRC?  
If not, we can take it, or I'm trying  
to give you a chance here. (overlapping)  
All right, so the agency has evaluated the likelihood  
of chloride induced stress cracking corrosion.  
This is a longterm aging phenomena,  
we do not believe it would occur within the first 30 years  
of the life of the canister,  
that's why we've imposed regulations  
to require an Aging Management Inspection Program  
to start at year 20.

And one of the specific concerns there is inspections,  
non-destructive examination type inspections  
that look for chloride stress cracking corrosion sides.  
And to date, based on the inspections  
that have been done in the industry, we have not encountered  
any chloride stress cracking corrosion of a canister,  
is that right, Patty? - That's correct.

- Eric, talk more about this canister number 30  
that's stored in the Unit Three Fuel Building,  
is that allowed? - Yes, it is allowed.

It is an analyzed condition, as they say, and they can store it indefinitely in the transfer cask because it's cooled, it is able to maintain its thermal stability in that configuration, and it's fine.

- And this actually, this question came in both during today's webinar, but it was also submitted through a participant, ahead of the webinar, and one of the technical staff did some more research on it. It's actually,

the canister, in a transfer cask, seismically restrained to the fuel building wall, is an acceptable condition at San Onofre.

They, the bounding temperature profiles were used to determine the impacts on the canister, and the results of that evaluation are all published in a publicly available section of the FSAR for, or the Final Safety Analysis Report for San Onofre.

And the numerical results for thermal analyses, and peak clad temperature, and pressures are all described in the data tables that go with it.

So this is an acceptable condition for San Onofre.

Do you want to talk about radiation surveys?

- You want me to? - Yeah.

Rachel, can you pull up the slide on the radiation surveys?

(background noise drowns out speaker)

- There is a schematic of a UMAX lid there.

- Right, so prior, prior to the webinar, we also received a number of questions regarding the radiation levels at the San Onofre ISFSI.

This is something, the licensee would periodically do their own surveys of the ISFSI pad, and the individual vaults, to make sure radiation levels are consistent with technical specifications.

What this slide shows is the top of a, of a UMAX vault, that's the closure lid. We recently, I think it was two weeks ago, we had some inspectors out doing decommissioning inspection activity at San Onofre, and we decided to perform independent surveys of each and every ISFSI vault at San Onofre, the surrounding fence, the beach area, for those that live out there, the bluff above the ISFSI, and the parking lot that's also up above the ISFSI. Every, every reading we took on each and every vault was, was at least an order of magnitude, if not more, below the technical specification limit for radiation levels in the ISFSI area, and adjacent to the ISFSI, in addition, San Onofre's required to submit an annual report, radiological effluents report, I'm getting a nod of agreement.

And, and they have reported less than one millirem total exposure to the public, that's the lowest value you can report in that document. So again, it's, the radiological issue of the ISFSI location at San Onofre is not a significant concern.

- No.
- Not from the actual dose rates that are present at the, at the site.

And then there's a lot of questions about,

well, what could happen to a canister,  
would it be a significant radiological event?  
And for an ISFSI, the radiological release concern,  
it's a function of the likelihood of a zirconium fire,  
and the likelihood of a zirconium induced fire  
in a canister goes down, the longer the fuel decays,  
the less of a chance there is of a zirconium fire.  
These canisters were all helium inerted, so there's,  
there's insufficient oxygen to sustain a fire.  
And then the zirconium itself is in the wrong form  
to support a fire, you really want, to have a fire,  
you would want it to be in the powder type form,  
and that's not what exists inside the fuel canister.  
So again, in order to get that big release  
that a lot of people are concerned about,  
you really need to get that zirconium fire,  
and that's just not a plausible event.

- Yeah, and all this fuel has been cooled  
for at least five years in the spent fuel pools.  
So you're well outside of the risk range  
for a zirc fire event.

- And then I think it's,  
and so there's a question on why doesn't  
the NRC require realtime radiation monitoring, and,  
and that's, so the NRC does require radiation monitoring.

- Right. - It takes place in the form  
of exposure monitoring devices--

- TLDS. - TLDS that are,  
that are connected to the fence surrounding the ISFSI pad.  
So there is realtime radiation monitoring,  
but there's not, the NRC doesn't require a,

a digitized type radiation monitoring system,  
to where there's the detector,  
that then converts that signal,  
and then it goes up to a, to a wifi signal  
to feed a webpage, or something like that.

The NRC does not require that for ISFSIs,  
and I don't know why we don't, I speculate it's  
because of a very low radiological hazard presented  
by an ISFSI location in the first place.

- Yeah, and don't forget, also, Troy,  
ISFSIs are passive mechanisms, they have passive cooling  
of a spent fuel, the fuel is getting cooler  
and less radioactive over time,  
and there's an active surveillance requirement,  
where you have to look at each  
and every ISFSI vault every day to make sure  
that the, the intake screens are clear,  
and the outtake screens are clear.

So there's an eye on the ISFSI at all times,  
every day, to make sure everything is still in place.  
And the radiation monitoring is just added assurance.

- Okay, I'm going to, I'm going to take you back  
to canister number 30 again, how is it cooled?

- Natural convection.

You know, all of the fuel in a spent,  
in an independent spent fuel storage installation  
is cooled naturally, by natural convection currents.  
The helium transfers the heat to the MPC shell,  
which is then, which is then taken  
by the environmental air out into the atmosphere,  
it's really simple.

- How does that work if it's in a transfer cask, though?

- The same mechanisms are in place.

- Okay. - In a transfer cask.

It is, you know, there's an annulus that allows heat to go up, outside of the transfer cask.

- Just scrolling down now, one second.

So there's a question on, Patty, maybe I'll talk, I'll give you a shot at this.

Can chloride stress cracking corrosion breach a canister in less time than

the Aging Management Program would detect it?

- No, we don't believe it could.

Stress corrosion cracking takes awhile

to get to a canister, and

we don't think that would, it would.

- Yeah, so what Patty's saying is that the,

in short, the answer is no, it's a,

chloride stress cracking corrosion is a,

takes a long time to occur,

our studies suggest it would take more than 30 years.

Aging Management Programs start at year 20, and,

and that program requires

that the licensee determine the most susceptible containers for the inspection.

And so we don't believe there would be cracking due

to stress, chloride stress cracking corrosion,

before we detected it was occurring.

(background noise)

I'm scrolling through the questions

that are being sent out to me.

Canister 30.

We do have questions on keeping spent fuel

at San Onofre, and the transfer of fuel  
to a permanent nationwide waste storage facility.

- Yeah. - Permanent?

- Yeah.

- Or an interim consolidated--

- Either, something that moves it away from San Onofre,  
is that something you can talk to?

- Well, we do have two,

two license applications in

For consolidated interim storage facilities,

one in New Mexico, and one in Texas,

they're actually right across the border from each other.

So we have to review those, those licensing applications.

So there is a possibility for movement there,

if that's what the licensee intends to do,

to move it off of the site.

- And I believe it would, we're still waiting

on some type of Congressional level action

to take place for a permanent repository

for high level waste. - Correct.

We do not have a permanent repository for disposal.

- I'm not sure, I don't think I have

the right people here today to talk about the--

- whistleblower protection?

- Yeah, do you?

I don't think we've inspected that,

you haven't, Eric, have you? - No.

- Yeah, so there's some questions

involving whistleblower protection,

and safety conscious work environment.

So the regulations still apply

and are in effect at San Onofre for,

for employee protection rights,  
that would include whistleblower protection rights,  
employees, and we do go out,  
I don't have the right inspectors up here today  
to talk about our last inspection  
of the safety conscious work environment program  
at San Onofre, but employees do have the right  
to bring forward safety concerns, and not be retaliated.  
And if they, if they feel that the licensee  
has been unresponsive to their concerns,  
or they think they've been retaliated in some manner  
for raising a concern, they can always reach out to the NRC,  
they can call our Headquarters Operations Officer,  
they can call anyone in the regional office.  
we'll capture that concern, we'll enter it into our process.  
So that's always an option for them, that you  
could even call our Office of Investigations directly,  
if that's what they wanted to do,  
if they didn't want to talk to an NRC inspector.  
So there's a number, number of pathways, we take those  
in the mail, telephone, email, anonymous,  
a person's name attached to it,  
any form, we'll take that, then we'll,  
we'll either inspect it or investigate it as is appropriate.  
Okay.

Right, now I'm scrolling through the questions  
that are coming in.

- Did I see one about a criticality analysis or--
- That is there, what's the chance of a criticality of?
- well, the licensee actually provides information  
about a criticality event, and in the absence

of water in the cask, and along with the,  
with the boron impregnated lattice structure  
in the canister, criticality is, cannot happen  
in a dry cask, in a dry fuel storage canister.  
It is just, you can't get there.  
k-effective is so low,  
you can't get the multiplication of neutrons,  
without water, and with the boron, again,  
and the lattice structure of the canister, it's impossible.  
- Okay, and there are some followup questions regarding the,  
it's with the opening of a canister, once it's been,  
once it's been put in a vault,  
and then taking it back out and whatnot, that's something,  
if a canister had to be opened, or repackaged,  
that's not something that's going to take place very quickly.  
The first step would be for the licensee  
to establish a safe environment  
to transfer that canister to, it could be,  
most likely it would be a hot cell of some sort,  
so if you're at a fully decommissioned facility  
where there's no structures left,  
like San Onofre will be in the future,  
they would likely have to, to either, one,  
they would have to figure this out,  
and get NRC approval, but they would, one,  
have to either build a hot cell,  
or a radiological confinement purposes.  
It might be something where they could  
have a vendor, or somebody construct a new shipping package,  
and then just repackage it into a different type of device  
for shipment somewhere else.  
They, it might be something where you could put it back

into a spent fuel pool, but that would have to be closely evaluated before something like that's done because the, the fuel is hot, the canister is, you know, there is, it is at an elevated temperature. So you'd want to make sure that you'd carefully analyzed and studied the impact of a, of a water shock on the canister before you put it in a water environment.

- And, and to add to that, Troy, remember, when it comes to radioactive decay, time is on your side, the longer you wait, the safer it's going to be. - That's right. And there's a question, well, if the canister is dropped, how are you going to get it back out? And, and again, the licensee isn't required to analyze for a load drop event, that's why we put in the license, the requirement for redundant drop protection at all times. And again, that's what made the August 3rd event so significant, was, was the loss of redundant load drop equipment. So they don't have to analyze for a load drop, I don't think anybody's really, and maybe, Eric, you can correct me-- - I want to say that San Onofre has demonstrated the ability, during their dry run operations, to retrieve a canister. - An undamaged canister.

- An undamaged canister, right.

- Right, and so the question is, if you dropped it that 18 feet, and you somehow deformed the canister, which we don't, right now, our evaluations aren't showing

that there would be a canister deformation  
from an 18 foot drop, but hypothetically,  
I don't think anybody's analyzed trying  
to pull a stuck canister  
from a drop out of the bottom of the vault.  
I just, I don't think it's been done, and again, it's not,  
the NRC doesn't require that type of analysis.  
What we do require is redundant load drop protection  
features so that you cannot drop the canister.  
And again, we don't, just to go back to the consequences  
of the August 3rd event, that this canister was,  
was lowered in a slow and controlled manner.  
It made contact with the shield ring,  
and then rested on it, and then the slings were disabled  
because they went completely slack,  
and therefore, we don't believe there's any damage  
to the canister, or to the fuel assemblies inside.  
So this would be no different  
than if they successfully lowered the canister all the way  
to the bottom of the vault, when it finally made contact  
with the surface, it would have been an easy,  
slow mating of the surface.  
So there's, we don't believe there's any fuel damage  
whatsoever to the affected canister.

(inaudible)

- You want to talk about that at all?
- Yeah, you can.
- Well, there's a question here about criticality,  
due to water entering through a crack.  
If there was any evidence of a crack in a canister,  
they would have to take immediate actions  
to either re-containerize that canister,

or remove the spent fuel contents, or repair.

- And we actually think cracks, when we're talking about cracks, we're talking about weld cracks, and that would most likely occur from a canister in storage, due to some type of stress corrosion cracking, and again, the Aging Management Program is set up such that you detect the early signs of cracking, and you have the option to, the ability to make repairs before you would actually have a through wall crack of the canister, and in San Onofre's case, again, they're, they have an agreement with the state of California to have that Aging Management Program in place by year five, which is well, well more conservative than what the NRC would require for a similar equipment.

Now, one of the questions, I see some in here, Eric, and I know I've asked you,

so they've been, San Onofre's been moving fuel out to the pad for a long time.

Why isn't this something the NRC, all these weaknesses with oversight, and procedures, and whatnot, is this something that the NRC inspectors should have picked up on from the very beginning?

- Well, you know, and I think me and Troy were talking about this earlier today, you know,

NRC inspectors, we go out to these sites where they have to demonstrate for us their ability to safely load fuel, and while we're out onsite, and when NRC's there, you're going to have lots of management oversight out there, also,

you're going to have lots  
of supervisory oversight during these activities  
because everybody wants to get it right  
for the NRC, you know?  
I mean, we've talked about some aspects  
to them having their A team out there  
during these operations, and even for the first loading,  
you know, they're going to have their best performers out there  
because nobody wants to fail in front of the NRC.  
I think what we saw out there at SONGS is,  
with time, you have turnover of staff,  
the A team leaves and moves on, and you know the amount  
of people you have monitoring these operations,  
it goes down, in a very real sense,  
radiation protection programs don't want a lot  
of people out there standing around, soaking up dose  
because it's not good for their numbers, you know?  
And so you end up having a situation,  
what we had out there at SONGS,  
you have fewer and fewer people out there,  
actually observing the operations.  
When we were out there observing dry runs, you had everybody  
and their mother out there watching these operations,  
but once we left, you know, they get into a little bit  
of a battle rhythm, and they start fighting  
with things like dose, and oversight falls off.  
Instead of having two people up in the man basket  
during downloading operations, now you have one.  
Instead of having supervisors observing  
every little thing you're doing  
because NRC's looking over your shoulder,  
you have, you know, you have people down

in the low dose waiting area,  
just having a little bit of a chitchat, maybe.  
And you end up in a situation where we ended up here  
on August 3rd, it's unfortunate,  
but, I mean, that's what sometimes happens, I believe.  
- Yeah, so I think when we inspected during the,  
during the dry runs in early,  
during the initial loading campaigns, what we observed was,  
well-qualified people involved in the evolutions,  
and plenty of management oversight  
and quality assurance oversight to observe and make sure  
that everything was being done correctly.  
And so when you have well-qualified people,  
and a lot of oversight, you can get by  
with procedures that don't prescribe each  
and every little thing somebody has to do  
because they're knowledgeable of the work  
that has to be done.  
And then, I think in San Onofre's case,  
as they got past the first couple of loading campaigns,  
and they started to experience turnover  
of the riggers, and some of the contract force  
that was available to them, they didn't maintain  
that same level of rigor, and rigor and quality  
in the training program.  
And so now you had people being put out on a job site  
that had less knowledge than what the original team had  
when they first started.  
And then, and so when, and that's okay,  
to even do that, but you have to balance these three pieces.  
(overlapping)

So if you have people come out, and you put 'em to work, that have a little bit less knowledge, then, then the procedures have to go up to account for that, or you have to apply even more management supervisory oversight to monitor all the critical evolutions.

And in this case, what happened was, we ended up with people that had less qualifications, or less knowledge, and the oversight piece slowly backed off, and so, and then the procedures were never updated to reflect the gap left by a decrease in oversight, and a decrease in knowledge.

And so, so that's not, for the, I think for the, we expect the licensees to be able to manage and balance those three pieces of the puzzle, and the NRC can't be there every day to do that, that's why we give these folks a license, and that's why it's their responsibility to stay on top of it.

we did not think there needs to be a design change to the vault storage system at San Onofre, it is possible that, with the right corrective actions, and put into place, that provide the critical parameters and measurements that need to be made during the downloading evolution, people with the right knowledge and skills, and the right level of oversight, you can safely lower that canister down into the vault without making a design change to the, to the vault system.

- Right.

- And then, and then there's a question about the notification, and--

- Do you want me to answer that one?  
- And there is a difference between a courtesy call, and a formal notification to the Headquarters Operation Center. That call to the Headquarters Operation Center starts everything for the NRC, and it also is a way for the public to get aware of events that have occurred at a licensee's facility. But when that call is made to the Headquarters Ops Center, they're, our operations officer immediately calls the regional duty officer that's on call, and that initiates the NRC's response actions. And so it is significantly different to have an immediate report to the ops center, than trying to catch somebody in the regional office, to let them know that something's going on with the site. And how about you take external events? Seismic, do you have that one?

- Sure.
- We have a slide for that, too.
- Yeah, the, the problem I have with this one is just, it's, well.
- I can take it.
- Okay, you go ahead and take it.

(background noise)

- So, Rachel, can you pull up 39, slide 39? Seismic and flooding, so there's some questions on seismic and flooding, I'm going to refer to that as tsunami, so the ISFSI systems at San Onofre are evaluated for earthquake, they are evaluated for a maximum flood height,

and flood velocity, at San Onofre, the,  
I'm going to refer to the UMAX system,  
but the TN system's a little bit different,  
but it's not as,  
I don't,  
the UMAX has a,  
it's designed to withstand ground motions of 2.1 Gs  
in the horizontal, and one G in the vertical direction.  
The San Onofre design basis earthquake is 0.67 G,  
so it's, there's plenty of design margin  
for earthquakes at San Onofre,  
and then, with respect to flooding,  
the UMAX system  
is designed to withstand flood levels up to 125 feet,  
that's 125 feet, fully submerged.  
The Transnuclear system, it's 50 feet, fully submerged.  
For those that are out on the west Coast, and have been  
by the site, you've been down around the beach,  
you've seen the seawall, atop of the seawall,  
just as a reference point, is 28 feet.  
And the maximum design tsunami wave height  
is roughly 27 feet, so there's plenty of design margin  
at San Onofre for both flooding, and for seismicity.  
And then we're back to the unpacking, so,  
of a canister, if required, so that,  
San Onofre, nor any other site,  
is required to maintain a spent fuel pool,  
solely for the purpose of repacking,  
or opening a canister, there are other safe ways  
to do that, if required, or needed by a facility,  
they would have to determine the safe radiological facility  
to do that evolution in.

Most likely, it would be, involve some type of construction of a hot cell to do the work. But there are other options, again, that would be on the licensee to figure out the safest option that works for their facility, and then the NRC would approve that. But they are not required to have a fuel pool to do the work. And then there's a question about evidence, with respect to damage to the canister, or other canisters in question, during the downloading evolution. That's still something, San Onofre is still analyzing that question, we've put that to them. We think there's probably been some metal to metal contact during downloading at more than just this canister in question, but if you go back to the photo, Rachel, maybe you can remember it, the. Look, the one with, that says, "Look close." That one, thank you, Rachel, so if you look, if you look close at that photo, you can tell there was contact between the canister and the shield ring, but, there, and I think, and we've examined this photo, and in detail, it, essentially it's just paint scrape-age off the, off of the shield ring, off the divider shell. So we don't think there, if there was some wear marks, they're not significant wear marks on the canister, and I believe the acceptance criteria for wear indication on a new canister is gouges up

to a quarter inch depth, and we certainly don't believe, at this time, that there would have been gouges that even come close to a quarter inch depth, due to a downloading operation.

Therefore, we don't think there's an immediate concern with the canister, but that said,

we're waiting on San Onofre to complete their analysis for not only wear marks on the canister in question, but the other canisters, and what type of impact will that have on their longterm Aging Management Program.

The other piece with that is,

is these are stainless steel canisters, and even if you did have scrape-age on the canister's surface, it's likely you would re-oxidize the stainless steel layer that was scraped, prior to the onset of some type of chloride pitting, or stress cracking, so.

But we're still going to wait for the analysis, and do our full review.

So there's a question on the hot cell, again.

So canisters don't have fast breaking emergencies, and so, so what would likely happen--

(inaudible)

what would likely happen is, is the, through the Aging Management Program, you would identify an indication, or early signs of cracking of a weld, and you would have the time, because chloride stress cracking corrosion is a longterm phenomena, you would have the time to construct the hot cell, or repackage the canister for shipment elsewhere, if need be, and do the repair work.

We don't see this as something

where you have an indication one day,

and you must make repairs that afternoon,  
that's not the type of scenario we're talking about.  
These are long range, lots of time available types  
of repairs, okay, we have some questions on shims,  
do you want to take shims?

- Rachel, you want to go to 34?

Oops, 34, is that it?

Do you have the shims? - Let's try slide 34.

- Oh, oh. - Or--

- They changed the slides, okay.

- No, there you go.

- That's, that's the one I'm thinking, so in this picture,  
it shows the bottom of the shims, so the original design  
was called the monolithic shim standoff,  
and that's why see on the left hand picture.

And Holtec changed their design

to the shim standoff pins, which are shown  
on the right hand of the, the right picture.

The pin design has a possibility  
of failing during fabrication process,  
and during transportation of the canister,  
and since this issue had been identified,  
Holtec has ceased application of the pin,  
of the pin design, and replaced existing and new canisters  
with the original monolithic standoff design.

This change to the shims was the subject  
of an NRC inspection done by headquarters,  
by my team, out at the Holtec Camden, New Jersey facility.  
Results of the inspection are still pending,  
we reviewed the thermal analysis  
that had been provided by Holtec,

and the agency does not believe there's  
an immediate safety issue with any of the four canisters  
that were loaded with the shim pins at San Onofre.  
So additional information will be available,  
once we issue the inspection report,  
which we hope will be sometime soon, in the next few weeks.

- If you see something.
- This may be for you to answer...
- Yeah, so I'll, so there was,  
there's a question that came in on,  
on the NRC doing unannounced inspections.  
That's, that is a part of our tool bag,  
we do use that, but it's mostly,  
mostly at our other materials licensees,  
hospitals, radiographers, those types of facilities,  
most of those are unannounced.  
Of course, our resident inspectors  
that are at the operating sites,  
most of the work they do is unannounced inspection activity.  
We do have that option, and maybe that's something we think  
about with our inspection program, is do we announce all  
of our fuel loading campaign inspections,  
like with our current practice?  
Or do we just go out, unannounced?  
Part of the problem, at San Onofre,  
it'd be a little bit easier because they,  
theirs is a longterm fuel loading campaign.  
When Fort Calhoun starts next year,  
it'll be a many month window, and so we could do that.  
But most of the time,  
these are short duration type campaigns,  
and so we have to coordinate with the licensee

to understand the schedule for, for a fuel loading campaign.  
And so it's not that we can't do unannounced,  
but it is a closely coordinated activity,  
the schedules are, but that's something we can talk  
about later. - Okay.

(inaudible)

(inaudible)

- A lot of these questions, people have the same questions.

- Yeah.

So the, the presentation slides are,  
are already available on the webinar handout link,  
they're available on the NRC Spotlight.  
Any slides we use today to answer,  
to help support some of the Q&As,  
questions and answers, those will be attached  
to the meeting summary that'll be published following,  
within two weeks of, I think of today's discussion.  
The session is being recorded, and we do plan  
to upload that to the NRC website,  
and the conversation that you hear will all be transcribed,  
so you'll have a text version of today's presentation,  
as well, for review.

So, and we have a question on,  
how do we enforce the licensee's commitment to us,  
to cease fuel handling activities.  
So the licensee, when they called us on the sixth,  
and then again on August the 7th,  
verbally committed, that came from the site vice president,  
verbally committed to cease all fuel handling activities  
at San Onofre until the NRC came out and inspected,  
and was satisfied with the corrective actions,

at which point, they would, once we,  
once the NRC was satisfied,  
they would resume fuel handling activities.

And so for now, we're taking the licensee for their word,  
that they're not going to refuel, and to date,  
they have not done fuel handling activities  
since August the 7th.

If, for some reason, the licensee decided they weren't  
going to wait for the NRC, and start moving fuel this week,  
once we became aware of that, of course,  
we would talk about it internally.

We have the option to impose a confirmatory order,  
ceasing fuel handling activities at San Onofre,  
if we chose to do that, but for now,  
we don't believe the licensee is going to make any attempt  
at fuel handling activities, and so we're comfortable  
with where we are, and not, and the licensee is comfortable  
with waiting on us to do our inspection activity.

In addition, we have at least a,  
a weekly phone call with the licensee team,  
to talk about their progress with the causal evaluations,  
engineering evaluations, implementation  
of corrective actions, retraining and qualification  
of the staff, so that takes place once a week, so,  
so I think we have a pretty good handle  
on what they've done, and where they're heading,  
and the timeline they're on to be able  
to resume fuel handling activities.

And I'll, I don't,  
I'm going to have to, I don't know the answer  
to this question, maybe one of you guys can send me a note,  
but it's, will all questions be made publicly available,

and I don't,

and I'm getting indications from my IT staff  
that the chatroom, are we going to make the,  
we can make the chatroom publicly available?

Yes. (laughs)

They didn't want to, they didn't want to be heard,  
though I got a thumbs up, yes. (laughs)

And again, the NRC doesn't require drop testing  
because the load drop event's not supposed to happen.  
we require redundant load drop protection,  
we require that, the load drop protection to be tested,  
so those slings have to be tested,  
they have to meet industry codes,  
lifting equipment has to meet industry codes,  
and if you implement that program, as we required it,  
you would not have the drop event, so.

Therefore we don't require drop testing.

There are, there is some drop analysis that is done  
because you do have to lift the canister a certain height  
in order to move it from one location to the other.

Those heights are small, they're on the order  
of one to two feet, and licensees do have  
to do drop analyses for those distances,  
or heights, if you will.

So this, so there's a question,  
would this event be possible with a standard,  
above ground ISFSI, so there are some sites  
where, where they do some of the cask,  
the transfer cask loading in a pit that does require a lift,  
not to the same height as the UMAX storage vault,  
where you have that 18 foot vulnerability,

but there are some where it's more than,  
more than a one or two foot lift to, of a canister.  
So, and those sites, well, at all the sites,  
they're required to have the same, they're required to meet  
the redundant drop protection we require at all sites.

- Right.

- So it's not, it is directly applicable  
to the UMAX design, but there are some sites,  
because of the configuration of their fuel building,  
where they have to make a similar type of lift,  
and they're required to have the redundant drop protection.

I think we've addressed all, did you,  
I haven't seen, I think we addressed--

- No. - All right.

(inaudible)

Hmm?

And, and we've asked ourselves that same question, do we,  
should we make licensees have a drop analysis  
in their final safety analysis report,  
given this event, and we've talked about that,  
and the answer is no, we need to make sure licensees comply  
with the redundant drop protection feature.

Had San Onofre complied  
with the redundant drop protection features,  
there would have never been a near-miss event.

- Hmm, that's an interesting question.

- And so the other one is, did we,  
should we require Holtec, or San Onofre,  
or other licensees to use, on this,  
we're going to talk specifically about San Onofre.  
So should San Onofre's training canister be full size?  
So you heard Eric talk earlier

about there being an additional three quarter  
of an inch clearance, it's okay for the actual,  
for the equipment used in training  
to be different than what's actually in the field,  
but the training program has to teach the workers  
what those differences are, and how  
to compensate for that difference in the field,  
during actual conditions, so we don't have plans  
to require a full size canister be used during dry runs  
at San Onofre, but we do expect the training program to--

- Acknowledge the differences.
- Acknowledge, and train on the differences.
- Exactly.
- And I think, and we'll re-answer this question.

So San Onofre, the question involves  
removing a canister from the vault,  
and San Onofre has the capability  
to remove a canister from a storage vault.  
Just, the canister in question did not drop,  
so we don't think, so, so there's no damage  
to that canister, no damage to the fuel.

Had it dropped,  
the early analysis suggests  
that there would not have been a sufficient deformation  
to the canister, such that we would not have been able  
to remove it, but in any event,  
it didn't drop, so that's, that's  
not something we have to consider today.

"Why are two slings on the same device redundant?"

- well, you want me to answer that one?
- You can, you can say it out loud.

- Okay, why are two slings on the same device considered redundant? Because two slings on the same device are redundant. If one of the slings would have failed, the other sling would be there to carry the full weight of the canister with a lot of margin, with some margin included. Unfortunately, as I've stated earlier, this is sort of an extraordinary event, where the vigilance of two individuals both failed open at the same time, and that's a very unfortunate situation, it is really, in essence, why we're here right now today, discussing the event, and why San Onofre is put in the position to ensure that this, an event like this can never happen again.

- The slings are attached to different points, as well.

- Oh, yeah, yeah. - Yeah.

- Each sling is attached to a different point at a canister. So any given sling could fail, and the other sling would be able to support the load.

- And I don't, maybe you know this one, too, any, the differences between Callaway's system, and, and San Onofre's, the vault?

- There are subtle differences between the two systems, but for all intents and purposes, they are the same. You know, San Onofre has a somewhat longer fuel than Callaway, Callaway has a shorter canister, SONGS has a longer canister. So there are those differences, Callaway's MPC is slightly more narrow than the MPC being used out at SONGS,

but those differences are as far as it goes.  
It's still the same stack up configuration,  
it's still the same downloading operation at both locations.  
It's just that, I think the real difference is  
that San Onofre, it was in the production mode  
of loading numerous canisters,  
and Callaway has only been involved  
in six, in 12 cask campaigns so far.  
Far less than were loaded out at SONGS,  
and so SONGS had a much more of a opportunity  
to have an event like this happen, so.  
Yeah, and the shield ring, it can,  
at Callaway, is actually further down into the ISFSI vault,  
further down on the divider shell than it is at SONGS.  
So by the time you make it that low  
in the Callaway divider shell,  
you're probably fairly well aligned,  
whereas when you're up that high,  
when you encounter the shield ring at SONGS,  
you're probably, and the evidence bears it out,  
you aren't very aligned at all.  
It's more of a, more of a nuanced approach they have  
to do out there when they're downloading than at Callaway.  
- Rachel, can you pull up slide 35, please?  
There's a question specifically regarding canister 29,  
radiation levels, and if you look in the bottom right corner  
of this slide, we actually have the gamma radiation levels  
from canister 29 on the slide,  
the lid was .015 millirem per hour,  
and the outlet vent was 0.12 millirem per hour.  
It just, it just happened that canister 29 was the,

had the lowest radiation level readings  
of all the storage vault, UMAX storage vaults at San Onofre,  
and it was the canister involved in the event,  
which gives us a,  
kind of reconfirms that we don't believe there was damage  
to any of the fuel assemblies,  
or any damage of significance to the canister, as well.  
And then, is it, is a horizontal vault more safer  
than a vertical vault, or vice versa, and I think  
we believe they're equally acceptable, equally safe.  
And then  
the VCT operators, were they,  
were they around during the July event,  
or were they new since the July event?  
Do you have a perspective?  
- This particular VCT operator involved,  
in the August 3rd event,  
was present onsite during the July 22nd event,  
however, there was no communication or no,  
no operational experience passed on  
from that VCT operator to this one.  
It is actually one of our biggest concerns  
at the San Onofre site, is that,  
depending upon who you spoke to,  
there was a vastly different amount of experience  
and amount of knowledge, given one person versus another,  
in our interviewing of people out at SONGS.  
And that was one of our findings, was that a lot  
of this operational experience wasn't being fed forward  
to other cast members, it wasn't being shared freely  
among all of the workers onsite,  
and it really should not be that way.

Everyone should have the benefit of all of the experience that's going on on a site, but out at San Onofre, this was not taking place.

- And Patty, I had a couple of questions coming in that I think are going to be your territory, right? So the, for the proposed interim storage facilities, do you know, are they being proposed as vertical, or horizontal, or is it too early to know?

- So one of the, one of the license applications is actually UMAX, the Holtec one that's in New Mexico. And then the other one is, is multiple, I mean, it can be the horizontal, I believe they can, they're also proposing that they can handle other ones, like the HISTORM that's just up on the pad, vertical.

- vertical or horizontal?

- vertical or horizontal, but not, I don't think they're proposing, you know, beneath grade.

- And then the, and then just a canister life, right, from, so I know we initially licensed for 20 years, but can you get a perspective on the beyond 20?

- I can actually give a little bit of perspective on that, because canisters, at least the Holtec UMAX components, they have a license life of 20 years. And they have a design life of 60 years, and they have actually a service life of 100 or more years, with proper maintenance and surveillance activities. So that goes into the designing of the dry cask storage systems.

- Okay, and then they, they're,  
they have to come in for license renewal,  
prior to year 20?

- Right, they have to come in for license renewal,  
prior to year 20, and then they,  
their renewal can be up to 40 years.

- Okay.

And then

there's a question on the radiation reports  
and measurements that we took,  
and it's my plan to have the staff document, in the next,  
well, they're writing, in that decommissioning  
and inspection report now, as we speak,  
and we plan to attach all our surveyed measurements  
and data tables to support the work of my two inspectors  
that were out at the site, so that will be included  
in an inspection report.

And, and so there's a question on  
when the canister was aligned with its weight shifted,  
doesn't this warrant the canister being opened  
to inspect the fuel, and so I'm going to go back  
to the picture that shows the transfer cask  
on the vault door.

And I wish I had a dimensional slide,  
I know Eric's pulling it up, which one?

- It's this one.

- I think the one, that one right there, that top one, no.

- This one? - What is that?

- 11. - 11, slide 11, Rachel.

So the canister's inside the transfer cask.

What you see here is the transfer cask,  
and if we could look down on top,

and see a cutaway, it's a pretty,  
the tolerances are pretty small,  
between the canister and transfer cask.

And so what we believe happened is,  
when the canister was lowered and it made contact  
with the, with the shield ring, it most likely tilted,  
but it wouldn't have tilted very much at all.

And maybe you have a perspective on that,  
I know I don't have a real perspective.

- well, it'll tilt probably at the order  
of maybe one to two inches, but that's all.

And when it tilts like that, it is completely suspended.

- Right.

- Unless something happens to jostle it.

(overlapping)

- well, it wasn't suspended, it was resting  
on the shield ring, but it wouldn't have been a,  
a sudden, it hit the shield ring, and then slammed over  
into the transfer cask, that wouldn't have happened.

It would have rested, it would have rested gently  
on the shield ring, and then gently made contact  
with the transfer cask. - Side of the transfer cask.

- So the inside of the transfer cask,  
and so there's not enough force  
or stress being placed on the canister at that time  
to give us concern about the integrity of the contents.

- Right, the downloading process is a very gradual process.

They come down with the lift beams  
on the vertical cask transporter  
in a very slow and methodical fashion.

- And, and Patty, I don't know the answer to this.

It involves warranties of the UMAX system,

versus the warranty of a canister, I don't--

- I'm not sure what they mean by warranty.

- Okay, I don't, Eric, do you have any idea?

- I don't know. - All right.

So we're going to, that's one that we'll take away,  
and maybe Lee, in the back, you can make note  
of that one, and then we'll do some research on that.

We have, on the NRC Spotlight page,

we have posted some FAQs on that page,

and we'll take a look at this,

and depending on what kind of answer we get,

we'll put that back on our FAQ, on the NRC Spotlight.

And what's the structural rating of the shield ring?

That's something that,

that, as I mentioned before, the licensee's evaluating the,

the drop analysis of the, what would it,

what would have happened, had there been an actual drop?

And I think that's something the,

the capability of the shield ring to support the weight, and

that's something that we still

have asked some questions about.

- That's right, according to Holtec,

the shield ring can support the full load

of a dry cask storage canister, however,

that's not what it's designed for, so, I mean.

In that regard, if we understand that's not

what it was designed for, and so they get no credit

for having the analysis showing it would support the MPC,

because that's not what it was designed for.

- And,

and we asked this question earlier today,

or yesterday, we were talking about it.

So, if at the end of the first,  
the initial 20 years, the licensee says,  
we're done, we're not going to renew.

- Yeah, okay, so if they say they're done,  
and not going to renew, so it depends on who's saying that.

So you've got the certificate holder,  
with all their general licensees,  
who are using their systems, and if they decide  
that they, they aren't going to renew the certificate,  
the licensee can actually renew the certificate,  
if they choose to, so that they can remain,  
continue to, to have their spent fuel  
in that, their, that cask system.

If it's a specific licensee, they would have to have a plan  
on how they were going to exit out of that, so.

That's the answer, they, I mean.

- And the, and I would think that the NRC can always impose,  
through orders of requirements  
that would replicate a renewal period.

- Right. - It's, right.

To ensure that there was longterm safe storage,  
so the, the licensee, ultimately,  
is still responsible for the safe storage of that.

The NRC has legal options we could pursue  
to make sure that takes place.

Eric, what's the shield ring actually designed for?

- You know, there are a lot of good aspects  
to a lot of these dry cask storage designs.

For instance, the shield ring, in and of itself,  
helps to reduce radiation dose out there

on the ISFSI pad, so it's saving dose for workers,  
sort of at the expense of downloading your MPCs.

The same way the cone that we showed you on top  
of the MPC, that's also designed  
to help reduce, I mean, reduce radiation dose  
to the workers, so it's a good idea.

- And then there's a question along structural integrity,  
regarding the MPC 37 canister, just in general.

And these are robust canisters, they're,  
I think the bottom surface is almost three inches thick.

- Yeah, it's three inches thick,  
the top lid is nine inches thick,  
and the shell itself is five eighths of an inch.

- Five eighths, so well, so over a half inch thick,  
and this is all high grade stainless steel,  
so we do not have issues or concerns with,  
with the structural integrity  
of the multipurpose canister 37 design, very robust,  
highly capable of maintaining the integrity  
and the confinement barrier.

And the shield-- (overlapping)

Rachel, can you go back to the shield cone picture?

- Yeah, you see the green slings?

You probably missed it in my initial discussion,  
but those green slings are there  
for retrieval of the shield cone because it,  
it's going to be used again with the next MPC  
that is downloaded, so the shield cone comes out,  
along with the yellow slings, and the MPC lift cleats,  
something we hadn't discussed too much,  
all come out after the canister has been installed  
in the ISFSI vault, that way they can be used again

on the next canister.

- And then they put another, another lid on top of all that, to seal it up, the vault up.

- That's right. - Right.

- That's right.

"...MPC Guide. - with the sole purpose of helping to guide the canister into the hole. It's not a shield ring."

- well, honestly--

- Let's read the question out loud.

- Oh, I'm sorry, you read the questions for me, and I'll.

- Okay, so there's a question regarding the, the guide ring

versus a shield ring,

so is it, is it really something

that helps guide the canister,

or is it providing shielding, or is it a little bit of both?

- Rachel, if you could go back to picture, slide number eight?

So,

those guides that you discussed in your question,

they're actually the gussets that are on top

of the shield ring, and they are there

to help guide the MPC into the storage vault.

But the shield ring, in and of itself,

as I mentioned earlier, is there

to provide radiation shielding

for the MPC while it's in storage,

and should reduce radiation dose to workers,

and out on the cask.

So we're sort of talking about the same thing,

and they are part of one another,

but the shield ring and the guides are connected,  
but separate, so. - Okay.

And then, and then the cables, the slings,  
and the yellow ones, is there,  
is there a required inspection program for those,  
and what does that involve?

- Yeah, the slings are actually, they're,  
the guidance that you follow when,  
when designing and making slings is ASME,  
that's the American Society of Mechanical Engineers,  
30.9, and it spells out all the requirements for slings, in,  
in the design.

- Do they have to be load tested?

- Yeah, load tested requirements,  
how much of a dynamic load you're going to impose,  
in addition to the load rating,  
and all the slings out at SONGS,  
they're actually load tested to twice their rated capacity.

- And the yellow covers on the slings,  
are those removed for inspection, or how does that work?

- Well, actually, they're actually areas  
on the slings where you inspect them.  
Now, we don't have a picture of this,  
but if you look at a sling up close,  
they'll have a little bitty tell-tale on it.

And any time that tell-tale begins to move inside  
of the sling, it's an indication  
that the slings are wearing.

And so if that tell-tale disappears, it's time for you  
to get rid of the sling, and purchase a new one.

- And is that something they would inspect  
before each lift, or-- - Absolutely.

Yes, the slings are inspected before each lift, when they're being installed on the MPC.

- Rachel, can I get you to go back to that other slide on the vault?

That one, so, so earlier, we talked about the, the spotter said, said it was four feet down.

- Right. - Right?

And we said, and how there was some confusion about, was that four feet below the shield ring, or whatnot, about how far down is the shield ring from the, from the--

- The top? - From the top?

- About four feet. - About four feet?

- Yep. - Okay.

So that would be somebody standing on top, with a camera, could easily take that, zoom in on it, it wouldn't be an issue for, for that, right? - No, no.

- And that's an empty vault there?

- That's right, that's right, and I took that picture.

- And Eric says he actually took that picture, so.

- I took them all.

- So there's a question that says, if they have gussets, are there to guide the canister into the storage vault.

Why is the fact that they actually fail

to do what they are designed to do not being addressed

by the inspection report? - You know,

that is something that we are addressing,

as part of our special inspection.

And it's, it's the,

there's an important nuance here.

When you guys look at the shield ring,

and you look at the gussets that are there  
to guide the MPC into the canister,  
there is a little bit of an offset  
in a lot of these shield rings and gussets,  
where the gusset does not go flush  
with the interior surface of the shield ring.  
And that's actually a,  
an engineering enhancement that they actively made out  
at the Callaway site, to address those gussets  
in the fabrication of their divider shells.  
We had questions during our inspection,  
why weren't any of these enhancements fed forward,  
out to the divider shells used at SONGS?  
And the fact of the matter is simply  
that the divider shells at SONGS were all manufactured long  
before Callaway got out to perform their,  
their vendor inspections out at Holtec,  
and had those enhancements put in place.  
So there is, those gussets aren't perfect,  
is what I'm saying, there's still a little bit  
of a lip inside of that gusset,  
about a quarter of an inch, on a lot of these shield rings,  
and that's unfortunate.

- Yeah, the key factor here is  
to make sure you have the correct alignment  
from the beginning, before the canister gets  
to that part of the shield ring,  
before it starts to approach the shield ring,  
so that you don't have the challenge  
of the canister making contact  
with the shield ring in the first place.

- Right.

- And, and we don't believe there's any plans to, to enhance the gussets used at San Onofre. So there's a question about the radiation levels during loading, and being concerned about the amount of radiation during loading, if you have to have folks go to a low radiation area. So just as a good ALARA, as low as reasonably achievable practice, you want, you want the staff involved, and working in radiological areas to minimize their exposure. One way to do that is to take advantage of the distance from the source of the radiation, and so many licensees will adopt a low dose waiting area, or low dose area during any job site type of evolution, and so it, it was appropriate for San Onofre to designate a low dose waiting area, but you have to balance that with maintaining the right level of oversight at the job site to ensure quality standards are maintained, and so. And I think the, during the downloading, there's, there is one part of the downloading where there is a radiation streaming effect from the canister. - There is.

- And those levels are about--

- well, at San Onofre, those levels can go as high as three and a half R per hour, and actually, what ends up happening during downloading operations, most people will post the area immediately around the VCT, during downloading, as a locked, high radiation area, which requires special dispensation to be able to enter into that area,

and so they restrict a lot of people.

Everyone but who is absolutely necessary will not be in that high, locked high radiation area. But in this case, I think they could have found a better area to have staged themselves, where they could still observe downloading operations, and not have an obstructed view, as they did in their low dose waiting area.

There are other areas on top of the ISFSI pad, for instance, where they could have gone, and not been in a locked, high radiation area.

- Yeah, and just to put it in perspective, a locked high radiation areas are greater than 1,000 millirem per hour.

- That's right, one R per hour.

- And so it's acceptable to work in the locked high radiation area.

You do want to provide the appropriate rad engineering controls for workers that are in, that work in those kind of spaces, and I do think, and that's why there's shielding provided for the VCT operator, so that they're not exposed. The spotter is up in a man lift, so they're above that high, high radiation area, so they're, and then the issue here was, everybody else was moved to that low dose area. As Eric mentioned, there were probably other places on the pad that provided an unobstructed view of the operation, and you could definitely leverage cameras, video capability, to assist in the oversight monitoring role.

- Absolutely.

- And I'm not sure, so going back to that, Rachel, can you go back to the shield ring picture again? And the question is, it looks like there's a gap between the shield and the canister wall.

- Well, actually, there has to be a gap between the shield ring and the canister because you want the hot air, that's being heated by the MPC, to be able to rise to an exit through the top of the UMAX vault. If you go to the lid picture, Rachel, if you don't mind. You see the lid there, you have inlet vents on the outer periphery of the lid on all the low corners, those are inlet vents, and they feed air to the outside of the divider ring, that's cool air coming in. That cool air travels down, it enters into the MPC cavity, underneath the shield ring. That air is heated by the MPC, and it exits up, out through the top vent there, and that's essentially the cooling for the spent fuel in the storage canister, while it's in the UMAX ISFSI vault. So a gap is an integral part of that design.

- And, I don't, so the question, is turnover related to radiation exposure at the site?

And I don't believe that's the case.

- I don't believe that to be the case, either. Most of these, most of these people want to work, and they mostly enjoy going to work. So I don't think radiation's an issue out at, for workers out at San Onofre,

I don't think that's a disincentive to, no.

- And it's said, there's a comment about inspectors avoiding radiation of downloading the canister into the vault, and that was a consideration at San Onofre, was the, was moving people to a low dose area.

I'm going to think inspectors here--

- Oversight.

- This actually refers to San Onofre, or Holtec oversight staff.

And again, they want to minimize exposure, but you need to minimize exposure while maintaining the correct level of job oversight, so there's a balance between the two.

My inspectors, when they go out and watch these, they're asked to go to the low dose waiting area, but they go over there with the VCT operator, and observe the downloading evolution up close and personal, that's what they do, so, to get a good understanding of what's going on, and talk to people while they're doing the task.

And then we're back to the, hey, Rachel, can you go back to the vault photo again?

So there's another comment about the quarter inch there, where the gusset is. - I saw that.

- Yeah, so that is, that's just a fact of life for San Onofre, there is a quarter inch, about a quarter inch space there at the end of the gusset.

They need to account for that, train the staff, and make sure that they're knowledgeable of it, and do a better job aligning the canister, before they do the download, and I think,

and at Callaway, they actually brought that gusset out

to the edge, so that, so that you didn't have that same vulnerability, both designs are acceptable.

At Callaway, I think there's more forgiveness to the, to the operators, at San Onofre, you have to be more vigilant, to make sure you get the initial alignment of the canister correct, and that is definitely something that's achievable and doable.

So there's a question about, is there any type of quantifiable requirement by NRC for qualifications of workers and supervisors performing the work, so, in 10CFR72, point, the qualification requirement, which is, what is it? (overlapping)

Yeah, one of these, which one--

- It's 190. - 190.

So 10CFR72.190 requires a qualification program for all individuals involved with important-to-safety tasks, so these frontline workers here, that would involve the--

- VCT operator. - Okay.

- The guy responsible for making sure the MPC is being downloaded properly.

- The spotter?

- The spotter into the vault, and it actually goes onto other operations during fuel processing inside of the fuel building.

So it's not just activities out on the ISFSI pad, it's all of the quality related activities, which includes things like welding, on the placement of the fuel assemblies into the MPC, into the lattice basket inside of the MPC.

All of these jobs are quality related, in dry fuel storage.

- Okay, and then if it's okay to use workers that haven't completed the qualification process, but they have to be directly accompanied by an individual that has completed the qualification process.

- Correct.

- So, and that's why we, one of the reasons why we chose to go with the qualifications violation, was because you have people doing a task for the first time, where the training program didn't get them where they needed to be, and there wasn't a supervisor, or somebody with the appropriate quals right there with them during the job.

So Eric, I think one last time, we'll talk about metal to metal contact, and what our thoughts are on the significance of that on a canister.

- Well, metal to metal contact isn't the best thing to happen to a canister, however, realize that in the case of MPC contact with the divider shell ring, there is paint there, that's designed to take these kind of scuffs, and absorb some of that impact.

And Holtec is going to provide us with an analysis, to give us the bounding conditions, as far as scrapes and scratches that they think this MPC number 29, installed in their ISFSI, experienced. And I think that could be considered to be a bounding analysis for all the other canisters, because all the other canisters, while they experienced a little bit of scuffing, and a little bit of contact going into the ISFSI pad,

none of them actually hung up as MPC 29 did.

So, and then moving forward, we'll see how that informs San Onofre's Aging Management Program, how far they intend to go, as far as evaluating all of their canisters for future degradation, because, again, a scratch today isn't that big of a deal, however, as time goes on, that could be a point where stress corrosion cracking could initiate, but again, those are all longterm concerns on these canisters.

There are absolutely no immediate concerns regarding the condition of the MPCs, and their ability to perform their confinement function.

- And there's a question regarding radiation being an issue to the folks that live within 50 miles of San Onofre, and again, we'll just, one last time, the, we don't think there's a radiological concern with the ISFSI being located at San Onofre, and as the fuel inside the canisters continues to decay, there's less and less risk of a zirconium fire, that's the principal driver to what would be a radiological release, and we don't think the conditions exist within a canister to have a zirconium fire, because of the lack of oxygen, and the wrong form of zirconium, to propagate a fire, so we don't--

- And-- - Yeah?

- There's also another requirement that San Onofre has to abide by, and they've been abiding by this requirement for years. It's the publishing

of a radiological environmental monitoring program report, each and every year, where they have TLD monitoring stations, effluent monitoring stations, monitoring stations onsite, as well as offsite. And they're actively measuring the radiation impacts of their facility on the surrounding environment, and those reports are available in ADAMS, they're publicly available in ADAMS, and anyone in the southern California area, or anyone in the United States can go to our agency-wide document system, and find these reports, they are there, it's a requirement.

- And so there's a question about are, if, whether or not San Onofre is going to use cameras in the future to see into the vault during the downloading?  
- All indications right now are yes, but we'll see, when we perform our next inspection, and see how they're engineering enhancements and procedure enhancements are truly being borne out. But all indications now are yes, they will be using cameras.

- And there's a question on, back on, Rachel, slide 21, just so I have it for reference. And there's a question about, what's actually paint? Are the canisters painted?

- The canisters are not painted, however, the divider shell that you're looking at in the webinar, that is a painted surface, and if you look closely, you can see, the paint has been scuffed off by the contact this divider shell made with the canister.

- Yeah, so the canisters are stainless steel, and then the divider plate is?

- Coated carbon steel.
- Coated carbon steel, okay. - I believe.
- All right. (inaudible)

Okay.

And there's a question about, why not have two spotters?

- That's a very good question, I think, probably, moving forward, you're going to find certainly more than one spotter, or more than one person who has a vantage point out on the ISFSI pad, during future downloading operations at San Onofre.

- All right, and if they, if they leverage cameras, then you would be able to have multiple people spotting the downloading evolution, depending on the number and placement of the cameras.

So that, so there's a question on the transfer cask cooling system, so there's not a cooling system, if you will, for the transfer cask.

This is for, so the fuel is maintained cool--

(overlapping)

We're talking about MPC 30 now, the one in the field, though, so heat goes from the fuel assembly to the helium gas to the canister wall--

- It's radiated out to the--

- It's radiated out to the transfer cask inner wall.

- And then to the environment.

- And then that's transferred through the transfer cask shell, and then just the normal air surrounding the transfer cask shell is what dissipates that to the environment.

- Yes. - Okay.

And there's a question on the bottom of the canister, and whether or not the weight of the canister, sitting on that half inch gusset did more than scrape it, it seems like there'd be a deformation at the bottom of the canister, and that's one of the key engineering evaluations we're waiting to be provided with from San Onofre.

So we haven't, we haven't ruled out deformation, but we're waiting to see the engineering analysis. Our own experts think, if there was deformation, it would be very minimal, this is a three inch thick bottom lid, and it would be minor deformation at most, which would not have an impact on the canister integrity.

- So where do we find monitoring reports, can you direct them to ADAMS, or?

- Yeah, so the licensee does the annual filing of the--

- Regional environmental--

- Of the environmental reports, those should be available in a search of our, of our public library, ADAMS, and you should be able to pull that up, and in the prior years.

Is there an outside agency that monitors radiation levels, or is only, or is it only left to Edison to measure and report levels to the public?

- Well, there's one agency that monitors radiation levels, it's the EPA, they have their Environmental Radiation Monitoring Program, however, the EPA program is sort of a voluntary program, where they partner with universities, and local interest groups, and they'll provide you with a realtime radiation monitoring system.

Again, talk to your, whatever EPA region you're in,  
and you can find out from them  
where their closest monitoring station is.  
It's actually called the ERAM system,  
so maybe if you search on the EPA website for ERAMS,  
you can find it, and it's a realtime monitoring system.

- And then, and then, just to make sure that,  
that San Onofre is doing the right radiological surveys,  
and monitoring, we have inspectors that go out,  
and that's one of the things they look at each year,  
they check those, the reports, the accuracy  
of the reports, and they actually go out  
with the technicians at the station,  
and make sure they're actually taking the right measurements  
from the right locations.

So that is, that process is validated and verified  
by the NRC through direct inspection each year.

And then,  
so the question is, the divider plate,  
we keep talking about the vault picture, that's for  
which location? - what do you mean?

- Which vault was that, vault number, do you remember?
- Oh, that was a picture I took during the dry runs out  
at SONGS, September, 2017, just,  
it's whatever vault they were downloading  
into during the dry run when we were there.
- Okay, and the one with the paint scrape-age on it?
- That is the actually vault number 22.
- And that was for canister 29.
- For canister number 29.
- And if the canister was in there,

then how were we able to take a picture of that?

- That picture was taken by staff out at San Onofre.

- Okay.

- And they would have been able to take it from the surface of the ISFSI?

- Yeah, and they can, they can take, they can get a boom, and put a selfie stick or something--

- And zoom in on it. - Oh, yeah.

- Yeah. - Yeah.

- Okay.

- Or they could just have someone stand there.

- And so there's a question about cracking, and cracking would allow oxygen to enter the canister, again, we would expect the Aging Management Program to detect, early detection of signs of cracking, and then the cracks would be mitigated.

So we don't believe, and then, if it was a crack, we're talking a very, very small opening.

If it did exist, it'd be small quantities of oxygen, and you still don't have the right form of zirconium to cause that spontaneous combustion, and have a, to have that type of fire.

And there's a question about the, when the canister was leaning onto the side of the transfer cask, it's not three inches thick there, it's something less. - well, if.

Go ahead.

If you think about it, when the canister is leaning, it is leaning, the very top edge of the canister is going to be in contact with the wall of the transfer cask.

And at that location, there's several layers of weld,

and actually, a nine inch thick shield plug,  
which is the MPC lid, resting there.

So they're really, we really don't have  
that many concerns about the confinement at that location.

- Yeah, where, it would have been leaning against the side  
of the transfer cask, it's actually thicker than where it is  
on the bottom of the MPC? - Yes.

(overlapping)

- And so there's a question, back on slide 21,  
it seems to be our favorite slide today.

- Oh, okay.

- If, where's the canister, in relation  
to where that picture was taken?

- Isn't that picture--

- You know, if you back up, that's right,  
if you back up the slide, thank you, Patty,  
if you back up to slide number 20, there's the canister.

- There's the canister, so you can see,  
that is canister number-- - 29.

- 29, loaded,  
and that's the gusset in question,  
is directly above it, and that's about,  
what is that, how many feet is that,  
from the canister to the gusset?

- I couldn't tell you, but it looks like,  
probably about a foot and a half.

- Okay. - Maybe.

- And then you could take that--

(overlapping)

- It's probably six to eight inches.

- All right, and you could take a picture of that,

either standing from the side, or from up above.

- You absolutely can because, we're there when they're welding, this lid that you're looking at right now, we're there when they're welding that in, and we stand directly over it to observe the welding operations, and the NDE, when they install that.

Now, radiation levels can be very high there, but you can go in and take a picture fairly quickly, you don't have to linger around for too long. And, again, that is absolutely the thickest portion of this canister, it's nine inches thick, just to provide shielding for those operations of welding.

- And then if, again, if there were early signs of crack propagation, or crack indications, we think the licensee would have time to develop a repair strategy, and if it required removal of the canister, it would be able to do that, they'd have plenty of time to do that before there was a significant impact on the canister.

- That's about right.

It's probably closer than that.

Go ahead (inaudible). - Yeah, and, and I don't think today's panel is in a position to, I wish we could give you an exact value on the distance from top of the, of the--

- MPC canister, to the top of the--

- To the lid, I just don't, yeah, we just don't have that.

This is one, I'm going to have Lee, who's one of my inspectors, I'm going to have him flag that comment, about how, you know, the shield ring to the top,

and the shield ring to the top of the canister,  
and we'll see if we can't put something  
in one of the FAQs about, that provides dimensions  
of the storage vault.

There's a question on high burn up fuel, and how long it has  
to stay in the pool before you can move it out, and I think.

- Those, those lengths of time have been changing,  
it's new studies, I don't have that information.

- So will we get back to them for that one, too?

- No, I think there's, I'm not sure

what we prescribed, I think that the reference here is,  
high burn up fuel require longer cooling time  
than five years, before putting in the dry storage, and,  
and I think five years is sufficient time  
for decay purposes, prior to loading the, an MPC.

So I think that's okay, and in San Onofre's case,  
they ceased operations (overlapping)

more than five years, it's been more than five years  
since they've ceased operations, so they're okay  
to move high burn up fuel into an MPC.

"If slide 21 is of the  
actual problem vault, why don't we see the canister,"  
but we showed the canister.

- Yeah, and so, there, we received a lot  
of questions throughout the course of the presentation,  
on how long does it, how much time do you need  
to build a hot cell, I don't have an answer for you.

That's something the licensee would have to do,  
but there are, there are different ways  
to do it, it could be brick and mortar,  
it could be, you could move it into a,

a building, and then compensate with lead shielding,  
and that would take less time,  
so there's different alternatives out there,  
so I don't, I can't give you a direct answer  
on how long it takes to build a hot cell,  
so it's very case dependent.

And any idea on the skin temperature  
of a canister, loaded canister?

- We've seen it get close to 300 degrees,  
a loaded canister, but that's, albeit,  
after welding activities have taken place.

I think the hottest canister I've seen  
on surface, maintaining the temperature,  
is probably at 200, 235, 240 degrees, and--

- But what would be the hottest point of the canister,  
would it be radially, or would it be top,  
bottom, do you have a?

- Well, when I'm on top of the can,  
it's usually at the welding point.

- Right.

- That's really hot, so I really couldn't tell you.

- Okay.

- And I haven't seen  
fuel loaded at the top end of what's allowed, either.

- Right. - So.

- But normally, you'd see something in the 250  
to 300 degree range? - Oh, yeah, yeah.

- And Patty, we have a question,  
you talked about the shims before, right,  
and so San Onofre does have four, I think it's four--

- It's four canisters--

- Canisters with the shim pins?

- Correct.

- So there's a question about those, the canisters with the defective stand off shim pins. Will they, will they withstand the weight of a fully loaded can?

- Not really holding weight.

So the shim pins are on the shims, which are the, they're along the, okay, so the basket has a lot of square pieces in it, and then there's, the canister is round, so in those areas. (overlapping)

Oh, there we go. - Oh, there we go.

(overlapping)

- Basket in there, tight, so then we move around, the shims, the stand off pins are at the bottom of that, to hold it off the bottom of the canister, to leave some air space for the circulation of the helium through the whole basket system.

- And, just to confirm, we were talking in degrees Fahrenheit, not the.

- Not Celsius.

- Not Celsius, degrees Fahrenheit.

So,

are those scratches on the CEC, with canister 29, and what's the whitish looking material?

- That's actually not the CEC, and, it gets a little confusing when we begin to talk about all these different terms, and dry cask storage, especially with the UMAX ISFSI because a storage vault actually consists of,

you mentioned the CEC, the cavity enclosure container.

That is the

stainless steel hole

that's in the concrete pad, inside of that hole,  
they insert a divider shell, which provides the conditions  
for continual cooling of the MPC.

So the divider shell is what we were looking at,  
when we're looking at the scrapes and scratches.

The CEC is actually the outer wall, outside,  
on the outside of that inner divider shell there.

- That white powdery material right there, what's--

- Oh, that's just--

- That's what we're talking about.

- Oh, that's just, that's residual cleaning fluid,  
left over from the developer.

That white stuff you see on top of the MPC there,  
that's probably left over developer

that wasn't properly cleaned completely off  
of the welding when they performed the,  
the NDE testing, if you look around the inside  
of the ring there, there's an outer ring,

I can't explain this well for you

because I don't have a pointer.

But that is probably just cleaning  
that was done incompletely, that's right, that's right.

That's what that white stuff, that's what it looks like  
to me, but I wouldn't be concerned about that at all.

- That's something that they would eventually clean off,  
before they put the closure lid on?

- I don't think so, in this case, no.

- All right, okay.

while we're waiting for more questions

from my staff back there, for those that are still, still with us on the webinar, if you, that have hung in for I guess almost two and a half or so hours now, if you have comments regarding the webinar itself, and did it help you be a, participate in learning more about this event, and the NRC activities, if you want to provide feedback on that, that'd be great, if you could just add them to the, to the chatroom, and then we'll take that feedback, and see if we can't make the next one better.

So there's a question about, about the NRC allowing promises, I'm not going to, or commitments, I'll say, from a licensee, to figure out how to inspect, repair, retrieve fuel, and inspect fuel, to be a strong regulatory framework.

And so we've established a regulatory framework that we think, that we believe provides for the safe storage of spent fuel at San Onofre, and we think the requirement, to have the Aging Management Program, goes a long way, in the early detection of, of deficiencies that allows sufficient time to complete the repair, and so we think that provides an appropriate regulatory framework for the licensee.

And so I have, I have, there's a question regarding comparing procedures at San Onofre with that of other licensees, or training programs, and I have two inspectors in Region IV, Eric and Lee,

and that's one of the things that they do,  
when they go from site to site,  
is they're able to compare and contrast the adequacy  
of different programs, from one licensee to another.  
- And I can tell you that the real difference is not  
in the quality of the procedures from site to site,  
the true difference in a dry cask storage program is  
how the licensee, that is the utility,  
how engaged they are in dry cask loading operations,  
how engaged they are,  
are they out performing deck plate oversight,  
or are they sitting back in an office someplace, you know?  
That's the real difference in dry cask loading operations,  
is just how involved the licensee is going to be,  
how intrusive they're going to be.  
NRC is only going to be there for one can  
of a loading campaign. They are there  
for all the cans, and they need  
to be out there providing deck plate oversight,  
looking over the welders' shoulders  
when they're doing welding, they need  
to be out there watching dry cask storage operations out  
on the pad, or when they're downloading into a HISTORM,  
or any other type of overpack, that is the difference.  
That is the difference between a good program  
and a program that doesn't perform so well,  
that is the difference, in a nutshell, and that is  
what we see when we're out inspecting these licensees.  
- And there's a question on, again, on  
requiring licensees to do drop analysis,  
and,  
and how the public can intervene

to require that a licensee does some type of drop analysis, and so, so as of now, the NRC believes that the drop analysis is not required, not for this type of event, that exists at San Onofre, because the ultimate requirement is to maintain the redundant load drop protection.

And so we don't plan to require a change to the final safety analysis report to include the, a load drop event.

That said, that the public always has the right to petition the NRC, through the petitioning process, to impose additional requirements on licensees.

And if you choose to do that, you can, you can follow the NRC's program for that, and ask the NRC to reconsider their decision on when a drop analysis is required.

And then the question on how can the licensee inspect, or monitor canisters?

- Oh, (inaudible) inspect or monitor the canisters?

So I had mentioned,

I don't know, it's,

EPRI, the Electric Power Research Institute, did some studies to kind of help industry figure out methods of doing their Aging Management inspections, and they put, what I mentioned before, these crawlers that you see they have, either keep, you know, (inaudible) for a camera, or other non-restrictive examination equipment to go, depending on what kind of system it is, you know, the cases around the canister,

to be able to go through close to, like,  
the annulus to go through and see,  
or there's other probes, not maybe crawlers all the time,  
and they were testing these, they did a few tests  
that the NRC sent, we sent one inspector,  
and one technical reviewer to,  
to watch their testing, and they did.  
We've also gone out to a number of facilities  
that were preparing for their renewals,  
and they did, they brought out whatever pieces  
of equipment that they were going, that they were planning  
on using in their Aging Management Program,  
just to test those out, to see if those were going to be useful  
when they actually had  
to do their Aging Management inspections.  
So usually, it has to do with some sort of probe,  
or crawler that goes along the annulus,  
and looks at sides of the canister.  
- And this, and the use of robotic technology  
to do non-destructive examinations  
at nuclear power plants, and else,  
and other industries, that's, that's not new technology,  
that's been around for awhile,  
and so we're just taking advantage of the technology  
that already exists in the US,  
and applying it to multipurpose canisters.  
There is no requirement to do an inspection  
on the inside of the multipurpose canister,  
these are all inspections that are done external  
to the surface of the canister.  
And I know we're getting a lot of comments  
about hot cell construction,

and the NRC does not require licensees to maintain a pool, or to maintain a hot cell structure for, for retrieving fuel from a multipurpose canister, or some other canister, should the need arise. They do have to have the ability to, to perform that, and we don't think that it's a, an immediate or rapid type of inspection to meet. So you would have early detection, you have the ability to construct the facility you need, and there'd be ample opportunity to, to make those repairs, and at this time, we don't have any requirements imposed on licensees to maintain either type of facility, pool or hot cell, again, I understand that there are probably a wide assortment of views on whether that should be imposed on licensees, and that, and if you feel strongly about that, this is where'd you want to avail yourself of the NRC's petition process, and, and send it to the NRC for consideration. So there's a question that says, given that Edison created this fuel under the impression that there would be a national repository, would you consider it fair for Edison and other companies to be getting national assistance for help for maintaining safe procedures and monitoring systems for this fuel? And.

- So that, so those that were required to, the acceptance of, for the disposal of the fuel was,

was Department of Energy's task,  
and yes, they do not currently have a repository  
for disposal, I believe there are some facilities  
that are tapping DOE for some funding,  
for some of the operations that they're doing,  
with their spent fuel, I'm not certain, as I'm not,  
I don't look at that directly,  
but I'm not certain what they've been approved  
to get funding for, but it's up to the Department of Energy,  
and whatever their responsibilities were,  
and what the licensee is doing,  
whether those items could be reimbursed or not.

- Right, right-- - So there is a small part,  
that they are getting reimbursed--

- Okay, and of course, with the appropriate legislation,  
Congress could dictate that that happen, as well.

- Correct, yeah.

- And says, how much longer will loading take at San Onofre?

- Probably another year, once they start,  
a year or less, is my best guess.

- And then there's a comment that says,  
in the case of San Onofre, there's no room  
for cameras, or other actual ability to do any other checks,  
after loading into the vault?

And so, and so I think actually San Onofre is looking  
into that, and there is, my understanding is,  
the robotic technology is such that you can get a crawler  
into the storage vault, and do the inspections at,  
of a canister at San Onofre.

And it's also my understanding  
that the robotic technology being deployed today  
is using the, an eddy current testing methodology,

and that that's, that has,  
that's proving to be sufficient at checking  
for crack initiation,  
and that's why we,  
the testing has been going on with EPRI at some  
of the sites, to fine tune and work out a solution  
for everybody to follow.

And then there's a question  
about how involved has Edison been  
in the oversight of moving waste.

- well, one of their corrective actions is,  
they're going to be much more involved than they were,  
prior to this event, that's for sure.

- That, one of our concerns that we've communicated,  
and it's been identified in the root causal evaluations  
by San Onofre, is they weren't as involved  
in the contractor oversight at the facility  
as they should have been, they recognized that,  
and many of their corrective actions that they're,  
that they're developing now involve  
building up that contractor oversight.

So it's important to us that they get it right  
for Holtec during the, when they resume fuel handling,  
and it's important that they get it right  
for their decommissioning contractor, before they  
start significant decommissioning work at the site.

- That's a good question.

- And so I'm going to skip down the, Patty,  
if the shim pins all break, in the affected canister,  
would there still be adequate cooling of the canister,  
if the shim pins were all snapped off?

- I don't know if we have an analysis of that.

- A final analysis?

- Yeah, a final analysis.

- Yeah, I think the early analysis said that there was adequate cooling of the canister, even with broken shim pins-- - Right.

- For the fuel that's currently loaded, affected-- - For the fuel in the affected canisters. - That's right.

- That we believe that there's still adequate cooling of the canister, so, but I also recognize that there's more engineering evaluation continuing on that question, but we didn't believe that there was an issue, based on our own evaluations. And so there's a question, I guess, I don't know. (inaudible)

And so there's a question on, if the canister dropped, and the containment boundary breached, what's the worst case, and again, for the scenario at San Onofre, if this canister had dropped the distance of 18 feet, into the storage vault, we don't believe there would have been a major loss of the containment boundary. So there wouldn't have been a significant radiological impact from a canister drop. So the worst case scenario would be some cracking of the weld of, of the MPC, and the release,

via cracking of a weld of an MPC, if, would be marginal, it would be very small. So I don't think there would be a significant radiological hazard, that, that keep, with that said, that is one of those evaluations that we are waiting for, giving the licensee the opportunity to complete that, and then, and then we're going to take a look at that, do our own independent engineering look at that evaluation, and reach our own assessment of what the consequences could have been. I think we're in the five minute range, left on the webinar, is that about right, in the back of the room, okay.

So why is the mesa not being discussed for safer storage?

- You mean the big bluff overlooking the ISFSI--
- No, mesa, on the other side of the freeway, where the, where the training building, there were some warehousing, over on the other side of the freeway, why isn't that being considered, why wasn't that considered for the ISFSI pad location?
- Well, actually, the NRC doesn't decide where it's going to be, it's the licensee who decides. They propose, they give us all of their analysis, and we review that, so it's based on what, where they were identifying it would go.
- Okay, and so, and then our role is to, when presented with the location that they wanted, is it a safe location, we determined that met our requirements for, for placement of an ISFSI pad, so.

So there's a question about,  
what are the internal mechanisms in the NRC  
to identify opportunities for improvement  
from this and other situations,  
where licensee has multiple violations?  
who's in charge of thinking about those questions,  
and how do corrective action programs occur  
within the NRC itself?

So the,  
in the San Onofre case,  
what we've done is, we've taken the learning  
from our inspection activities at San Onofre,  
and what actually happened,  
and we've been providing operating experience  
and knowledge management,  
knowledge transfer briefings throughout the NRC.

And one of the next steps we have to do is  
to take the presentation we've provided today,  
and offer it up to the other regional offices  
and program offices at headquarters,  
and brief them on the event, our learnings,  
and where we think there might be areas  
to improve within the inspection program.

So that's done, at least within my division,  
that's done as a matter of routine.

If we go out and find significant issues  
with the licensee, we come back,  
we talk about it with the whole division,  
and if we think those learnings are generically applicable  
to the inspection program, we seek inspection program change  
to get it right.

Is what, is the ISFSI site for indefinite use?

I think Eric, talk--

- It's safe for indefinite use.
- I think Eric talked about this before, so it's initially licensed for 20, and--
- Can be re-licensed for 20 or 40 years.
- 20 or 40, we think it's good to go for up to 100 years-- - The canister.
- The canister. - The canister.
- Yeah. - Yeah, for 100 years.

And, and the NRC believes that, that there'll be a, within the next 100 years, there'll be a solution for longterm waste disposal of high level waste.

And I think we're down to a couple of minutes, I do want to thank those that have hung on this long to participate, I really appreciate the use of the chatroom features, and all the dialogue and questions that came into the chatroom for the, for the panel to respond to.

We do plan to go back through the chatroom comments and questions, and scrub them some more, and where we find things that we didn't address today, or we don't think we did a good enough job addressing, then we'll collect those, we'll likely add those to our frequently asked questions document on the NRC Spotlight, underneath the San Onofre tab.

So the dialogue is, I view this as, the dialogue has just begun, this is not a one and done opportunity.

If you think this forum was useful, we'd like to do it again, we have another inspection activity

and corrective actions coming up  
in early mid-December timeframe,  
I think, you know, this is-- - If all goes to schedule.  
- You know, if desired, this,  
that might be a good opportunity to,  
to use this forum again, to brief out to the public  
on what we found, and why, you know, if we make a decision  
to resume fuel loading, that we can communicate  
that with you, what the basis of our decision is.  
- That's the last question.  
Is it over?  
- Okay, so I think we're going to,  
to wrap up the webinar, again, thanks to everybody  
that joined and participated, have a good evening.  
- Thank you.