November 1, 2017 - NRC
>> Good morning. See the room start to fill up. Not as full as yesterday. But I think some of you maybe had a great time trick or treating.

I went to a young neighborhood where my son lives. I really had a great time seeing all the costumes and grab all the candy from them. So I was wondering whether the White House, I doubt that the White House is open for trick or treating. For security reasons they probably couldn't do that. But I hope you all had a good time.

Welcome back. This is the second day of the REG CON 2017. And I hope all of you had rested well and ready for another exciting day. I can promise you today's program is going to be as good as yesterday's and I'm excited about all of it and today I'm particularly excited about the 72, 71, 72. Hopefully in a few years we can extend that to 7163. But we'll see what happens.

And today we also have decommissioning, transmission and all the NRC initiatives. And this whole conference we really encourage all of us to be engaged in dialogue and discussion, exchange of ideas. Yesterday we felt, at least I felt we could do more and we encourage all of us to participate more to give us ideas and comments and how we can do better together as a community and particularly today in a couple of the sessions, the 727172 we started out as roundtable we couldn't find a roundtable we have this rectangular table to have the panel sitting there. But the idea is to have a dialogue with all after you folks and to see how we can achieve the best outcome when we're preparing to go 72, 71 to 72 and similar with our initiatives, NRC initiatives we also really would like to seek your input.

And yesterday, like I said, we felt -- let me back up. Everyone should have the feedback form. That's important. We like to hear from you how we can improve. This and we're also thinking starting this year that starting next year or the year after we may want to combine this conference with the regulatory information conference.

So we'd like to know how you feel about it. I've heard mixed opinions on it. But that's a consideration.

Yesterday like I said I felt we were a little short on giving you time to ask questions, interact and provide your input. I'd like to yield my next ten minutes or so to see if there's any questions or comments left over from yesterday or the overall conference. This is the time for you to let us know.

So...
>> Thank you, Tony. Yesterday I jokingly said that there's not going to have a fire drill here but in the spirit of the REG CON's tradition, when I left here towards the beginning of the last session, there was a fire truck and an ambulance in our parking lot because there was a medical emergency. So I'm going to be counting noses and see who is the common denominator so we can avoid this in the future.

Welcome back to day two, the final day. Right now I'd like to remind you of some of the ground rules we've got so we can make sure that we're safe here.

The first thing is be sure that you have signed in. That is our way of being able to figure out if you made it out of the building safely, if we have a fire drill. We're also keeping it for records of the meeting and everything.

But most importantly it's to make sure you don't get left behind. If you've not signed in when you get an opportunity please go outside and do that; it's helpful.

Secondly all the talking things we talked about yesterday still do apply. Hot mics when we're in casual conversation mode just in case you're talking near one and you want to say something that you wouldn't want other people to hear.

When you are speaking into the microphones, remember that these are directional. And directional means that if you talk away from it so you can talk to somebody else, that doesn't work.

If you're trying to talk to somebody and you face away from the microphone it may not get recorded. And we are recording this for purposes of transcribing it. Which means that we need a real good

record. And that means we need to know who you're speaking, too, otherwise we have unknown speaker number one, two and three which is not as accurate as we would like.

Please every time you get up to the microphone to speak state your name. You don't have to spell it every time, if it's the first time the name is spelled differently like Toni Hsia, I would have spelled it Shaw but it's not. That's one thing we'd like to get correct on the record so please give them the spelling on the hard parts. Speak slowly, clearly, one person at a time. Question from the audience to the panel. You're allowed a couple of bounce backs a couple of questions clarification if the answer wasn't exactly what you want but we don't want to get to the point where it's a dialogue.

If it starts getting close to that, then I'm probably going to have to stand up and adjust my tie or something like that to get your attention to tell you that it's about time we moved on.

The badges, same rules as yesterday. You've got full access down here. You can go to the elevator, go upstairs and go to the cafeteria without having adult supervision but if you want to go someplace in the building other than here, the cafeteria, Starbucks, complex right there, before you get into the second opening, then you're going to have to have an NRC person escort you. There's plenty of us around in here, and we're more than happy to do that.

If you want to exit here, there's only two ways to do it. That's to go through the back doors out here the revolving back door on the next level up or have one of us escort you. Because you'll be going beyond the limits of the okay boundary for internal guests.

I needed to clarify that yesterday, because what I had said was not entirely accurate. If you want to exit closest to the metro station so you can catch your train to catch your plane, then grab an NRC person to take you up there because you're into no man's land over there.

Again, we're trying to stay on time. We did really well yesterday. Unfortunately, I think staying on time meant that we kind of rushed ourselves through the question period at the end.

So when Tony goes back up, Tony, planning on coming up and allowing for more questions before we get started? If you have questions from that last session that was kind of truncated so we could end on time for people to catch their rides, this would be the time to do it.

I don't have any other comments other than have a great day and we hope to facilitate all of your needs. I'll turn it back over to Tony. Thank you, Dan. So like I said this is the time we can try to recap some of the ideas or comments or questions you may have had from yesterday.

First volunteer. Good morning.
>> Good morning. Brian Gutheraman.
>> We had a Hardy day yesterday. Compliments to you, very good. My question is pertaining to the question regarding Ricardo and Meraj. May have facilitated the session. The information that's coming out of the high burnup the new reg in particular, how is that going to be meshed with the licensing work. I don't know if this is directed to you John or Meraj. In other words, how do you see that fitting into the licensing framework given that there's several CoCs already for spent fuel and allow for the high burnup fuel. Is this a going forward sort of guidance structure for new applications or both and if you could shed some light on that we'd appreciate it.
>> Meraj?
>> Thank you, Brian. Good question. As you know, as we are developing guidance, we've got to take care of the business. Licensing action. We cannot stop. We've got to move forward.

And remember the risks, the RAF risks that we put out, really in my opinion that's served its purpose. It provided a roadmap. And our applicants had been using that roadmap for coming in with those applications.

So most of the high burnup application that we approved generally, they have been going like a consequence analysis route, which in light of the absence of the test data, and when approved one-7180, you look at the number of designs we proceeded to do that. So this approach brings in now we say we have test data now, hey applicant if you would like you can come in make the argument for this, which is what we did a

bunch of tests at Oak Ridge and we found out that the high burnup fuels, they're not bad.

Okay. So at this point now there are more options available to the applicant. They can come in, they can point to that data and they don't have to do that consequence analysis for it.

So all this work is really adding more option to the applicant. What licensing approach they want to take. So we are consistent with the risks in 2015 that were put out which the risks showed the roadmap, you could have the data. You could go through consequence analysis.

So this is just providing more options and eventually all these will be incorporated to SRP. Because right now the SRP that they were putting out we're going to make our SRP similar to the reactor site, that we can go on a chapter-by-chapter basis. We can update those as we do more tests more research that be more kind of agile that we can go and update our SRP both for the review as an applicant and they can see, okay, now I can come in and use this data for this application that I want to submit. Does that answer the question? .

>> And that is clear. Industry I guess has a cynical eye sometimes when options become requirements. Is the new reg that's coming out, the one that's offering does that go through ACRS before it gets published? Because we just want to make sure there's a good balance between options and what could be perceived as backfit requirements as applications come in. So that's in this whole environment of AIM and delivering a nuclear promise we have to deliver adequate protection and assurance.

>> Not only that but we're going to issue the draft for public comment because it's not just the purely technical document. We decided this is more a licensing approach and we need our stakeholders, vendors to have a chance to take a look at it. To make it.

>> So you all know we're sensitive to the backfit issue. Even as we look at the 1204 the staff is right now we would like to take a different interpretation how the practice could be different than from what we did before method of evaluation and there were discussions amongst our staffs that say, hey, is that a backfit? Actually that's a reverse backfit if you will. We're very sensitive to that and all the issues and the purpose of doing the research is we gain knowledge so we know things we didn't know before like Meraj says, high burnup fuel.

Some fuel may sigh high burn up fuel is good and that depends on your perspective but the whole purpose is so we still use taxpayers money to gain knowledge so we get better and there's clearly a nexus to the licensing regulation. So thank you. Tony and Meraj I heard SERC 4 for high burnup. I think I heard him five. I'm not sure if I heard anything about Serlas but my question is do you have any concerns about high burnup, is there anything for the an applicant came in, the payloads four now with testing that's done is there any concern of limiting the assemblies for that payload?
>> So sponsor is all for SERC 4. They've sponsored a lot of test dynamic test data for those types, they haven't done any SERLO but all the testing that DOE has sponsored is in this condition past the irradiated condition. Really no comparison basis. For those planning types to go through the process. [Inaudible] orientation. With respect to what will be in the new reg for drop accidents, our conclusion for SERC four is applicable for all other types. We see the flexible rigidity for composite rod is much higher than the clotting we've taken the lead and said this holds up true for all the other planning types. But the drop accidents takes care of storage and takes care of Part 71 requirements. You still have to address vibration or more incidents of transport Part 71 through five. The approach we're protecting is you take the dynamic test data from Oak Ridge studies for both a nonreoriented and reoriented planning time. They haven't sponsored it for other planning types once it's available for M 5 or SERLO or the rod program. You can use that data for lower bound and take care of the performance and demonstrating compliance with 7171 C 5. So the work is halfway done with the other class types. Storage, operations and so on, we think we're fine for qualified as such.
>> Great. Any others. By the way, there's plenty of seats in the first several rows, please come on up and take the seats.
>> I'll add the first phase includes M 5 and SERLO so let me just reiterate that's in phase 1.
>> Thank you, Sylvia. Any others? Comments or questions or in general?
>> We have one from the line.
>> Ray your line is open.
>> Ray Lutz citizens oversight I have a comment and I have a question about transportation. There's a lot said about the inadequacy of the thin canisters, et cetera, et cetera. We have a new initiative that we're going to be sending out so please look for it when hopefully

going to send it to everybody called Helms and Melo look for that acronym.

Now my question: Sorry it's kind of early here in California.
>> The question regarding transportation I've heard it said both ways, one we've had a lot of experience with transportation. We transported many thousands of miles, et cetera. In fact I heard this in the conversation with Allison McFarland the other day on the phone. Now I see that we're doing a little bit of testing on canisters being shipped and the vibration. So let's set the record straight. How many of these canisters, these full-sized canisters the MCP like 37, et cetera, has been transported in the United States? How much experience do we have of real transportation?
>> Tony, response.
>> Transportation is nothing new. You look in the 1970s, 80s, we shipped a lot of spent fuel as trans shipment between the poles. That was one of the strategies as the reactor pools were filling up utility that owned several reactors. A lot of trans shipment if you go back to 70s, 80s, records, of course the casts that were used, it was the older generation of the cask. Like a 7 PWR cask or 12 PWR cask those were the older generation. NRC you get application, every year about 70 transportation applications that we get granted they are not for shipping a 37 WPWR. In terms of one and two, the truck casks, we certify those every year. So in terms of the in general transportation is nothing really new. We have a number of them. But in terms of the 37, there are a lot of shipments also in Europe that they have done. So Mike wants to add.
>> Meraj, Ray, that's a great question. And this is Mike Layton director of spent fuel management. And simply you asking that question is really caused me to think that's a great lookup for us in NRC to take on. That's information that we should be able to pull together and provide in our Web page for everybody to kind of look at not only the cask you're looking at but also what designs and what casks have been used for the last 25, 30 years, thanks for the question. Stay tuned.
>> Thank you very much. I appreciate that. I do want to again point out that I do think that we have a good solution with a, what would you call it, a backfitting or, I guess, upgrade plan that will allow a graceful upgrade from what we have now to basically deal with this discontinuity that we have between the approval for unlimited

indefinite they call it storage around the country and the fact that these canisters we're using now were never designed for indefinite storage. What we see happening is a whole bunch of administrative control such as inspections and so forth which I'm not saying shouldn't, we shouldn't try to do those things. But I don't want to rely on that. I want to rely on a better design. And so that's what our paper is about so I hope I can get that to everybody in the next few days. Another comment.
>> Rob McCullum I want to say a word in response to his question he's correct the largest newest generation of canisters has not been shipped with used fuel in them yet. So I just want to make that clear. But I also want to make clear that those are designed to the same standards and the same regulations as everything that Meraj Rahimi indicated we have shipped. And furthermore on behalf of industry we consider those standards and those regulations a minimum.

This is a very competitive industry. The folks that manufacture those casks have been innovating and developing and improving. So everything we've shipped in the older canisters should ship even safer, even better in the newer canisters, that really is the industry position and we look forward to getting those off the site and not to get to that.
>> We need to get started with today's program.
>> Can I add just one little thing. Oak Ridge last year did a study on all transportation accidents on commercial used fuel so can you look that up Oak Ridge National Laboratory last year. It's a comprehensive study on all accidents that happened I don't have it memorized but we can look it up if we can hold questions from off the webinar or the telephone, that would be appreciated.
>> Good morning everyone. I hope everyone had their coffee and tea so you're awake for a good session, engaging session.

When I put this session together, and I really wanted to be at the beginning, not the to have any presentation, just basically talk, have discussion and. But we decided distinguished panel and present a 10 to 15 minute short presentation that will put their remarks in some kind of a context. That's what we decided to do but I hope most of this session is sort of a dialogue and engagement. So first I've got to introduce myself. I think yesterday I did not. My name is Meraj Rahimi. I'm the chief of renewals and materials branch at the division of spent fuel management in MNFSS at NRC. So what I'm going to do I'm

going to, I have one slide that puts the whole session in context I wanted to focus a discussion. The title of the storage is transportation interface but next slide please. This is the question is it's focused on one aspect of the interface. Storage, transport, storage. Specifically at this point we want to focus on canisters. The question is when the aging spent fuel storage canisters which are certified for storage under design basis storage condition under part 72 are subjected to the normal accident, 10 CFR 71, what kind of canister assessments, the assessment include analysis, examination, testing. If any are needed to provide assurance that they can continue to meet design basis storage conditions. Why this question, why now. This is really aimed at consolidated interim storage facility that the -- as you well know these canisters are certified or licensed under part 72. And part 72 is storage only although we have a requirement in part 72 regarding transportation, there isn't anything regarding the restorage. I mean there's 72236 M can go in the regulation. It says consideration needs to be given to the transportability of the system. But really the question is more this storage canister have been analyzed for storage only condition. You're introducing a transportation load that happens and looked at can you continue under that storage, put that canister in a central storage facility and in terms of assuming everything is okay, you need to get regulation for the design basis that the accident for storage condition, 15, 20, 30-year-old canister. So that's the focus in terms of I hope that the engagement, the questions is around that. So with that we're going to have our first presenter Jack. Jack, let's see, Jack Boshoven is a senior advisor project engineer for tan America in Maryland. He has 31 years of experience in the nuclear design and fabrication industry as project engineer and manager. His background includes design and licensing under 7172 fabrications delivery of licensed Part 7172 cat system and Mr. Boshoven holds a bachelor of engineering, nuclear engineering and bachelor of nuclear engineering degrees in University of Michigan Ann Arbor. Jack.

>> Move the slides. This morning I'll give a good introduction. Meraj gave a good talk on what's going to focus but I'll focus on what Wren and I have been working on we'll talk about the process of shipping a canisters and focus on canister from an IFISI to an interim storage facility. Talk about additional valuations of the canister to demonstrate it's transportable and acceptable to be transported to another storage site and then we'll talk about storage at the interim

storage facility and also aging management, because as has been pointed out this morning some of these canisters are getting fairly old. If I could have the next slide, please.

So centralized interim storage, at least Areva's view of that is that the license application that we will put in with our partners is to basically take canisters stored now and put them right back into the same storage modules, not the identical module, but the same designed and same built modules at new modules at a storage site.

At a location somewhere else in the country. Our system here has several different new homes. HSMs and DSE models that we're looking to license and NAC similar has different canisters and VCC, included in this. It it would be a site specific license under storage under part 72 and obviously would not have a part 50 license backing it up it will be completely under part 72. The canisters are loaded prior to shipment and these canisters would have some age to them and there's a picture there of a concept. Next slide, please.

So before a canister could be shipped from an existing facility to an interim storage facility, the first thing that's going to have to be determined is whether or not the canister complies with the license at the facility it's going to be going to. And so what we envision there is that basically there's going to be two organizations that are going to be responsible for that.

The organization that's trying to ship the fuel, obviously before you can ship it you get to trade licenses and so you have to verify that what you're going to ship to the site meets their license. And so it would expect the package being put together to demonstrate that they meet the license at the central interim storage facility and then obviously before the interim storage facility can accept the package they're give to make sure it meets their license. You'll have two organizations doing independent reviews to verify whatever canister is coming meets the license.

Beyond that, you also have transportation license considerations. If you were to dig through our which I guess I wouldn't say is light reading M 971 BHP license, what you'll see for canisters in storage a while there's a bunch of conditions that have to be met even before it

can be put into transportation so you have a third license that you have to verify that you're in compliance with.

And then if there's any change, any changes have been made at the storage site, under 7248, those are going to have to be also evaluated against the license where the canister is going to be going. So that's the paperwork. And then once that's completed and everybody agrees it can be shipped the canister is removed from the storage site to the site to an transportation overpack which I said also has a license you have to verify that the canister is actually compliant with that license and that process is done under the site's part 50 program and their part 72 program and their Part 71 program, because part of unloading is part of part 72 and Part 71 that has conditions that have to be met once that's done it's ready for shipment under Part 71 and appropriate other CFRs and I'm sure there's other regulations that apply but these are the main ones for making the shipment.

Then the canister is shipped it's received at the new ISF and it's placed back into storage. So it's received under the Part 71 license and the part 72 license. The site specific license, and then it's handled and operated under the part 72 license to be put back into storage.

And I think Meraj alluded to this. This really isn't about managing different systems. Part 72, Part 71 and then back into part 72. These aren't isolated sets of regulations. In reality, if you go -- go to the next slide. Sorry. Thank you.

This is a better picture of what's going on O you have a canister and the canister and its contents are kind of at the center. The canister and its contents I just used our CFC 1004 license as an example here. It's being stored under that CFC 1004 general license plus parts program and you have the cask that would be licensed to ship that canister that would be under Part 71. Then you have the storage license at the storage site so all of those impact this canister and this canister has to be compliant with all three of the licenses. So really the center of of this is not the regulation. It's the canister and how the canister is impacted by those regulations. Next slide, please. So what's the regulatory basis for the canister and its content that's included in the various storage licenses? So at the

ISFSI where it was loaded that license demonstrates the canister and its contents their integrity is assured for all normal off normal and accident conditions. That's what it's licensed for. And there was a question about canisters weren't designed to be stored indefinitely. But canisters also weren't designed to be stored for 20 years. That's what the license is for. But I just signed a design criteria document for something that we're working on within our company and its design life was 120 years. So part of our design process is to look at much longer than the 20 years, even though the NRC issues licenses for 20 or 40 years at this point on the design. I'm sure that the folks here do the same thing. We're designing for things. And even our earliest canisters were designed for much more than 20 years even though you only get a license for that.

So that's the first step. And then the interim storage license, it includes evaluations of the canister and its contents during normal conditions of transport, because typically the canister is not the confinement bar, the containment boundary under Part 71. What we've put into our SAR for interim storage facility is that we took the loads from transportation and we looked at the canister confinement boundary because really that's the most important portion of the canister for under Part 72 is that you maintain confinement or containment of the canister. So what we've done our canisters are pressure vessels under MV with code alternatives what we've done under normal conditions and in reality off normal and accident conditions in most cases we've compared the loads against level A allowables. So we have assurance that the canisters are going to maintain their integrity during transportation. And then once it's put back into storage, again that license looks at all normal off normal and accident conditions to make sure that you maintain the integrity of the canister. The basket is already evaluated under Part 72 and 71 because you have to maintain the configuration of contents for criticality reasons for thermal reasons and things like that during shipment.

So the entire canister is evaluated to demonstrate that it meets the requirements under all conditions from the beginning to the end.

Next slide, please. So what we've included in our license application is some additional what we call bootstrap methods because we've demonstrated through analysis that the canisters maintain their

integrity through this entire process. But what we've offered up here or what we've presented in our license is that there be some post-transportation verification of the canister shell again the confinement of the material is the most important. And so what we've proposed is basically these things are being shipped in a transportation cask that can be used to evacuate, you can evacuate the volume around the cask and canister on the inside that's filled with helium. You can basically demonstrate that the canister remains leak-tight.

In its form as it's in there. You don't get the entire confinement boundary because it's welded behind a couple of plates you can demonstrate there's no leaking going on within that canister that demonstrates there's no breach to the environment of that canister. It can be performed before it's taken out of the transportation cask.

Then the other thing that we've offered up is doing a visual inspection of the two most limiting canisters from each site. And to define what the most limiting canisters are, I only have 15 minutes, so if you go to the EPRI report there it gives guidance on how to make those decisions and it accounts for basically site specific conditions where it came from, canister design, fabrication detail and the canister contents.

And then finally the canister is placed back into storage using the same proven methods that have been used to move canisters for years in this country. And the last slide has to do with aging management. To deal with that what we've proposed in our license is a license condition to require that we perform a license amendment at the interim storage facility as soon as within so many days of license renewals being approved for the system from which the canister came from. And the age of the canister is determined based on the time it was loaded not when it showed up at the interim storage facility. The age of the storage ever pack was from when it was put into service so it would start when it was put into service at the ISF. But all those applicable AMPs at the system would be at the storage site to demonstrate that the canister is continuing to perform its safety functions thanks.
[Applause].
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>> Thank you, Jack. We're going to for the sake of time we want to really get through these presentations and the majority of time we really want to dedicate to question and answers. So our next speaker is Mr. Wren Fowler director of licensing for NAC International is responsible for licensing activities associated with NAC storage and transportation systems, both domestically and abroad. Been at NAC since 2011 and has progressed in responsibility from licensing engineer to licensing manager until reaching his current position as director. Mr. Fowler holds a Bachelor's degree in nuclear engineering and master degrees from from business administration from Georgia Tech.
>> Title for my presentation today is dual purpose canisters and shipment preparation. Not to be confused with dual purpose cask. When I say dual purpose canisters referring to canisters used in dry cask storage and moved into off site. Before I move to my credit I have to give credit where credit is due. I'm glad Rod McCullum if you've seen him start off with a presentation he starts off with a picture. I saw him give a talk once on a flock of geese flying. I have to give credit where credit is due I'll give Rod credit where credit is due. Next slide, please I came across this picture several weeks ago when I first saw this picture there was something that caught my eye and I'll tell you what it was that caught my eye. If you look at the man in the cart does he look concerned to you? He looks like he's having a grand old time. Doesn't have a worry in the world. And then I kept looking at the picture and there was something else that caught my eye next and if you look at the cart. Now, there's probably at least 10 or more things on that cart, if one thing fails, that man's going to get trampled by a thousand-pound animal. At that point in time I don't think he's going to be smiling and having a good time. May not even be breathing after that point in time. So in other words, this picture represents the old saying don't put the cart before the horse. In other words, do things in the right order. Don't get ahead of yourselves unless you want to take the risk of a thousand pound animal running over you. Keep that in mind as I go through my presentation and hopefully at the end maybe it will make sense why I picked this picture. So there's three things I'm going to cover today. The first one I'm going to start off talking about is the canister and these contents, what are these requirements to ship? What are they, where are they located? Second bullet is what I would call nonshipment-related activities. You hear a lot of people talk about the rail call, hear a lot of people talk about transportation route and security. These all very important things

that have to be done. But there's also a significant amount of work that has to be done before you even get the canister ready to be shipped off site. And finally, who cares. What's the point? Why am I even bothering to talk about this so what. Hopefully we can tie it all together and you can see where I'm coming from. Content requirements. Probably first and foremost is your licensed just like part 72, Part 71 things you have to adhere to. The key thing here is you have to construct it in accordance with that drawing. Exactly.

The second one is type and form of materials. You have specific content requirements on what type of material it is, what is it form, is it PWR, BWR what array is is it, what enrichment it is, et cetera. There's descriptions in there that refer to tables and figures of what this has to match to be able to ship this type of material offsite.

On top of that there are requirements on the maximum quantity. So I've told you you have to make sure you match your license drawings, in other words you've got to construct it in accordance with the licensed drawings. You have to have the type of form and material that you're going to be shipping off site. And at the same time you've got to make sure that you meet the maximum quantity of material that you're going to be shipping off requirements, these are all requirements from the steep requirements you have to meet. Next slide now the question is where is all this located. So like Jack was talking about you've got the interface, 71 to 72 to 72, and documents and you've got CFC, and part 72 certificate you've got to meet, et cetera. So for 71, where are these requirements where are they located other than Part 71 itself it's located in certificate of compliance, CFC. Here you have the license drawings and probably what's most catching is not just the drawing number it's the revision level that you're at typically located in Section five A 3 in the front part of the certificate and some of the most important drawings detailed up here is not just the cask. You've got the cask drawings. The body assembly, et cetera, but you also have the canister and basket and damaged fuel cans shipping high burnt up fuel and safety such as spacers, et cetera. Next one is the type and form of the material this typically comes after the license drawings in Section 5 B 1 goes into a lot of detail what type of form and material what you're shipping whether it's damaged or undamaged fuel and CFC has other material that's just material that can be shipped in a cask class free way. A lot of times the section will

refer to figures and for some cask vendors equations that detail the minimum cool time that material has to meet before it's even shipped. And this is related to not just burn up but the enrichment for the material that's being shipped. Also usually following right after that in the transportation CFC is the details on what's the maximum quantity of material. Typically this will refer back explicitly to the type and form of material. It will tell you the maximum amount of weight that you can ship. It will tell you the maximum heat load not only per basket but per fuel cell location. You have all this stuff that you have to verify before you even think about putting this into a transportation cask. Just because like the U.S. Postal Service if it fits it ships it doesn't apply here just because the canister fits in there doesn't mean you can ship it off site.

What's the point of outlining this, why did I go through the trouble of detailing the type and form of material and you've got the maximum quantity you've got to verify. The point is I'm outlining this because you have to verify all this before you ship it off site. You have to look at the license drawings that are in the transportation field. Why would that be a potential issue? Think about it this way. These are typically drawings that get revised over and over throughout the year. So as we come in to get amendments for transportation certificates, these drawings get revved. This may have been a canister that was built under the 10, 15 years ago under a old license drawing you can't just assume I can ship it you have to review the drawings. Not a trivial exercise. Another one Jack alluded to it earlier when we're building these canisters and we're getting them ready to be put into dry cask storage there's things that come out of fabrication that you have to deal with nonconformance is one typically addressed through 7348 changes and it's for changes being put in storage not reconciled immediately or at all with transportation. You have to look at the documentation package as delivered canister what fab was it built to and nonconformance and what 48 changes and was it captured in CoC. Particularly for us included we'll deliver it with the hardware the information is there but you have to do it. The point is somebody has to go through it can't just pick it up and move it off site because it fits. You have to verify each one. Next slide. Similar to the fabrication you've got the loading documentation you now have to look at I told you you have type and form of material you've got to verify just because something was allowed in a part 72 certificate doesn't

necessarily mean it's included in the transportation. You have to go and verify that. There are all sorts of catches that are in the transportation CFC that don't necessarily line up with storage one of them minimal pool time, shielding requirements all these are different tables, different years, different durations that you have you to verify that you meet. Can you do it? Sure but get the loading documentation from the site. So in other words just like previous one, somebody has to go and verify that.

So who cares. What's the point? Why am I going through this whole exercise of showing you now I have to prepare license drawings and type and form of material, maximum quantity gotta look at the documentation package for when the canister was fabricated and look at the loading documentation from the site. So who cares. It's not necessarily a trivial exercise. They are hundreds of canisters that have been in storage and there are these documents that I'm referring to can be several thousand pages long. Second of all probably more important than anything you hear a lot of people talk about in this industry on knowledge transfer. A lot of this documentation is old. You may not have people around that are readily familiar with the format of that information. It may all be there but again the several thousand page document do you know where to flip to to go look to get it. The second one it's time-consuming another one is the documentation may not be efficient to get at. In other words a lot of sites have gone to microfiche as they start transitioning, have you ever looked at one takes a long time to going through. It's time-consuming and one of the more important points I want to make if you go through all this hopefully you go through you don't have to do anything. It all lines up everything is good. But if you don't, now you have to come back and put an application together to a transportation certificate, SAR and now get in line with the NRC to get a review and approval done on that and again time-consuming. Next slide. In conclusion hopefully this all ties together with the picture don't put the cart before the horse there are these things that are paperwork-related, time-consuming may not have easy access to the information. These are things that you've got to do. So don't put the cart before the horse. So why care? Time, money and more importantly you do not want to put one of these into the transport and ship it to the site and somebody finds out it's not compliance with the CoC. Now you have a 79 report and any fallout that comes from that. With that said, hopefully my picture and credit

to Rod, he probably used that picture at some point in time but don't put the cart before the horse. Thank you for your time.
[Applause].

>> Next speaker is Dr. Stefan Anton. Stefan is vice president of the engineering for Holtec international and in his role he's responsible for providing technical and licensing leadership to all Holtec technical services departments engaged in design and analysis functions. Dr. Anton has over 25 years of experience working in the nuclear industry in the U.S. and Germany with a primary focus on spent fuel storage and transportation. Stefan.
>> Thank you Meraj and good morning everybody. When I was preparing for that I was concerned that all three of us would give the same presentation because we didn't share anything before that.

I'm glad to see that that's not the case. So I see that all of them they complement each other nicely I see Jack primarily focusing on part 72 at the end. You focused on the Part 71 side and also focused on the Part 71 side but in a different way than Wren did.

So next slide, please. That's what I just -- I don't have any pictures. Sorry.
[Laughter].

First, the Holtec systems of course we have also systems in all these categories and looking at the transitions in all of these areas again I'm looking at the storage transport basically on the 71 side separately from the later on transporting to storage again. I think it's important to divide that and not mix them up because the requirements are really so different in there. So that's kind of one of my focus points and in addition to that my main focus will be the first one, storage to transportation so let's go to the next slide, please. These are systems we have. We have our high 100 storage system. We have most of our canisters are loaded in that system and that has the corresponding high star 100 transportation cask and that will be eventually will be also included in our central storage facility license where we, other than what Jack described our approach to store all the canisters in a single system, UMEC system and new system high FW and UMEX, both of them are already deployed and we just

in August we got our transportation license for this so we by now have a licensed transportation cask including high burnt up fuel and that also will in the end go into the high store central storage facility and as I said that's currently under NRC review. My main focus is here not the licensing focus or the loading focus both of these are very important. I don't want to say that -- my focus is really on the more on the technical on the safety analysis side specific for the transportation so the basic question for are my perspective is what is the relevance of the canister integrity. Canister integrity in terms of is it leak side or not. What's the relevance to that with regard to the safety regulations that we have under the transport conditions? Probably both normal and excellent. I'm not necessarily initially wanted to distinguish that. So I want to walk through that -- the question is coming up are canisters transportable. From a technical perspective, I'm almost surprised by this question because I want to go through and basically say that there shouldn't be any concern about transportability of canisters. So let's go through the technical briefing briefly. I'm focusing on leak tightness of the canister is there really from, for example, from the cracking would there be if there would really be a leak in a canister what consequence would that actually have on the transportation condition? So let's first at the structural evaluation for structure evaluation that would not be relevant. Really the structural safety is really provided by the cask itself. The canister is more part of the contents, so to speak. So structural people I will talk to them tell them there's a small leak in the canister they would say that doesn't affect me in any way shape or form.

Let's go to the thermal analysis. It's not relevant. The thermal analysis will credit, of course, the presence of the canister. It's actually, additional thermal resistance and small canister and crack. So it would not have any effect on the thermal performance of the entire system.

There may be some pressure differences in the content usually the canisters are pressurized and at a higher pressure than the area between the canister and the cask and if there would be a gap there you would have some equalization of this, but that's inconsequential from a thermal perspective. Again the thermal people say it doesn't affect me. So true for shielding of course the canister itself is credited as

a material in the shielding analysis for the safety analysis to ensure we meet the dose rate around the canister but again any small deficiencies of whatever kind would not result in any difference in the dose rate around the cask that it's located.

Then it comes to containment and people may be surprised if I say it's not relevant to the containment of the cask. But that's true because the containment boundary, the primary boundary of the cask is the cask itself. The safe enclosure of the content is shown in the safety analysis report to be provided by the cask body by the vaulted lit and by the field in there. Even if there's a canister inside and it is not credited I'm not aware not in our systems and I'm not aware that anybody else have credited the presence of the canister if there's actually calculations done to see if there's any release that would be in the regulatory framework of course a release from there.

From a containment perspective from the cask that's not really relevant. Let's go to the next slide what's next is criticality those that know do a lot of criticality calculations probably expected that I'm getting to that at the end.

[Inaudible] criticality we have to provide between a couple of different areas. Let's first look at the normal condition of transport. Again, the canister is not relevant. We have to assume for flooding with water any how whether there's a canister in there or regardless of the condition of the canister.

And let's go to the [inaudible] technical conditions. Now after subdivide this again because we have all the discussions about the high burn up fuel. If I'm not looking at high burn up fuel, if I look at moderately burned fuel and I look at -- again it's not relevant it's not credited in the analysis, because the moderately burned fuel under any condition would be in the same, would be the same as the normal conditions. Only if I get up to high burnt up fuel it's relevant. Depends on how dealing with high burnt up fuel. There's different ways to deal with high burnt up fuel I should have added that in there as well. If I basically show that the high burn up fuel will not undergo any significant degradation, based on data that is now available then again the canister is not relevant. Only if Holtec has been using using moderator exclusion for transportation of high burn up fuel it

may actually have a technical function. I say it may because a chain of certain events and assumptions that would be leaving to this. High burn up fuel rods they may break under hypothetical accident conditions and that may result in a higher reactivity. I don't want to go into too much detail why this is highly unlikely, but that's why -- that's why I highlight it's a "may" and even if there's any reconfiguration, whether it's really an increase in reactivity is quite questionable. It could actually result in a reduction.

Nevertheless, in the end, basically as a defense in depth we credit, we apply moderate exclusion. We basically state that the canister can be used as an additional barrier to show that water would not get into the package. Remember, our containment analysis already showed that the system remains leak tight. So there's other design basis accident. There's no situation that water would come in there. But it's basically just an additional assumption for that as another defense on top of another defense. So that's where we are with the function of the canister would be. What are the expectations in that respect? Rather than doing complicated calculations here let's go to the next slidepy actually found an EPRI report. And the EPRI presentation based on a report that's from 2010. And there was an evaluation of the probability of the criticality event from fuel transportation conditions and the conclusion was there that really the probability of a criticality accident during a transport would essentially be zero. The number that was stated in there was the probability was 10 to the minus 16. I don't know if I need to believe this number but it's essentially so well below anything what we usually consider to be credible that I think essentially 0 is not is a good discussion for this. So what am I heading to here? At least from my perspective it links back to the discussion early yesterday or the presentation from Mark on reasonable assurance of adequate safety. In the contents of this going through all these things I think we should take that into consideration regulatory decision about guidance and the question on transportability and from my perspective there's no transportability of canisters that should be also recognized any regulatory decisions and guidances and it also goes back to our approval of the 190, which where there was a focus on this subject.

Next slide. I have very little on the next step. Transportation the storage. I want to really keep that brief because it's been discussed

to a significant extent. The one important thing is that under storage, the canister is in confinement boundaries, basically the equivalent of the containment. It's a very different situation. That's why I say it's important to distinguish 71 and 72. While I say 71 it's relevant is low. Here it is very different because that's the confinement boundary. And so from our perspective, I mean, it was already discussed analysis test. I think all these things need to be done to ensure that any canister that arrives at a central storage facility that is actually meets the requirement there and is to consider to be safe testing methods, encryption methods and all these steps. So then the next slide, that's just a summary. We have the systems, storage transport, regulatory guidance to recognize the safety in the light of the reasonable assurance and for transfer to storage that meets acceptance methods that meets the appropriate justification. It continues to function. Thank you.
[Applause].

>> Our next speaker Darrell, is going to sort of package it. We've heard I guess from our major vendors in terms of regulation. I think one might ask the question, okay, how does it look like what does it look like in the implementation, this canister. So I think that's basically what Darrell is going to do sort of try to bring it home, give some examples. Darrell Dunn is an engineer in the Division of Spent Fuel Management. Duties include technical reviews of application and storage application renewals prior to moving to the NMSS Mr. Dunn was a material engineer in the office of nuclear regulatory research working on primary stress version cracking and containment line or corrosion. Mr. Dunn formerly worked at southwest research institute has a BS in metallurgical and MS from the University of Arizona. Darrell.
>> Thank you. Let's go to the next slide. I think the previous speakers and Meraj's introduction to the session has basically provided the background here. We're interested in the 72 to 71 to 72 transition, and in this case the NRC has received two license applications for consolidated interim storage facilities over the past 18 months or so. These applications seek to utilize structure systems and components that are currently in service at existing entities. The canisters that are storing spent fuel greater than Class C waste they're looking to take those from their exiting storage facility and

transport them to a CISF and place them back in storage in that consolidated interim storage facility.

So next slide. In reviewing those two applications, we saw that the applicants provided an approach to assessing how they would evaluate these systems that have been in storage then transported before they put them back in storage they provided a methodology for how they would evaluate those systems. And I think that they've been described in the previous presentations. But we recognize that there were different approaches taken somewhat different approaches.

And we really didn't have guidance to evaluate these applications that utilize the 727172 interface. So we sought to develop some guidance for this particular 727172 interface. We looked at the activities that are involved during initial storage transportation and subsequent storage. We looked at important storage variations that I'll describe in my next slide. Of course the applicable regulatory requirements, the possible testing and nondestructive examination methods that have been presented in the previous presentations and also some potential relationships such as situations where credit for examination of tests that have been performed might be allowable for your prior transportation or prior to placing the canister back into storage at the CSIF.

Next slide. So the scenario variations that we considered all these are limited to dual purpose storage and transportation canister based systems. That's because these applications only deal with those type of systems and they're the majority of the systems that are presently in use at generally licensed and specifically licensed entities in the U.S. The scenario variations for part 72 we considered an initial license or initial certificate of compliance period and also a part 72 where you had a period of extended operation, a certificate of compliance was issued or license renewal was issued and there were aging management programs that were part of that renewal application that are now in place. For Part 71, two scenarios that I think were described fairly well in previous presentation the canister is not important the canister integrity is not important for Part 71 transportation. And the other case where it isn't, credit for the canister and boundary integrity is necessary is primarily for moderator exclusion.

So we looked at the four different cases, and I'll have subsequent slides that go through these possible four combinations of those cases. Next slide we looked at testing nondestructive evaluation methods. These have also been described in presentations leak test, in the package, and to verify that the canister has no breaches prior to or after transportation. Visual examination that would be conducted using remote methods while the canister is either in storage or during the transfer of the canister from a storage overpack to a transfer cask. And the purpose of that inspection would be detection of aging effects or handling defects that may have occurred during storage in previous canister operations and serve as a volumetric nondestructive examination which would only be necessary if the visual examination acceptance criteria were not met. These again would be conducted using remote methods while the canister was in storage or during transfer operations and I think yesterday Jeremy RenShaw presented an excellent presentation on the different systems that are being developed for that purpose offer those at the dry vendors also developed in methods in their particular systems.

Eddie current or ultrasonic testing are potential methods that can be used to characterize these aging or handling effects that occur during storage.

Next slide. Okay. So the next four slides basically go through each one of the possible combinations of examples. The first one is initial storage CoC license and during transportation the Part 71 there's no need to take credit for the canister boundary. So the way this slide is broken up is on the left there's part 72. The initial storage period. Of course that's going to be in accordance with the ISFI license or the CoC and then the blue is Part 71. . We're calling that things that would be done pretransport prior to the transportation taking place and then on the far right is the Part 72. So that would be things that occur either in the CISF receipt or in CISF storage.

So the case where we don't take credit or credit is not needed for canister and boundary integrity there's no need to perform a canister leak test or visual examination or surface of volumetric examination prior to transport. And the reason for this is we're not taking credit for the canister containment boundary and in the initial license or CoC

period we haven't identified any degradation mechanism that could plausibly occur that would compromise the integrity of the canister boundary anyway. At the CISF, once the canister is received we're looking for a canister leak test to be performed on all the canisters received to verify that the confinement boundary and integrity exists and visual examination of at least two of those canisters originating from each site determining to be more accessible using the EPRI susceptiblity criteria that was previously mentioned and surface of nondestructive examination of those canisters is not necessary unless of course the visual results do not meet the acceptance criteria. I have here on the Part 71 transport no visual examination unless the CISF received visual examination results meet acceptance criteria. If there's some handling effects or aging effects that have occurred that are identified in those receipt inspections we'd want to know what the extent of that condition is at that specific site prior to transportation of more canisters from that site. For the CISF storage that's, of course, in accordance with the initial license and site. Next slide, this is an example of the initial CoC license for Part 71 credit for canister boundary integrity is necessary. So the initial storage is the same in the previous side and as is the CISF storage after the canister's received and inspected the difference here is under Part 71 for the pretransport, we need to verify the canister boundary integrity, a leak test has to be performed prior to transport and visual examination of at least two of the canisters from each originating site again determined to be the most acceptable surface and volumetric is not needed unless the visual criteria is not met and at receipt, at the CISF, looking again for canister leak test to be performed to make sure that nothing has occurred in transport, unless the canister integrity is maintained prior to placing the canister into storage. Next slide. Example number three is we now have canisters being transported from a part 72 facility that either has a license or CoC under renewal there's components for safety and have to be inspected by aging management program or in some way covered by an aging management program.

In this particular example, there is no credit taken for the canister integrity boundary under Part 71. Again, there's no leak test performed in the pretransport. No visual examination of the canister pretransport. And no surface of volumetric in the performed pretransport.

But they CISF, once the canister is received, we're looking for tests performed at the canisters at that site to verify canister boundaries. And official examination of at least two of the canisters from each originating site again determined to be most susceptible there may be some situations where credit for an amp examination that occurred at the original Part 72 site could be credited during, at the CISF receipt. And no volumetric or surface examination necessary unless the visual examination acceptance criteria are not met. And then for the CISF storage, the same thing. In accordance with the initial license. But there would be requirement for amps to be in place for structures systems and components that are in extended operation.

The final example, next slide, is now you have a period of extending operation for for credit with the boundary and integrity in Part 71. Initial condition is the same as previous slide. We've got initial storage is done in accordance with the CSV or license CoC but there are amps that have to be implemented for pretransport, 100 percent leak test of the canister and examination of at least two from the originating site to verify canister integrity prior to transportation since take credit for that boundary prior to transportation. There could be some circumstances where credit for the amps examinations performed at the original SOC could be credited but once it's received at the ISF again leak test of the canister to verify confinement integrity. Visual examination and surface NDE is not necessary and for CISS storage, there are amps that would be in place for structure systems and components that are in that period of continued operation. We expect in these applications there would be some contingency planning. The number that don't meet acceptance criteria are anticipated to be very limited if any. But an acceptable plan for addressing noncompliant canisters should be applied in the application. And it should address the procedures and controls to limit occupational exposures, inside boundary doses and the corrective actions that are necessary to return to more normal operations and these are required to meet the requirements in part 72 that I've listed here. Path forward. We anticipate collecting feedback here at this conference. And we will seek to develop draft guidance that we hope to incorporate into future revisions of our standard review plan. Probably the storage standard review plan but we'll have to have some reference to that in our

transportation SRP as well. I believe that's the end of my presentation. Thank you for your presentation. Thank you. [Applause].

>> Time for questions. Looks like we have somebody making their way to the mic.
>> Paul Plant from the three Yankees. This is for the cask vendors how they answer I'd like to comment afterwards. But how difficult does that helium leak test to conduct inside of a transport cask or your transport casks?
>> Just pulling down a vacuum transportation cask. You have such a small-volume of free volume outside of the cask you should be able to get that vacuum stream to that hole. We'll have a four-inch radial there's essentially no room. For the transportation you should get helium detection right off the bat and be able to hold it tight for an indefinite period of time unless there's some kind of flaw within the canister. At that point in time you shouldn't be able to hold that vacuum at all because the free volume between the canister and that area is so big that's really what you're trying to detect, is there any kind of path for helium in the canister into that anulus region.
>> So it would be relatively simple operation to conduct up front.
>> It is a prudent thing to do up front. I think it's more of a commercial issue than anything else. You don't want to ship one of these things even though you don't take credit for the canister only to receive it now you've got to do something with it. So it's a prudent check up front do a half canister integrity now, now I have a baseline for when I received it on site.
>> Recent you are relying on it for confinement inside your transport cask.
>> Correct.
>> That might be an important step to take at the shipping location.
>> That's the way we've formatted our applications is to do that. We don't take credit for the canisters, like he was talking about, but it's a prudent thing from a commercial standpoint up front.
>> One thing I would add is because the cavity has helium in it it's going to be important to flush that cavity good before you try to do the helium leak test because as you said there's going to be helium there. So you need to get that out so you don't get a false positive right off the bat. So that will be the biggest issue.
>> Question over here.

>> Ed Bryce from [Inaudible] I want to follow up on something. Jack pointed out that the Areva design licensing is for 20 years but the actual design I think you said design life 120 years plus probably.
>> Depends on the design. Some older designs not out 120 years. For each individual canister you'll have to go to the design reports to find out what they were designed to. But that's not an outlandish number.
>> That's probably something I followed up with the thermal people I asked about degradation of the fuel. And I wanted to follow up with NAC, what is your estimate?
>> Typically you'll see in our SAR and ASME 50 year design life.
>> 50 year.
>> 50.
>> Someone mentioned to me about the potential degradation opening up casks to see there's not fuel spread out all over the bottom. Of the canister and being a nuclear engineer myself, I'm trying to make people understand that if that were the case, and we conduct radiation surveys of these all the time. If something like that were occurring you'd see big changes in the radiation profile. And also I used to be a fuel performance engineer and most of these are pretty darn robust.

So my engineering judgment tells me they're intact whether they're sitting there being 20, 30 years, whatever. I just wanted to maybe clarify that and see if you all agree.
>> Yes, definitely.
>> That must be on loaded canisters they were not burned up fuel moderately burned up fuel and I can't remember how many years in a cask why that was not a canister but the situation for the fuel assembly was the same. And they basically opened them up and the fuel assembly looked pristine. Nothing to see there. And we would expect them to be the same in a helium sphere nobody would expect there would be something to happen with the fuel assembly. At the same time if something would happen you would see it from, you would be able to to detect something from the outside. Maybe even from a thermal perspective you could see something is shifting there, even that wouldn't communicate that you have a problem at that point in time. But then you get an indication that you might have to have a closer look there. But that's correct.
>> Thank you. I wanted to clarify that for some people that were concerned and also get -- some people don't understand licensing life,

like we license a lot of the nuclear plants for 40 years and that was based on economics than the degradation. I think the same thing with dry cask.
>> One thing to add we're incorporating by reference the enhancements we're bringing. If they have license renewal, you have aging management programs you have DOE demonstration program that's incorporated by our reference there to address these long-term degradation concerns. Obviously haven't seen anything yet that's of potential concern. So we're incorporating by reference those amendments. So if we get to a point where we want to accept a canister in those and we adopt techs and fuel aging management program, et cetera.
>> And one more comment on this. We're talking about licensing life. Which is like 20 or 40 years and it will be extended. Then we're talking about design life. And that's also like typically at least 50 years that was supposed to come up and going higher. But the design life is the system can operate within its design basis at that time. You can go one step further and say what's the service life. So how long would the system be operating. It might not be exactly within its design basis, but it's probably still safe and this would be a number that would be even larger. It's very difficult to estimate but it may potentially be large than this. So as we talk about design life, that means operating within the design basis of the system.
>> Appreciate it gentlemen. That's what I wanted to do, I wanted to get the point across to some people that time of life is different than -- thank you very much.
>> I recognize we have somebody else here in the room that wants to ask a question but before I go there I want to check with the operator. Do we have anybody on the phone that has a question?
>> Yes, we do. Our first question we have a couple. Our first question is from Donna Gilmore. Your line's open.
>> Okay.
>> Donna, your line is open do you still have a question? I'll go ahead and move on to the next question at this time. Marvin Lewis, your line is open.
>> Thank you.
>> Thank you. I've been listening to this and I don't have a strong criticism of what I heard so far however I fear I hear a terrible omission. And to give you a little background on it here in Philadelphia a couple of years ago, a commuter train tried to make a

curve over 100 miles an hour. The curve is rated for 50 miles an hour roughly. We had 200 passenger cars 100 passenger cars overturned 200 people in the hospital. Eight people in their graves. And I could go on.

I want to point out that this is totally unforeseen. And so was Fukushima and so was the gen Genoa fire. And Anno worth mentioning, pounds of [inaudible] and in a switch gear room. Yes, the engineers -- not the engineers, the electricians had to don wading boots and go up into there because the water was up to their waist not a good situation a switch room flooded up to your waist. And I'm sure the company didn't give those electricians medals. But that's beside the point.

The point is that it's wonderful to see everything. It's wonderful to leave no stone unturned. The problem is that it's kind of hard to find those stones before the fact. And from the way you're talking, I don't want to say arrogance. I don't want to say that I've called somebody arrogant. But to say that you know everything that's going to happen in the future is a bit much and I really think that's a comment that I would like to put on the record, saying that you've looked at everything is a bit much. Thank you.
>> I'm not sure there's a question there.
>> I'm not sure there was a question there either. I think it depends on the engineers to answer if they feel there's a question in there.
>> Let me respond to that. Thank you for your comment and just want to provide some assurance that in our regulation these canisters will be transported in NRC certified what we call the overpack or cask and these casks are subjected to the test conditions, that these conditions encompass 99% of the accidents that are out on the road in the railroads because we did a study. This goes back to the 80s and 90s, the descriptive tests that we have in our regulation for these transportation package encompass the actual accident. And there was a study that was done in the '80s and '90s and these overpacks, these are designed subjected to drop and puncture and fires. So these canisters will be transported in that type of overpass. That's what I wanted.
>> If I may. I think I would take umbrage to the statement that none of these conditions are taken into account. The regulations and our design requirements take into account accidents, off normal events and normal conditions. And I hear these claims about how dangerous this is. Wren pointed out in his talk that safety was the number one

concerns in the designs that we do and the evaluations that we do. We take safety very serious. We have a history in this country since the 50s of with nuclear power plants operating them. We've done more than 4,000 shipments of used nuclear fuel in this country and no one has died. That's not arrogance, that's a testament to putting safety first and our regulator putting requirements in place and us as engineers. I live on this planet too I don't want my family and I don't want to be killed I live and work near these things so it's in my personal interest for this to be safe. So to make a statement that none of this is taken into account is patently false. The regulations have the requirements in them and we as citizens of this world and people that have to live here want to make products that are safe that I can live with as well as you.

>> Thank you for your comments. We're going to move to a question here in the room.

>> I'll try to do it quickly. My name is Alexander Gels, licensing regulation manager and I happen to be level C testing as well. So my question would be there's a lot of presentation rely on the 100 percent leak test during the acceptance of the canister to interim storage facility. And there was a first question about how easy to do a leak test, and I think there was explanation given. But I think it's more difficult than that, because realistically, old canisters how do we have a seal for the gas inside the canister how do we know that for fact, measure that that they're sealed. If you can't measure it you make assumption that you have helium somewhere is number one. Number two, when you're trying to do leak test, you to him adopted well time which you wait until you start seeing the signal. If you've got the path it might take lowers to see the leakage. You have to based upon the what you've required develop the procedures to get markup there to see that you can see through is small path you can see the leakage. It's not as simple as it sounds in this presentation." I wanted to point it out and possibly take it into consideration. Thank you.

>> I think when we get to these tests I would think that the first test you do, you actually do on an actual cask you want to transport. You have to develop that to make sure your test actually works and there are concerns of that I'm not quite sure what the big concern is whether you have actually have helium in the canister. I think temperature measurement and things like this would indicate before that if there's a concern of that case. But for the testing themselves I'm not an expert on that. But it might not be as straightforward that I

think people see that it actually is the appropriate thing to do. People think at one time.
>> Thank you.
>> And as far as hours and hours. As Wren pointed out the volumes inside the casks are very small outside the canister. And part of the process the qualification leak test is you introduce a standard leak that you're demonstrating for you try to detect it if you can't detect it you haven't demonstrated. We do helium tests all the time down to these standards and there is -- it's not hours. It's minutes.
>> The problem is we're actually doing the same test for our 820 B task it might take us 50 hours to actually detect the leakage when you introduce a standard your path is not, it's basically a straight path. When you have a potential crack in the canister the path might be tortious might take a long time to actually detect it from the testing and we actually verified by experiment in our company where we actually did the calculations upon one value when we did the markup run the experiment took 15 times longer. That's why the new requirements calls you to not only develop the procedure but qualify the procedure. Meaning you have to demonstrate that the procedure works. And try introducing the standards, introducing the standards is really given to calibrate your MSLG, your message from it and the system it's not to validate the tasks. It's different criteria.
>> Going move over here. Thank you. First I want to say thank you to the experience. It's been a wonderful experience the thinking is maturing and moving along. Very helpful to me. Question goes mostly to Wren's presentation. I appreciate all that because I'm a compliance guy. I get you gotta go through that top to bottom that certificate of compliance. So in that vein, the certificate of compliance incorporates draws by reference. Those drawings include the canister drawings and the drawings have numerous dimensions and tolerances andic thicknesses and so forth. How does a person go through that process, confirming that an aged canister still meets all those dimensional and tolerance requirements since manufacturing through that license period while it's been in service. Because, of course, Darrell mentioned if it doesn't have a function in transportation well, there's really no inspection requirements or testing requirements. But from a pure compliance standpoint, I'm wondering how do you get over that hump?
>> You bring up a good point which is when you read the certificate it says instructive. Which goes back to fabrication. So as long as there hasn't been any kind of handling issues or anything like that, what

you're wanting to go look at is go back to the fabrication documents and look at how was this constructed? Was it constructed in accordance with the current licensing documents and if not, how do you address that.
>> You don't get into the aging issue at all, then it's just construction.
>> Right. Just construction. Now the assembly, the assembly drawings and how you assemble the entire transportation cask those dimensions have to be verified.
>> I think we have time for one more question.
>> Suzanne Leblang from Entergy. And I want to also thank the panel. It actually sounds like we're all very close, on the same page. So that's a very good thing. And as ever the optimist, I guess I have a question about the logistics. Several of the speakers talked about the fact of the two most acceptable casks having some additional examinations. What I'm wondering is does that mean my two most susceptible casks have to be the two first casks shipped.
>> Well, that would be helpful if you're going to --
[Laughter].
-- unless you want to go starting examining casks that you've already put into storage. I think that would be a prudent thing to happen.
>> All right. That was very fast. So we're going to squeeze in one more question.
>> Hi, my name is Jeff England, spelled just like the country. I'm from National Labs and I like to panel they brought up the 717271 transitions those of us in the business have been talking about for a while. And truly the thing they highlighted there's a safety basis where you send it and a safety basis where you receive it. The transportation in between is all you have to do is meet both those safety basis requirements. And most of news the engineering and science field, we can solve those problems. The problem comes in what do I have to do to pick it up and deliver it because rejected loads are a real problem. That's where the qualification before you load and the other qualification they were talking about is content. You rarely take credit for the content it's what you put in the cask to make the shipment. There may be some aging management associated with the cask or the canister is a receiving body issue. It's where the receiving body matters the most.
>> Okay. With that, we're right on time. We now have a 15-minute break. I'll see you guys back here at 10:00. Thank you. [Break] .

>> Ready for our decommissioning section. With that I'm going to turn the mic over to Bruce Watson to kick off the next panel. Thank you.
>> First of all, let me thank you all for coming today. I realize this conference is generally focused on.spent fuel management. We're like somewhat of an interesting little break from the topic of spent fuel management. I have with me today a group of speakers this year -- this year we're going to focus on what the NRC is doing and more specifically our role in the decommissioning process a little bit more. Last year we had a presentation by a number of people from outside the NRC and thought that went well. So this year I thought the focus would be a little bit different. On my right is Rhex Edwards. Inspector from Region III, I'll get into biographies when I turn the presentation over to them.

Next is Meena Khanna, branch chief in our rulemaking group. Next is Mike Dusaniwskyj, an economist, chief economist from our office.
>> The only economist.
>> Yeah. Mike will be talking about decommissioning funding issues and then bringing the panel to conclusion will be Mark Richter, who is from the NEI and has industry perspective on issues. With that I'll go ahead and start with my first slide I'm going to be focusing on reactive decommissioning. I want to point out that reactive decommissioning is one part of the decommissioning program at NRC which includes a lot of complex material sites, research reactors, fuel cycle facilities and uranium mill tailings. So we have a variety of different types of licensees we do look at. And each of these have their own history successes and challenges. I'm going to touch on these specific issues during my talk today, which I hope it will be very brief. So I'll be talking about experience some of the new business models, 60-year issue and then some generic issues with ALara and industrial safety and finish with a short summary.

Next slide, please. One of the things I want to point out to everybody is our reactor decommissioning and actually our decommissioning program is fairly mature. We've been at this for 20 years with the current regulations. We've decommissioned under these regulations over 70 sites. Most are complex material sites. But it does include 10 power reactors. The second part I want to point out is that all our sites have been released for unrestricted use. The owner can use the site for whatever they choose to do in the future.

With the exception of the power reactors, I think there's seven of them that still have dry fuel storage facilities on the site, basically you can use the facility for anything that the owner chooses. So with that level of maturity, we still have one I'll call it one hole in the process. And that's what Meena is going to talk about with the transition part. In that our regulations were intended for operating reactors and intended for decommissioning sites. So to fill on that gap Meena and her group is working on some rulemaking.

Next slide, please. For those of you especially that were here last year we discussed this new business model which involves license transfers. Both Zion and Lacrosse are under license to a company which specials in decommissioning. We are entertaining a newer option in that which is the sale of Vermont Yankee to a private company who is going to do the decommissioning. That's currently under staff review. I expect that will take a number of months to complete. However we do do a rigorous financial review which Mike's group does or Mike and his group do within his group do and also technical review which my staff does.

I also want to point out that Southern California Edison for San Onofri is following the traditional model to hire a company to do the work.

We have a request in to exceed the 60-year requirement in 5082 to complete reactor decommissioning from G.E. FalacidasI want to say that it was based on safety to allow for radioactive decays. There's a number of statement in the consideration in new regs which supports that 60 year thing, requirement. And 5082 requires an exemption only for a couple of specific issues. However, we are evaluating it under the larger exemption process of 5012.

The point I'm going to make here is we are developing a commission paper and that because it is a policy precedenting issue. So we're working on that. Next slide, please.

I think decommissioning Alara is important. First is dismantling activities. It's first the extension of the rad and Elara program so nothing really changes. So however when you get into the final decommissioning stages doing final status survey in order to meet the

regulatory requirement of 25 milly rim and it includes the words plus Elara it shifts into doing stuff to make sure that you are cleaning the site up and it may require an extra shovel or so of dirt to be removed. On the left I have a picture of the steam generator being removed from I believe it's the Zion plant and it's really a picture of CRT or television screen where they're using remote equipment and remote monitoring to limit the number of people during the big lift of this steam generator that's going to be placed on a railcar for shipment. On the right is the actual hole where the containment building was at big rock point. And in the bottom there we're doing surveys and ensuring that the licensee is meeting the requirements. Part of their Elara concept was to remove the containment building and all the structures because they felt they had material underneath the buildings that needed cleanup. On the next slide, please. Industrial safety I want to remind everybody that decommissioning is the one area where industrial safety has presented itself that it can be a very dangerous operation. And so industrial safety plays a big role in decommissioning. On your left there's a picture of a piece of equipment which hit an overhead energized electrical line. This is probably the most frequent thing we've seen not only in the DOE complex but as far as industrial issue. These are preventible. So you really need to prevent these from happening. The slide on the right is a concrete slab. When they remove the other slab similar to this they were secured in place. This one was not. And I'm not sure that it was preventible, because it's very difficult to tell a slab of of this size would have been secure by a walk-down. However, it emphasizes the need to do a thorough walk-down of the area. The equipment operator here, it hit the slab where he was and escape the area before he was injured. So there's no serious injuries or fatalities with either of these events and lastly a few comments on our program we think our program has been successful. We do a lot of sharing with the international folks. We continue to expand the program as needed to meet the plants that are shutting down. We continue to look at our regulatory issues to make sure that things are processes are more efficient which Meena will talk about and we continue to inform our regulatory guidance from lessons learned right now we have 20 power reactors in decommissioning. We expect four of those will be completed by 2020. And in 2019 we have a number of them that are shutting down a couple more in 2020 and of course Indian Point and three in 2021. And since Diablo Canon has

announced they're not going for license renewal they'll be shutting down in the century or decade.

And the last statement I have here is reprieves and additions. So it's a fairly fluid situation. We had a couple of plants that were going to shut down now they're going to continue to operate. We don't know if there's going to be more plants or plants that will step back, get some kind of regulatory relief and continue to operate. So with that, I will be turning it over to Rhex Edwards. Rhex is a senior inspector from the Region III office. And has been there since I believe 2009. Rhex is a Purdue University graduate has his MBA from the University of Indiana University. And welcome Rhex and he'll talk about the art inspection program.
>> Good morning. In 1998 the United Kingdom of institute of chemical engineers published a study over 500 incidents in the chemical processing industry and what they found was that that industry operates less than 10% of its time during transition periods. Yet over half of all their safety incidents occurred during those operations, similarly in 2014 Boeing airlines company published a study of airline, commercial airline incidents over that occurred over a ten year period and found that over half those incidents occurred during landing operations.

While I don't intend to compare reactor decommissioning to either of those industries, I do believe it highlights the importance of being prepared for transitioning and adequate planning going into that. And we used these other industries lessons learned in our inspections so we're informed about potential precursors to issues. So I highlight that today. And for those of that traveled here by air, my apologies for using an airline example.

Next slide, please. But today I'll be discussing the priorities during decommissioning, and that's throughout the process from the start to when you're in the middle and to the end and then I'll talk a little bit about what transition really involves and the challenges associated with that and some of the lessons learned that we've experienced and then finally the inspection program that the NRC has.

Next slide, please. Basic priorities of decommissioning. At the center you can see safe storage spent fuel, great focus to all of us in this room.

Safe storage of spent fuel is and must be the focus before decommissioning, during decommissioning and after decommissioning is complete.

Also shown are personal safety which includes industrial safety like Bruce discussed and radiological safety for the workers involved.

Ultimately the goal is to achieve radiological decommissioning required for license and it's a priority and ensuring clean up of the environment.

These basic priorities form the principles for our inspection. We ask the simple question: How do the activities that a site wants to perform impact the safe storage of fuel or how might it affect radiological decommissioning of the site. Next slide, please. This graphic illustrates the various transition points and details throughout decommissioning. I don't intend to go into specifics of that. There's many guidance documents out there that explain this and can be found on the website you can break them into three main blocks. Next slide, please. Breaks down to these three here. Is first is a transitional period from operations to either a safe storage condition where the plant equipment is drained or deenergized and placed in a long-term storage condition until active decommissioning begins. Likewise, a site could transition directly from operations to active decommissioning and then there's transitional periods within each of these, of course, my focus today is primarily on the first one for transition between operations to I would say a safe storage condition.

When a reactor shuts down and removes fuel from the reactor vessel, the operating risk and the corresponding reactor accidents at that facility are no longer possible. However, immediately after shutdown, the various programs, equipment and personnel that are on site to assure the safe operation of the reactor and prevention of reactor accidents, they remain relatively unchanged. There becomes an unbalance as the risks from the operation are removed yet the programs remain the same on the right side of the scale there.

So transition is primarily about achieving the right balance. The priorities shown on the left, safety of the plant and spent fuel must be commensurate to personnel and equipment to ensure continued safety.

Of course as the site progresses through these changes, that's a primary focus of our inspection efforts is as I started the presentation with the importance of transition.

So this is done by first identifying the needs of a facility. What is it that the site needs to achieve decommissioning and safe storage of spent fuel. Once that's identified they can go about the process of reclassifying the equipment, the systems, the programs and the staff to achieve those needs.

And that's done under the regulatory change process, and if it's within the site's authority to make those changes under 5059 or 5054, et cetera, they can go ahead and make those changes. In some cases the equipment is no longer needed they can abandon those. For those systems, programs that cannot be changed within the site's regulatory authority they have to come to the NRC for permission under, through an exemption process or a licensed amendment process. Of course Meena will talk more about the improvements we might be able to make in the future but this is the current process under our current regulatory framework. Next slide, please. Of course, as we're making changes the change for a program that's used to satisfy one regulatory requirement will often impact the regulatory requirements in other parts of the regulation. So there's an overlap. And in our discussion today part 50 structure systems components the personnel and equipment associated with that facility overlap in many ways in the general license and specific license. So that's a key area to understand how does the impact on a change for part 50 structure or program impact the part 72 and that's not simple, there's multiple regulatory requirements. You can see the overlap in the various programs continue throughout various parts of the regulation. One more. These are just a bit of an example of where you'll find overlap.

And here are a few key areas where you see overlap, part 50 and part 72. And experienced quite a few lessons learned they're contained in our inspection reports and they're also contained within the

decommissioning lessons learned report which again I imagine Meena will mention and a wonderful resource for anybody who is going through the challenges and possible ways to address those concerns.

Part 50 structure system components. Obviously it shares quite a bit of equipment between operating reactor and dry cast storage operations. We've experienced instances or found areas where equipment was improperly classified. Maybe reduce the safety significance incorrectly or we've also seen issues in the control heavy loads where inadvertent changes were made to the heavy loads program for dry cask operations and weren't adequately evaluated to the sites controlled heavy loads program on the part 50 side. We've also seen instances where the certificate of compliances that have additional language requirements in there for decommissioning, yet when changes are made to the facility, those considerations in the CoC weren't fully understood or even reviewed to know how it would impact dry cast storage operations. I can certainly appreciate the effort to remove the detailed specific maybe unnecessary language in the CoCs and transition to the EPSAR but as an inspector I'm certainly interested in the unintended consequences of that. And I do foresee an increase in the 7248s that would be required for future changes there. And certainly would hope there would be an improvement in the regulatory guidance and industry guidance associated with making those changes and, of course, that would include additional training perhaps and all in supportive effort to ensure we get consistency and appropriate level of changes being made within the regulatory framework. Also shown are major programs emergency preparedness shared a lot between the power reactor and dry cask storage facility and changes where they were made incorrectly for reduction in staff. Fire protection two is often shared." Oftentimes changes are mailed to those programs or eliminated altogether for the power reactor once they reach a certain point within the decommissioning operation. And changes weren't adequately considered then for the impact on the dry cask storage facility and physical security of course may play a role.
Next slide, please. Overview of the decommissioning inspections that may occur at any site. Chapter provides for inspection program and spent fuel is captured under 2690, both safety and maintenance of spent fuel is covered under that chapter decommissioning reactors that have a [inaudible] have their own manual chapter under manual chapter 2202. There's overlap between all three of these and various inspectors will

do the inspections at the facilities and we'll coordinate and work together to achieve the overall goal of the safe storage of spent fuel in security and the priorities of decommissioning.

This is general overview of the process for decommissioning safety inspections. It begins once the fuel is removed from the core. At that point the reactor oversight process ceases and decommissioning process begins. Through that initial transition where a lot of changes are occurring we're maintain our resident inspectors on site for a period of time. Typically it's up to a year but again given the site specific conditions we will adjust that either shorter or longer and then the program itself is flexible and that as conditions change at the site we change the focus of our inspection and the inspection continues until the license is terminated dry cask inspections will continue as long as there's fuel on the site. That's covered under a separate manual chapter. With that that concludes my talk.
>> Thank you. Next speaker is Meena Khanna, chief of reactor rulemaking and project management branch in the division of rulemaking in the office of nuclear materials safety and safeguards. I want to point out she recently moved from NRR to NMSS where they have the excellence for rulemaking. I previously worked with Meena on some of the transitioning of reactors during the past years and was strum al in working with her on the lessons learned report, which a lot of the rulemaking basis is centered on.

So Meena had a variety of supervisory and management positions here at the NRC. She is a graduate of Purdue University and with that, we'll let Meena begin. Thank you.
>> Good morning. Thank you, Bruce. I appreciate the opportunity to be here today. And the purpose of my presentation today is to provide you with an overview and update of the decommissioning licensing activities as well as rulemaking activities. Next slide, please.

At this point basically provides a little bit of background with respect to the recent and planned. We have the shut downs, the recent experience with premature shut down of several reactors in the plant shut down of others in the future has focused NRC's attention more so on the decommissioning process between 2013 and 20166 power reactors permanently shut down defueled and entered decommissioning. These include the plants for Crystal River, kiwani San Onofri and you heard

from Bruce includes eight reactors planned for shut down between the years 2018 and 2015. I won't go through the list because I think you got that list pretty well through Bruce's presentation.

Although plant shut downs are the decisions of the licensees, I note that the current market conditions increased demand -- I'm sorry, decreased including the decreased demand, lower cost alternatives and subsidies for renewable power and anticipated plant modifications maintenance or repair costs were likely the contributing factors to the decommissioning factors of the plant. With the recent shutdowns NRC received aid number of requests for license amendments as you heard earlier from Bruce and Rhex. Currently the regulations are written for operating reactors and there are some regulations for when the plant is actually decommissioned, however through the process of transitioning to the decommissioning process we don't have the regulations so you'll hear a little bit later from me on the rulemaking process but in the meantime we've got an established regulatory framework that's working and that's basically comprised of issuances of license amendments as well as exemption requests.

And those license amendments include the emergency plan. We basically get licensed amendments in for emergency plan reviews and we also review exemptions that you'll hear a little bit from Mike on the appropriate, the use for decommissioned trust funds for spent fuel management. Currently the regulations do not allow the license to use decommissioned trust funds for various expenditures such as spent fuel management we receive things for that.

There are other things we've been rescinding orders from the Fukushima lessons learned. So if a plant is decommissioning, we do get order rescissions and we do approve those as well.

So bottom line the NRC does understand that the decommissioning process can be improved and made more efficient and predictable by reducing its reliance on the license amendments as well as requests. The NRC is continuing to proceed with decommissioning rulemaking and you heard from Rhex we did also from Bruce we did issue a very comprehensive lessons learned report and I provided the ML number there, but I do highly encourage you to please, if you haven't had an opportunity to look at that, but a really robust of lessons learned, best practices

all from the issuances of the license amendments as well as exemptions. It also talks about inspections. Talks about the public outreach, that outreach that we recommend that licensees have with the use of community advisory boards. Take some time to look at that and we've been -- the staff has been looking at it lessons learned and KM management tool that the staff uses. Next slide, please. With respect to lessons learned I'm not going to go into a few details but highlight a few key messages that we received out of the lessons learned report. So some of the staff's findings from the report include licensees should plan their decommissioning licensing actions well ahead of their need dates and prior to shut-down if possible. This helps with complex issues addressed through the licensing action, as you know we do public meetings presubmittal meetings they all benefit both NRC and industry. It also provides a venue for the public to participate. So please continue to do. I think that's been working very well. As you know Doug Brodof is chief and Ed Doral for the licensing actions it's been working well licensees should continue to doing the preplanning activities and request any of these public meetings as needed.

Licensing actions should also utilize recent precedence, as I mentioned before we have had six reactors that have gone through the decommissioning process. We have a lot of good experience with respect to reviewing license amendment requests as well as exemptions so we ask that the license, we do look at the past president. Obviously every plant is different. But there's definitely some good use out of the past precedent. Open and good communication between the licensees and public and local government officials has made for a smoother more efficient and effective process. For addressing issues important to local community, as I mentioned earlier, the establishment of local community advisory panels is a good practice and definitely has proven to be very successful when licensees have been using them. And I do mention that back in the 1990s, when there was some plants that decommissioned they effectively utilized these panels and we see them being used now and we do believe they're very, very effective. State and local community engagement by the regulator is a beneficial activity to help public and officials to expect with the decommissioning process and when opportunities for the public and local government officials to also engage in the process.

Areas of particular local community interest include emergency planning and decommissioning trust funds as well as the current regulatory to decommissioning many of the lessons learned in this report are being used and considered with respect to rulemaking and I'll go into the next slide please I'll talk about the rulemaking at this point as well it's a good segue into the rulemaking.

A

The goals of the power reactor decommissioning provide for one decommissioning process two to reduce the need for request for exemption and licensing requests from the existing. Three, address other issues deemed relevant by other NRC staff issues like cybersecurity and current regulatory approach to decommissioning. That includes the PCSR reviews we're doing, the commission asked us to also look into whether we need to do more of a formal lasted review. So we're looking into that as well. The 60-year timeframe you heard about that from Bruce. So we've been asked to look into whether that 60 timeframe is appropriate for the decommissioning process and also the other areas that I would like we briefly mentioned now aging management and fatigue management. These are issues that the staff is considering as part of this rulemaking activity. And the last item which is very important rulemaking supports good communication, openness clarity and reliability.

Next slide, please. With regards to background associated with the decommissioning rulemaking, in the staff requirements memorandum, SRMSecy zero one one eight addressed the staff, I'm clarifying what the commission has directed us to pursue in this rulemaking. One is the greater approach to emergency preparedness, two what we talked about earlier lessons learned from the recently planned shut down. Three is the NRC approval of the post shut down commissioning activities report. Four, is the maintaining existing options and associated timeframes. Next item is the role of the state and local governments and nongovernmental stakeholders in the decommissioning process, and then the other item is the one I just previously mentioned other issues deemed relevant by the staff. Next slide, please. In November of 2015 the staff did issue an advanced notice of proposed rulemaking that went out for public comment and the areas that were included in the advanced notice of rulemaking are listed on the table on the slide and as you can see it was a pretty comprehensive list. The issues ranged from

emergency preparedness to decommissioned trust funds and regulatory approach to decommissioning. We did receive 152 comments from ANPR, they were definitely considered as we drafted the reg basis and I'll go into this next slide on the draft side basis. Next slide, please.

As we consider those comments we see from the ANPR we did issue the draft reg basis, issued for 90-day public comment period in March. We made this document publicly available so that industry, public and the state and local could look at this document and provide some questions of the Rick. And then we actually just shortly thereafter we issued a preliminary draft regulatory analysis and the difference between the draft regulatory analysis actually identifies the cost and benefits for each of the areas that we're considering to be within the scope of the rulemaking. So that was also issued for public comment and that's very important for us as well because we estimate the costs for various aspects such as exemptions and amendments that licensees submit so it's important for us to get good data. So sending that out for public comment that really helps us to refine that data. So we appreciate the comments we receive. The time period for those ended July 15, 2017 and we held a public meeting between the timeframe of May 8th to the 10th on both of these documents.

With respect to the conclusions made in the draft regulatory basis, they basically fell into three camps. One was where we basically indicated that we felt that we had sufficient justification to proceed with rulemaking. The other category was basically we had made a conclusion in the draft reg basis that we thought the rulemaking was not needed in some areas and guidance would be sufficient. And the third area were those topics where we believe that we needed additional stakeholder feedback from both industry and licensees and public and state and local governments before making our final decision. Let me quickly run through that with you.

So the areas that we believe we had sufficient justification to proceed with rulemaking include the areas of emergency preparedness, physical security, decommissioning trust funds, on site and off site financial protection as well as indemnity agreements. And backside rule.

I'm sure the first four industry and public I'm hoping you had an opportunity to read the draft reg basis. The first four basically

focus on the exemptions and amendments. And last item with respect to the application of a backfile rule, it's not clear whether the plants entering decommissioning if it's appropriate to use the back fitting rule, meaning do they have back fit protection. So we wanted to take the opportunity for the rulemaking to clarify whether the back fitting protection does apply to those plants that are transitioning into decommissioning. Next category, with respect to guidance. Instead of rulemaking. We did include as I mentioned that we felt that guidance was appropriate for these next few areas and that includes the role of state and local governments in the decommissioning process role of NRC and approval of shut down activities report and 50 year limit for reactor decommissioning. And finally on the next slide this covers the areas whereby we indicated that we need additional information before we can make a final conclusion and I will allow you I'm looking at the timeframe, so I will allow you to read that if you don't mind instead of me listing through it but I would like to say we are getting ready my next slide is going to talk about the final reg basis in that final reg basis we are making a recommendation for each of these areas as to whether we'll proceed with rulemaking or guidance or take no action at all. Okay. All right. Next slide please with respect to comments on the draft regulatory basis we received 40 public comment submissions which included over a thousand individual comments. The comments were received from private citizens, members of the industry, state and local governments as well as nongovernmental organizations. And those comments received were in the areas of emergency preparedness, decommissioned trust funds as well as current regulatory approach to decommissioning while talking about those comments we're close to issuing the final reg basis we did take into consideration the comments we made on the draft reg basis and finalizing the reg basis. So our expectation is to publish and issue the final reg basis in mid November of 2017. The next step will be to issue the proposed rule and the draft guidance, which is expected to be provided to the commission for vote in 2017 and final draft guidance is expected to be given to the commission for vote in fall of 2018. With that that will conclude my presentation.

>> Thank you Meena. Next speaker is Mike Dusaniwskyj. Mike, as I said, is our economist in Office of Nuclear Reactor Regulation. He has over 20 years of experience with the NRC. He's had a number of different positions throughout the government. Mike has taught economics at several institutions he's a Fulbright senior specialist

having taught energy economics in Ukraine and Slovakia. He holds advanced degrees from both Fordham and Columbia universities in New York. As I say I call him our chief economist and I generally refer to him as professor Dusaniwskyj. So Mike.
>> Good morning. Next slide. I decided to tell you a story that deals with decommissioning assurance. First thing I want to make sure you all understand is that there's a big difference between decommissioning funding and decommissioning funding assurance. Decommissioning funding would essentially say you have all the money you need for decommissioning in the bank at this moment, whether your plant is operating or not. That is not what the regulations at the NRC require. Instead it deals with decommissioning funding assurance, which is always a story of a forecast, and basically the idea here is the money would be available for decommissioning at the time it's needed.

It's a little tricky to do that but it's really a simple idea to someone like myself. The best way I can begin this is to tell you a simple quote that I've always enjoyed from the movie the right stuff. Somewhere along the line, the astronauts are all talking about the fact that without bucks there are no bucks Rogers. The same idea with decommissioning, without no money there's going to be no decommissioning. You've got to keep in mind that this story takes over 120 years. Which is the reason why we're not so much concerned about nominal dollars as much as purchasing power. That's just simply a reflection of the idea that the dollars we have in our pockets today can only purchase a certain group of goods and services that will not necessarily be the same goods and services sometime into the future. There's a variety he have economic reasons why that takes place, but ultimately the idea here is that we want to make sure that the Decommissioning Trust Fund, as required under 10 CFR 5075, will be used for radiological decontamination as defined in 50.2. Let's put it this way let's go back to the beginning when an applicant comes in looking for a license to operate a commercial nuclear power plant. Even before the fuel is loaded, the licensee, the applicant, must provide the NRC with an estimate of what they think the decommissioning costs will be, even though that cost could be 120 years into the future. That's based on tables that are in 10 CFR 5075. And again that's really more or less a forecasting tool, taking into account time and the value of money.

The NRC looks at this as a process because we're not looking so much as to trying to make sure we hit a target at the end of 120 years, as much as the fact that there's a sufficient amount of money in the trust fund that will grow such that it outpaces inflation. There's a principle in economics called the Fisher principle which advocates that interest rates have to be greater than inflation, if it did not, then there would be no investment. If there's no investment, this economy would come to a crashing halt. So the assumptions were fairly true even through the worst of economic times on the long run this principle does hold. So we apply that same idea in a concept called the real rate of return. Again under 5075 it's identified as being a 2% real rate of return. As we look at how the fund will grow against the anticipated expenses for decommissioning, then we expect the fund to grow that by a point that the decommissioning is actually taking place the funds will be available.

Therefore, that's one of the things you have have to look after the article will claim there's insufficient funds for decommissioning. Not true. There's always a sufficient amount of money available because one of the principles that always takes place in all of this is that the licensee is also responsible for all decommissioning expenses. They have to pay for it. The decommissioning trust fund is only one vehicle by which they can use to pay for all of that. Since that's what the NRC focuses on we basically have a forecasting opportunity to look at this and make sure that there is reasonable assurance. This is a very difficult concept to always grasp because I know in a roomful of engineers determination is always supposed to be finite and very clear.

But you have to remember that economics is a social science. So there's a lot of irrational ideas going around. But fundamentally there's always been and from the NRC's experience sufficient funds to decommission every plant that has taken place in the past that are currently in decommissioning and it's anticipated that by the time the remaining 90 units still on line will probably have sufficient funding.

The 130 I caution everyone here when you do read these articles and they often talk about the fact that there was insufficient funding, the truth of the matter is we have found from NRC's point of view that the expenses associated with decommissioning are fairly what's the word I'm

looking for you can predict them pretty well. It's the funding that's going to make somewhat of a unknown factor as you move forward in time. That's just a reflection of economic times at the moment. The bottom line if you move forward from operations into decommissioning and you start drawing from that decommissioning trust fund, then 5082 kicks in that basically talks about what can you and can you not use decommissioning trust funds for, going back to 5254, the funds currently in the fund currently are to be used for radiological decontamination. As alluded to there's going to be potential rulemaking changes, one will be we will allow a licensee to use decommissioned funds under 85 dedicated for this will be allowed to be spent for spent fuel management and nonpart ISFI decommissioning. That's a proposed rulemaking change. Currently if the licensee shows there's sufficient funds in the decommissioned trust fund, to take care of decommission expenses and if there's excess funds above and beyond that with a regulatory exemption they can use those funds for spent fuel management and/or IFSI decommissioning. One thing to make clear is greenfielding is not under the jurisdiction of the NRC. The NRC under 50.2 is only concerned that the site is raid logically clean. Generally speaking, greenfielding or site restoration is under the jurisdiction of the state public utility commission and/or FERC. #as we move forward we'll be reviewing these decommissioning trust funds while in office they're biannual funding reports, several pieces of information have to be provided to the agency we take a look at them and we forecast based on the assumptions we have at that time whether or not there's reasonable assurance there will in fact be sufficient funding by the time the licensee goes into decommissioning. Once the licensee has declared they're going into decommissioning the PASTR becomes the document of fact. We look at that because it's going to be a very detailed site specific cost estimate. We no longer are using the table of minimum amounts that were basically used to determine whether or not there was sufficient funding while the licensee was in operations now you're in decommissioning. Now it's no longer theory, it's a question of do you have the money or not. Under the PATSR we take a look to make sure what the story is what the licensee plans to do on an annual basis. Whether or not there's going to be sufficient funding. So far we haven't had a major problem at this process the two things we do make sure none of this happens in all of this story is number one licensees are forbidden from taking out money while from the decommissioning trust fund while in operationings. The only notable

exception is there's a 3% that's allowed to be drawn only for decommissioning planning otherwise it's prohibited from removing those fund except under certain circumstances which I don't want to talk about because I did not support those ideas.

But once you're in decommissioning then you're allowed to take the money out and again it's for decommissioning reasons. I use that famous quote that I like to use is that if you want to use it to are a trip to Vegas, good luck, it's not going to work. During the time that while the licensee is in decommissioning, the biannual report becomes an annual financial report. And fundamentally we're looking to see how much money will be spent so far on decommissioning. How much money do you think is it's going to cost you to finish the decommissioning process and we've again look at whether there's sufficient funds to make all that happen. The second point why this is works so well is because the agency takes a very, very conservative approach in its forecasting of money. The idea here is we basically like the overestimate expenses and underestimate the fund's ability to grow. Under those conservative approaches then basically anything that happens above and beyond that is essentially gravy can be only used to the benefit of making sure there's sufficient funding for decommissioning. With that I spent my ten minutes to explain 120 years and I'll gladly answer questions later.
[Applause].

>> Thank you, Mike. Mike and I have been doing a lot of roadshows in case many of you don't know but over the last few years I think we've done almost 30 briefings of the congressional staff and Congressmen and other officials. But one of the things we always point out to people is in particular Mike's quote is that the NRC regulators safety, safety costs money it's up to the states to provide those funds in order to do the decommissioning and get it done completely.

With that, I'll move on to Mark Richter. Mark is the senior project manager for fuel and decommissioning programs at Nuclear Energy Institute around 30 years in the industry. He's currently the project manager of NEI's decommissioning task force used fuel task forces and deals with aging and quality issues. He has undergraduate degrees at the University of Delaware and he has a doctorate so I'll have to call him Dr. Richter from Johns Hopkins University and MBA from the

university of Baltimore. I'll turn it over to Mark to give us industry perspective on the decommissioning program and what folks think about have on their minds these days at NEI. Thank you.
>> Very well, thank you, Bruce. Also I would like to thank the speakers that preceded my presentation here this morning because I think they offered a very good summary and a very good overview of some of the details and the contents of what we may look forward to seeing in rulemaking. So rather than invest my time in reiterating some of those details, really what I hope to provide this morning is a perspective on why we, the industry and NEI on behalf of the industry believe that it's really important that we make sure our rulemaking is efficient going forward. Next slide, please. I think yesterday most of you probably heard the summary that I gave on our national nuclear energy strategy. So I won't necessarily belabor those details today, but the point that I would like to make and I think it's been driven home in reality that our industry faces today that being that you cannot look at decommissioning, that being the physical decommissioning and the transitional activities that lead up to that you can't consider that in a silo. You really have to look at nuclear energy and generation of electricity through nuclear energy really as a value proposition and although decommissioning may be the final or near final step in the life of a nuclear power plant, the decisions you make upstream certainly affect how you fund what you do at the back end of that.
Q The efficiency in which you treat the funding that's made available to decommission is certainly going to influence future decision-making and strategic thinking about how you fund that with operating funds. So really we need to pay more attention maybe ever than before especially in the context of plants that decommission ahead of their license the end of their license period or even earlier than a subsequent license renewal and potentially the impact that may have on decommissioning trust funds and how we think about and manage that as good stewards of those funds for their intended use for radiological decommissioning. Next slide. I won't invest a lot of time on this slides we've seen a summary of the plants in peril, the ones that may be the ones that have decommissioned and so forth. Essentially the same story. But an additional point that I would like to make, again this is in the context of proposed rulemaking what we might anticipate in the next year, the one thing the slide summarizes the speakers have spoken to the industry has a very long track record of safe

decommissioning. From that perspective there really isn't a safety issue that needs to be addressed through rulemaking. From our perspective, it's all about being efficient. Next slide. As I stated yesterday and others I've touched on this in the context of their presentations on different topics, we do know that the industry is in a pretty critical juncture right now. There's many challenges from marketplace inequities and extremely low cost natural gas that threaten the viability, the financial viability of some of the plants and we've seen results of that through early decommissioning. So one of the things that we can do at least in our world of decommissioning and used fuel is to work to develop in concert regulator and come up with ways to guide and govern the process to and through decommissioning. And again that's what we hope to be able to achieve as an endpoint here in this effort of developing efficient rulemaking for decommissioning. Next slide. Couple of points here I'd like to reiterate and this is something that we have as an industry and from our perspective used this sort of some guiding principles in terms of our input to rulemaking and our public response to some of the draft documents that NRC has provided. We certainly endorse both of these one being that the primary objective is to reduce licensing actions and other regulatory requests that require time and resources from the NRC and industry. And then we also reaffirm the shared belief that the rulemaking is not driven or based on any safety concerns. With that said, we have a vision from an industry perspective that really motivates us to work towards rulemaking that supports an efficient transition. Again, that's what this is all about. And not only by eliminating unnecessary barriers and licensing action like exemption requests and license amendment requests, we really would like to see and believe that it would be appropriate for the rulemaking to really be aligned with the actual risk that a decommissioning plant carries with it as it moves through the transition into physical decommissioning. A lot of that is driven by the status of the fuel but there's some other things that relate to physical configuration staffing and so forth that are reflected in some of the changes that could be and maybe should be made as part of a transitional process that reflects a reduced risk profile. And also on behalf of really the plants that have already completed decommissioning or are nearly there, we would hope that there are no additional or new requirements imposed on those that have already completed the transition. And in keeping with the NRC's guiding principles of good regulation we certainly

support any regulation that's efficient, transparent and provides certainty to the industry. We also agree and affirm that this industry is a learning industry. Not only from an industry perspective but I also note from the regulatory perspective as they've addressed as part of this conference it's extremely important that we take advantage of lessons learned both in the development of new rulemaking and even in the exemption and license amendment process in order to improve efficiency in preparing the licensing action requests and also in the NRC's review of them.

We can work that problem from both ends to improve our efficiency in doing so. Next slide. Meena touched on this in greater detail but again I'll reinforce our agreement that we believe that there is sound basis for rule changes in certain key areas and they're listed here we think generally from what we've seen in draft documents and through anecdotal discussions we're encouraged that there seems to be general alignment and consistency between what we anticipate and what we prepared as an industry to inform the rulemaking. So we're hopeful and optimistic of month are good things to come along those lines. Next slide, please. A couple things I wanted to point out that have come up that we do not agree relative to areas there should be in our view excluded from rulemaking that's in the review and approval of a PSDAR. And I think there may be some even more recent thinking and development in that area that probably will be shared later. But certainly in terms of how you manage and handle the spent fuel that's essentially in our view outside of the decommissioning transition process. And it will be more appropriate addressed through other rulemaking and also the amendment for nonpower reactors. We agree the regulation should be amended to clarify that those requirements only rather do not apply to the nonpower reactors. Next slide please, in summary I wanted to leave you with a thought from our perspective we believe that the rulemaking is headed generally in the right direction. And what we've seen in the draft reg basis provides strong support for improvements and efficiency in the transitional processes. From our perspective, though, we are keeping our eyes open for other changes that may impact efficiency. And offer no commensurate benefit to safety. Again from our view it's all about efficiency. The progress has been steady and we're pleased it's moving along, of course, from the industry's perspective a little faster would have been a little better. But we'll be content to move along at the pace that it's moving along. And we're pleased to be

where we are today with that. Next slide, please. Here's another point, too, that's been touched on in earlier presentations. You can have efficiency and safety at the same time they do coexist quite comfortably. As we pointed out earlier if you're doing the right things and investing the resources in areas where safety matters and you're using some thinking in terms of how you invest resources in areas that aren't so impactful to safety that essentially allows more resources be made available to areas that potentially require additional resources maybe some immersion issues we haven't identified yet. So we are again hopeful for an efficient process that enables the focus to go where it needs to be in terms of safety. Again, we encourage the staff to remain committed to timely and efficient reviews of license amendments and exemption requests that may continue to be submitted until rulemaking is made final and ultimately implemented. Again the challenge it's a point worth making again I think our future is as an industry I think our ability to be efficient today to set the stage for what we hope will be greater innovation and growth in the future to become a thriving and global leader in nuclear energy. And we certainly hope that we can continue to move forward in partnership with the regulator and the other stakeholders to make them happen.
>> We'll go to questions, I guess we will. One comment to everyone it's a decommissioning session which really means we don't want to be talking about or bringing up questions at this time that are related to other aspects of nuclear spent fuel. We may reserve time later on since we're vastly ahead of our schedule we might be able to to invite it later but right now keep your questions related to decommissioning. And who do we have first?
>> Garland Greene Greene with UX Consulting question about how do you define a reactor in decommissioning. I see different numbers, Bruce said 17 and Mark 19 and other numbers how do we define a reactor in decommissioning and Bruce on your one that said four will be completed by 2020, how you define to be completed as well and Mike your presentation was fascinating. I wish it had more slides to it.
>> Mike likes to tell stories.
>> Yeah.
>> There's one real reason. There's a difference between the number I have as 20 and Mark carries as 19. And that is the NS Savannah. NS Savannah is licensed to the Department of Transportation.
Q They're not a member of NEI. We're always one off in the slides. But they are.under our regulations and will be

decommissioning hopefully somewhat in the near future. They actually got the funding I believe to begin to planning work and other things?
>> When do you define starting decommissioning?
>> Decommissioning starts when the plant is permanently shut down.
>> Okay.
>> So the most recent plant that joined our decommissioning status I'll call it even though it's still under the project management of NR, hasn't been transferred over fort Calhoun will be transitioned in the next I'll say within the next year once they get the defuel tech specs issued to them then it becomes a material site from our perspective will be transferred to NMSS. But all those plants, there's 20 plants in decommissioning including the Savannah, which is licensed to the NRC.

We expect that four plants will complete decommissioning by 2020 or around there. That would be Lacrosse. Zion 12 and of course and Humboldt bay and they would have their licenses terminated unless they have an IFSI, be licensed and remain there.
>> License termination.
>> Yes.
>> One caveat as far as when the plant actually is official in decommissioning transitioning to decommissioning that occurs when we gets the two certifications under 5082, right, they certify that they're shutting down and that they removed the fuel out of the reactor vessel.
>> That's the transition.
>> Those certificates also begin two clocks. Number one the 60-year clock and number two if the PSCAR has not been previously submitted, the licensee has two years from that date to submit the PSCAR.
>> Next.
>> Monica Eairtogpozark and that's information administration. I have a couple of questions. Can you please elaborate on how staff provides additional time for operators to increase the decommissioning fund and also what are the other advantages or reasons that operators would choose [inaudible] over DECON and I notice that some of the reactors that already completed decommissioning, given they have up to 60 years. Some of them actually completed the commissioning under 10 years so can you explain the reasons why it takes for some of the reactors to decommission in such a short time.
>> I'll take the latter part.

>> I'll take the other one.
>> They have 60 years to complete decommissioning. It actually takes based on experience seven to 10 years to complete decommissioning. And this is really a business decision by the utility or the operator, the licensee.

So it's really up to them when they want to start and how fast they want to go and complete the decommissioning. So it's really a business decision on their part. When they want to start and finish. That may be related to the funding they have. And Mike will get into I think he said the real cost or real growth of money.
>> So I hope I answered your question on why.
>> Bruce if I could piggyback there's a radiological reason or benefit for waiting, radioactive materials decay in time it would expose workers to radiation and less waste and less material transported on the roads. So the 60 years does have a scientific reasoning behind it. Take cobalt 60, for example, half life is roughly half years, 10 half lifes is 50 years then we give you roughly 10 years to decommission, so you're at your 60 year timeframe for scientific reasoning for that timeframe.
>> Let me make one other comment that the reactors that have completed decommissioning principally in the 1990s did so because the waste burial sites Barnwell was closing which was the disposal site. So they had incentive to go ahead and complete the decommissioning and dispose of the waste otherwise they would be a waste storage facility if they didn't hit the windows to remove the waste from the site.
>> As far as funding is concerned it's on a case-by-case basis once the licensee determined they go into decommissioning we have to look at what they're proposing to do. As you.pointed out some licensee can decommission immediately or take advantage of the full 60 years. There's a curious financial repercussion from going into safe store. Number one, yes, the funds have a substantially more time to accumulate more funds and the compound effect on interest is a remarkable thing. It fascinated Einstein also. But also at the same time as was pointed out the radiological decontamination, it is cheaper to dispose less radioactive material than you would have to encounter upon immediate decome. Next.
>> Jerry V. And my question for Mike. My first question is on whether excess funds in the decommissioning trust fund that a licensee could use the exemption for spent fuel management. Does the NRC have

any comment or concern about the large variability of DOE reimbursement for those costs and DOE continuing to resist paying for those spent fuel management costs?
>> As I pointed out before and I think you recognize is that the funds as they are collected today are dedicated to radiological decontamination. If it can be shown that there's excess funds and, by the way, of these six or seven licensees that have gone into decommissioning they have all sought this radiological they've all sought this regulatory exemption indicating that what I had pointed out before that the regulations work because we use a relatively conservative approach towards forecasting. If a licensee can show there's sufficient funding for spent fuel management and recognizing the unknown factor of when this fuel will be taken away, therefore encompassing what I call the Armageddon scenario, ultimately there will have to be a financial solution found. It will just not be popular. But there will always be one found. If there's decommissioning funds left over after the license is terminated and we determine spent fuel is taken away that would be left over to the licensee, the NRC has then at that point ended its jurisdiction and the licensee is free to do whatever they want to do with those funds.
>> Or if they're under a sage requirement to --
>> As far as the NRS.
>> It's not our requirement.
>> Second question I have if I may again dealing with the excess decommissioning trust fund, and the exemption of this is probably for Meena, is the new proposed rule are you going to consider stranded large components that are normally disposed of during decommissioning but what I'm talking about here is steam generators, reactor coolant pumps, that are housed in rad waste storage facilities on site. Are you going to look to the possibility via exemption that decommissioning trust funds could be used to dispose of those components earlier.
>> During operations or during decommissioning.
>> During operation.
>> The commission has already spoken on this subject. There was a number of cases tried and the commissioners said that there will be no withdrawals from decommissioning trust funds while the licensee is in operations even for the disposal of spent generators.
>> Sensing there isn't a real crowd getting to either microphone anybody on the telephone that would be willing to ask a question?

>> Yes, we do have a few questions on the phone line our first question is from ace Hoffman, your line is open.
>> Thank you can you hear me?
>> Yes.
>> I'm unfortunately having to go back a bit because I tried to get in earlier and I wasn't able.
>> Is this a decommissioning question?
>> It's not a decommissioning question but it's on things earlier today because I was not able to get in on the queue for some reason. I don't know why not.
>> I understand. But let me explain to you, we have about 40 minutes left in this session here. These guys were really good, about 30 minutes left. These guys were real good about getting through with their presentations and allowing a large amount of time for discussion. We would like to clear out all of the decommissioning questions before we open the floor to anything else.
>> Are we going -- then I can go over the other things later. I have one comment on the decommissioning comments that were made just now.
>> Okay.
>> Okay and that is speaker referred to the challenge to the nuclear industry being the price of natural gas. He really should be pointing to the price of renewables which is the driving the price of natural gas making things worse he shouldn't be expecting any benefit at any time in the future. That's my only comment in this section, thank you.
>> Appreciate that comment. Thank you.
>> Thank you our next question is from Donna Gilmore. Your line is open.
>> This is Donna Gilmore. D-o-n-n-a G-i-l-m-o-r-e. San Onofri safety. In the decommissioning if they allow money to be used for dry storage and then they also allow elimination of emergency planning or funding requirements when the plant is shut down and these are based on false assumptions that nothing can go wrong in dry storage. And I've reviewed the documents that was based on and they assume fuel would never be loaded. They didn't consider the aging management of these canisters which can crack and leak. There's a whole slew of problems with that. You have -- I listened into a meeting in 2014 about the cracking issue. That they recognized exists. When I asked the NRC once a crack starts how long will it take to go through the wall. They said it could happen in 16 years. They didn't think it would happen for 30 years but then you have the Diablo Canyon canister that EPRI

checked for temperature in salt and found both. So there's a lot of thats, there's a lot of evidence pointing to the fact that we can have a problem. There's been this loading at Diablo Canyon where Holtec loaded half the canisters incorrectly you can't say there's error rate. And there's study of actual high burnt up fuel showing box side buildup which leads to hydrogen buildup and with the billian study showing after dry storage the fuel can become damaged with high burn up. And there's all kinds of facts not just wishful thinking or assumptions about nothing going wrong. And I do have comments for later because I was in the queue but by the time I was able to get the mute off you moved on so I want to reserve time before this is over for your next session. There's a Sierra Club document that was submitted ML 1028004 that those issues have not been addressed on decommissioning. It was comments submitted on decommissioning they've not been addressed and I want to make one comment that I really appreciate the staff work, the NRC staff work that is done on the REIs. I find that some of the best work of the NRC. And to -- and I want to commend them for their good work. It's unfortunate that those people don't get listened to. Thank you.

>> Thank you, Donna. Does anybody want to respond to the comments here?

>> I'm going to make just a general response. So Donna I appreciate your comments. I'm just going to encourage you to please continue to provide comments to us throughout the rulemaking process. I can tell you that -- and I appreciate Mark saying that he would like to see us do the rulemaking a lot quicker. I can tell you we are working very, very hard. The staff, myself, we're doing everything we can to meet the schedule. We're doing a very comprehensive review. We do consider all the comments that we're getting. We are not I guess I should say we're not required in accordance with the Administrative Procedures Act to address every single comment that we receive on the ANPR or the draft reg basis but we do consider them we don't address them specifically but we do bend the comments we trend them we look at the concerns if we need to make a change in position with respect to once we issue the final reg basis we're doing that. When it comes to the proposed rule, as I mentioned, we are going to be getting the proposed rule in 2018 to the commission for vote. When that goes out for public comment, at that time, in accordance with the administrative procedures act, the NRC will be addressing all the questions that are within scope that are submitted on the proposed rule. So I just ask that you please

continue to submit them. We do a balance look with respect to the comments that we receive from the public, industry, state and locals and everybody. So it's very, very important that we get these comments and we do consider them. I just wanted to mention that, thank you.
>> We had another caller Jan Lugar your line is open.
>> Can you hear me?
>> Yes.
>> My question is about the general accounting principles and practices. I'm familiar with the decommissioning, not very, but I'm quite familiar with decommissioning at Zion, and there was more than a billion dollars involved in that decommissioning. And general accounting principles and practices were not invoked to keep track of how that enormous amount of money was being spent. And I find that this has been true of the nuclear industry since 1942 that there's a lot of money there and accounting is not really required. So I'm wondering, in future decommissionings, if the NRCC -- the NR, C, excuse me are going to require general accounting principles that should be applied to all decommissioning projects. That's my question.
>> I was going to throw a dig at Mike but that's okay.
>> I'll just start. That first of all that's a good question. But it also talks to the separation of authority. We're an independent safety regulator. Therefore we set up regulations as Mike will talk about I'm sure what she's talked about previously about having the financial assurance to do the decommissioning.

The states actually regulate the commerce, which I commented on before. And so these decommissioning funds are with I guess an independent trustee.
>> They're an external trust fund, yes.
>> So there's a trustee accountable for expenditures of the funds and this really comes under the state and public utility commission or service commission for monitoring to make sure that the funds that they authorization were to be collected are expended for the proper use.
>> This is going to follow another question. Another question is going to follow. Does the NRC concern itself with efficiency or safety? Now, the last speaker said there definitely confined and I agree that an efficient operation is going to be more safe than an inefficient operation. But I would like to know what the criteria for efficiency are. Is it time ex-money, period? Is it time money and safety. What is efficiency and why if the NRC is talking, like you

said NRC is concerned with safety. But this whole thing that we've been listening today is concerned with efficiency. So I feel that time and money considerations are being well, I can't say it that way. I think safety considerations are being subsumed into time and money considerations. And I think the NRC needs to clarify what its position is.
>> NRC's role as a authority is safety. Our principal role is always safety. As I said before to do these things safely you have to have funding. We set requirements for funding but it's really up to the licensee and the oversight that other agencies may provide on them to ensure that the work is done efficiently and cost-effectively.

As long as they're staying within the safety envelope the NRC is within our role.
>> Okay. I've got a meeting -- the people in town say they're concerned about safety. And but the meetings are only concerned with time and money and people go talk about safety and they're not even respected.
>> Well, I can point out to you that our role with the plant life Palisades is to make sure that it continues to be operated safely to the end of the license. And by that I mean we're going to be there to make sure with resident inspectors to make sure that the plant is operated safely until the plant is shut down, defueled until it's completely decommissioned and the license is terminated we're going to be there to make sure that gets done safely. That's our role as the Nuclear Regulatory Commission in the operation decommissioning and cleanup of these plants.
>> I really appreciate your giving me a chance to talk. Thank you.
>> This is Mark Richter at NEI I'd like to make one follow-up comment if I may. Caller on the phone I was the last speaker that you're probably referring to in terms of the comments related to efficiency and safety. From an industry perspective, and I want to clarify this and maybe put this in bold print. Safety and safe operations are our first priority as well, because if we don't operate the plant safely we don't have an industry. And the ability to talk about making money or satisfying investor concerns, that becomes a nonissue at that point about safe operations. Now, with that said, how does efficiency support safe operations given that there's not an infinite pool of resources available either to us or to the regulator. We have to look very carefully at how that money is spent. And it's not necessarily

about spending less money in total, it's about spending the money that is appropriate to address the risks that are identified with an activity or an operation or a function.

So by doing that, and covering those risks appropriately, the needed funds are then more readily available for areas of greater risk that would be further enhanced the safety of those operations would be further enhanced by efficient use of funds in general. I hope that helps.
>> Madam operator, any other callers on the line.
>> We do have one more question from a previous caller.
>> Okay.
>> Marvin Lewis, you line is open.
>> Thank you. Look, I have had a little problem, couple little problems with finances of the NRC. One a very simple one, I tried to find out when the price Anderson act and when the price Anderson act doesn't cover a problem. And I've had conflicting statements thrown at me from the NRC. Maybe not thrown at me, given to me from the NRC. And I do not know when say radioactive waste, it comes out of the reactor now goes into a truck and it's taken to a ISFI or a geological repository which does not exist, when and where does that waste covered by the price Anderson and when is it not covered by the price Anderson. Let's start there, thank you.
>> This is Mike Dusaniwskyj. I'm not the expert on Price Andersen, but the essential process is as follows. All licensees have to maintain a certain amount of liability insurance that's going to be invoked outside the fence line of the unit itself. So I don't recall the exact amount. I'm subject to check I think it's something like $350 million, if and unless that money is exhausted in the clean upand liabilities associated with such an accident then price would be kicked in for additional costs that are considered legitimate because it would be reviewed by I believe it's Neil. I forget what the initials stand for to determine whether or not any particular claim would be valid or not.
>> Can I have your name so I can contact you later.
>> Mike Dusaniwskyj.
>> Spell that for the record.
>> I knew you were going to ask that. D as in David.
U-s-a-n-i-w-s-k-y-j.

I tell reporters if you spell my name wrong I'll never give you an interview.
>> Dusaniwskyj. Very good, the second thing is -- I'll let it go and I'll talk to you later Mr. Dusaniwskyj. Goodbye.
>> Thank you Marvin, that was great. That was the last of the phone calls?
>> We do have one that just populated. John Shaffer, your line is open.
>> Thank you, can you hear me?
>> Yes, I can.
>> Okay. First I'll say that I've been on the phone for a while and there was no directions about how to, what prompt to enter to ask a question. And so if that would be on the agenda the final agenda on the Web page, all I had was random finally I got to the point where I could ask a question, not knowing previously you make an assumption there I guess that everybody that's on the call knows how to get in the question queue. So thank you for attending to that.

I'm in Tennessee my name is Safer. And high question on decommissioning revolves around. Waste that's coming out of the reactors, the low level waste ends up in Tennessee in some form or fashion it's getting increasingly hard to track these materials. We do know, for instance, that 10 million pounds ever big rock point reactor ended up in a commercial, landfill that is designed for households and municipal waste in Murphysboro. My question is there a manifest or document or tracking of the materials that leave the reactor site for disposition which as I say many come into Tennessee I'm concerned that the volume of waste for processing and disposal and the four landfills that are still doing bulk survey for release, the two and north shall in Shelby county and Anderson county Oak Ridge and Watkins county in upper east Tennessee, we -- I think it's incumbent upon the commission to provide that information to the citizens of Tennessee how much of this stuff is coming to Tennessee and what is happening with it. So I'll stop but I'd like to know if there's a tracking mechanism that's available to the public.
>> Just point out that your first reference to the big rock point waste was actually an approval by NRC for alternative disposal because all this large volume of concrete this a very trivial amount of radioactivity in it to allow it to be disposed in a landfill. But the answer to your question is processes in Tennessee are licensed by the

state of Tennessee. So the NRC, other than the interstate transportation or if they meet the requirements to track with our shipping manifest to track where the waste is going that's essentially the extent of our regulatory authority. The actual processing and disposal of those wastes is under the jurisdiction of the state of Tennessee which licenses and those types of facilities that process the waste and, of course, regulate the landfills where some of this material which is deemed to be nonradioactive are bulk released for disposal.

>> Well, two questions on that, if I may. When it comes to 10 million pounds of concrete coming out of a retired decommissioned reactor, how is it possible to survey the material closely enough and with the care to really make sure that all of it is, meets the criteria for bulk survey for release which on paper I'll acknowledge that's low levels, relatively low levels of radiation, but my concerns have always revolved around the actual implementation of this. And with as much volume as that, we're relying a lot on procedures and concrete, in terms of determination of radiation levels. That's the first question.

>> The origin of the concrete is the history of it is pretty much known it was never generally contaminated in the first place. And so the actual contamination levels in it were a result of either processing the concrete near something or something that had trivial amounts of contamination. You've got to remember that the bulk waste from a nuclear power plant decommissioning is nonradiological. You have the contaminant structures, the actual buildings and stuff around the facility, the turbine buildings, they're all large concrete structures. So that's where most of this type bulk material comes from, stuff that was not immediately in contact with the reactor or radioactive components but may have become contaminated by other processes. But, yes, I agree. It sounds ominous to survey this type of bulk material. But it is done. It is sampled. In particular, I know big rock point did a process where they would spread the material out in what we call six-inch lifts, six-inch depths and actually do complete surveys of all the material and then collect that once they verified and sampled it it met the criteria and then do the next bulk filing, spread it out in a six-inch level that joins the procedure for people to be able to to detect the levels of radio nucleotides in that. They followed it rigorously and we were there to inspect it to make sure it was done.

>> If I may, thank you, if I may follow up on that. The question then becomes why isn't the material disposed in Michigan somewhere rather than shipping it a thousand miles or whatever it is down to Tennessee and then bringing it to Tennessee? If it's so low level to be not radioactive and not contaminating parts of the reactor, why is it being shipped all the way to Tennessee why wasn't it disposed there and can we have assurances that those materials will stay in whatever state of origin rather than being brought to Tennessee in the future?
>> First of all, the decision on where the material is disposed of is principally a business decision by the utility and what states will accept it.

I know we have authorized the disposal of some very bulk materials in the state of Michigan which had trivial amounts of activity in it previously in recent years, as a matter of fact. So I don't -- I I can't say I was here at that time during their decision process on why they were going to do that.

But certain states will allow certain things to occur in their states and other states will not. And so then it becomes a business decision on where to send that, the costs associated with disposal of that material by the licensee or the operator of the facility.
>> Okay. Thank you. And follow-up question on.
>> No, we've had quite a few questions and we've got other people that would like to talk and we've only got a few minutes left. I'd like to move on, please.
>> Okay.
>> Thank you. Is there anybody else in the room that wants to speak on this subject? Okay. Then we'll go back and let's start with the people that had tried to get on before but had somehow gotten lost in the queue when we were talking on other subjects. Let's start with Ace who was on the line first.
>> Ace, this is the operator, if you can press star followed by the number one during the question-and-answer session as a reminder it is always star followed by number 1 should you have a question. Ace if you're still on the line press star followed by the number 1.
>> Going once. Maybe we should move on to Donna.
>> One moment. Ace is on line. I'm going to go ahead and open up the line. Ace, your line is open.

>> Okay. Sorry that took so long. One of the speakers was talking about the, he said they had studied cents and they were 99% sure that they were safe for transport. And I wanted to know if he had considered the I-35 west bridge collapse in Minneapolis, if that had fallen on a dry cask whether that had been considered and had they considered a terrorist crashing a jet into a transporting dry cask or for that matter at a storage site. After all nobody had ever knocked a building down until 9/11. So I'd like both of those things and I'd want one more thing I want to comment on the response to Marv Lewis's comment where he said he didn't want to use the word the A word. And the response we got was in my opinion, and I've been to 150 nuclear regulatory commission hearings, either on phone or in person and it was the most arrogant comment I've ever heard. And so those are my comments. Thank you very much.
>> We're not here to talk about transportation right now. There is a historical review of the safe transport of spent nuclear fuel. It's a document that is available to the public prepared by the Department of Energy and it was Argon National Laboratory and Oak Ridge National Laboratory that actually worked on it. It was published in August of 2016 and it's under the category of fuel cycle research and development. You might get some good information from that document as far as your question is concerned.

Does anyone want to respond to this question. There's a report number on this. I believe the report number is FCRD-NFST-2016-000474 Rev 1. Do you need me to repeat that?
>> No, that's fine. Thank you.
>> It was me this morning in the panel that I referred to V. This is Meraj Rahimi from the division of spent fuel management at NRC. And what I mentioned the studies that were done in the 80s updated 90s called modal studies. And I can get the new reg number and all that stuff that was done.

And what I attempted to explain is that the hypothetical condition in the 105071 that's what it was looked at, how it was looked at. It's called the modal study. And I can get the actual, the new reg numbers for those studies. But also I guess I should remind Mr. Hoffman later this afternoon we do have a session on transportation of radioactive materials. That we can go into details.
>> Okay. Thank you. Is Donna available on the line.

>> Her line is open. Go ahead, Donna.
>> Hi. Thanks. Let me get this missed a question in front of me. Where did it go? So okay.

A So when you had asked for additional questions of people that couldn't get on earlier, wasn't that the case that you said?
>> Yes, yes, go ahead.
>> Okay. So that would address the earlier. The Holtec transport at Rei inspect for cracks before transport and inspect hybrid fuel for damage prior to transport. The NRC regulation 10 CFR 7185 requires preliminary determination before the use of any packaging for shipment, licensed material. Certificate of holder shall ascertain there's no cracks pin holes, et cetera, et cetera. Now, in the session they were talk about whether or not they should inspect for helium leaks. What happened to the cracks that you're supposed to inspect? The staff did a good job saying you need to be able to inspect for cracks before you transport. But what if those one of those cracks is located where the basket is being held up, the idea that Holtec says it doesn't matter about the canister. I mean, that's holding the basket with all the fuel in it. There seems to be a disconnect with logic and facts and aging is not just for transport it allows for a 75% crack before you have to take it out of service. It doesn't tell you what you do with it. My background is in information technology. I design mission critical systems and then programming. And we have decision charts that we have to account for every condition when our system crashes. I would like to see a decision chart before any transport there a covers all if conditions, without making assumptions that aren't based in evidence. We're dealing with the most critical stuff. And in transport what haunts me is we had a bridge in California on the way to Palm Springs, and that bridge failed from some rain. And it had been inspected four months earlier and certified safe.

So to make assumptions that nothing is going to go wrong in transport where it's all going to be okay and to allow canisters that could have partial cracks in them and we have no idea how the fuel is inside. We do have damaged fuel. We know after dry storage, based on the billian study that you can have damage after dry storage, the NRC staff -- working with the staff, they're asking great questions. Why are they getting overridden in a management level. This is too important to get wrong.
>> Okay.

>> Thank you.
>> Let's see if we can get an answer to this one then we'll call for a lunch break afterwards. Does anyone want to respond?
>> Donna, this is Mike Layton. Your last comment I take wholeheartedly as that's actually an allegation. So we will be taking your comment from the transcript and turning it into our proper process for that. We do appreciate you bringing it forward, thank you.
>> I think at this time we were hoping to be able to delve deeper into some of the earlier categories, but the comments and just sort of ate up that time. First, I think we'll call for a lunch break and if everyone can get back promptly on your agenda which I believe is 1:00, then we'll start with the second half.
>> I'd like to thank the panel for their participation today. [Applause].