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TECHNICAL SESSION - T3

PREAPPLICATION ENGAGEMENT FOR NEW AND ADVANCED REACTORS

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TUESDAY,

MARCH 8, 2022

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The Technical Session met via Video-Teleconference, at 1:00 p.m. EST, Christopher Hanson, Chairman of the Nuclear Regulatory Commission, presiding.

PRESENT:

THE HONORABLE CHRISTOPHER T. HANSON, Chairman, Nuclear Regulatory Commission

PETER HASTINGS, Vice President, Regulatory Affairs and Quality, Kairos Power, LLC

MICHELLE CATTS, Senior Vice President, Regulatory Affairs, GE Hitachi Nuclear Energy

TARA NEIDER, Senior Vice President and Project Director, Natrium Demonstration Reactor, TerraPower, LLC

MICHAEL DUDEK, Chief, New Reactor Licensing Branch, Division of New and Renewed Licenses, NRR/NRC

P R O C E E D I N G S

1:00 p.m.

CHAIRMAN HANSON: Good afternoon. It's a great pleasure to be with everyone and to welcome you all to Technical Session T-3, entitled Preapplication Engagement for New Advanced Reactors.

I'm really excited to chair this session because I personally believe that efficient and effective licensing of new reactors begins with successful preapplication interactions. Respective applicants must understand what's expected from the regulator, and the regulator must clearly articulate its regulatory expectations while learning about the applicant's design and safety approaches. Effective communication between the NRC and applicants is crucial.

With the anticipated volume of new reactor applications in the coming years, effective preapplication engagements are more important than ever. The NRC needs to continue to improve our effectiveness, and I hope our dialogue today can contribute to that.

We have an excellent panel with a wealth of knowledge and experience managing new reactor

licensing projects.

Tara Neider is the Senior Vice President and Project Director of Natrium at TerraPower. Peter Hastings is Vice President of Regulatory Affairs and Quality at Kairos Power. Michelle Catts is Senior Vice President of Nuclear Programs at GE Hitachi. And finally Michael Dudek is the Chief of the New Reactor Licensing Branch at the NRC.

We structured this session in a panel format to maximize need for dialogue on a variety of topics related to the reapplication.

We have no prepared remarks or presentations from the panelists, and we'll jump right into discussions. But please note that we'll be taking question from the audience later on in the session so I encourage you to submit questions through the platform.

Before we start with the discussion, I want to highlight a few points on preapplication for some context. The NRC encourages volunteer engagement of reactor developers and prospective applicants in preapplication activities in order to support timely and effective licensing for new and advanced reactors.

Many members are currently in preapplication engagement and more are announcing their plans to start engaging on such activities.

Our experience so far has taught us the importance of a comprehensive approach and a mutually understood plan for the scope and outcome of these interactions.

To that end, the NRC recently issued a draft white paper proposing a robust preapplication engagement could result in a more predictable, efficient review due to early identification of unique design issues and early engagement on technical issues through topical reports, white papers and public meetings.

So with that, let's get started. I want to get your perspective on preapplication activities. And to kick it off, Peter, Tara, Michelle, all of your companies have been actively engaged in preapplication activities with the NRC.

And my question is, quite simply, what's in it for you? You know, preapplication is not necessarily an inexpensive endeavor so why do it? What do you see, as an applicant, has the value of preapplication activities?

MR. HASTINGS: I guess I'll start. First of all, let me thank you, Mr. Chairman, for the opportunity to be on this panel with this very esteemed group.

At Kairos Power we've been described as a good example of what preapplication engagement should look like. While we've only been in business for 5 years and only about 3-1/2 years of preapplication engagement so far, we've had really good success.

We've had 11 topical reports submitted. Most of those have been approved or have draft approvals, and the remaining handful are imminent. We've had several ACRS engagements. We've got a construction permit application under active review with a committed 21 month review standing.

But you're right. It's not cheap. What we benefit from most is the reduction in programmatic risk by addressing the topics most likely to be novel or potentially sticky. We try to group those topics off of critical path for the actual application review.

A productive preapplication engagement also sends very positive signals to the prospective

customers, to our investors and to the market in general that we're moving forward in a regulatory sense.

It also buys us at least some reduced time one hopes in review of the application itself. That points to a little bit of a downside, which is the preapplication effort does not constitute a one for one tradeoff. In other words, the area under the regulatory review should in theory be constant. And every hour we spend in preapplication engagement ought to buy down an equivalent number of hours in the actual application review itself. But that's not likely. That's not been our experience. Making that tradeoff more predictable -- predictability is what it's all about actually. It's probably the best way to encourage a more fulsome preapplication in the future.

CHAIRMAN HANSON: Thanks, Peter. Tara?

MS. NEIDER: So, sorry, I had to turn off mic. There was an ambulance going by. But I think that the preapplication engagement has been very helpful, and it provides a lot of value.

For us, as an advanced demonstration reactor awardee, we really have no choice. We have

to keep our licensing within a very short window. So the more we can do upfront is going to help us through the process.

In fact, what our real goal through the preapplication process is to actually have all of the issues resolved before you even see it in the safety analysis report. That way things can go smoothly.

And so far we've had great results. We've got a great project manager at the NRC. They provide the right people in the room at the right time. We've had, I think 13 or 14 meetings so far with the NRC, and we've submitted a number of white papers. It's been very, very valuable. And it really -- I feel that we're very aligned on each of the issues we discussed.

CHAIRMAN HANSON: Thanks. Michelle?

MS. CATTS: Yes. I want to thank you, Chairman, and the NRC for the opportunity to take part in this panel today on this very important topic.

You know, governments and people in the world are focusing on reaching de-carbonization goals including our own government to reach net zero emissions by 2050. From recent events in Russia, it is evident we need energy independence. Energy

independence, it also meets our carbon neutrality goals. Obviously, nuclear is going to be a key role in that.

We're very excited at GE. We're working obviously with TerraPower on a natrium reactor. And we're also working on fulfilling our small modular reactor, the BWRX-300, to help provide that carbon free future.

So we're planning to license our reactor in multiple countries. And in this day and age to make financial sense, it really requires a change in mindset for licensing and design.

You know, previously we would license a reactor in one country. And then when we do a license in another country, we would change our requirements and change the design. It resulted in a lot of re-work.

So instead we're designing our reactor with international regulations in mind and incorporating those into a standard design. So our goal is to have an internationally adopted standard BWRX-300 design, which provides predictability in licensing and lower costs.

But if it is our purpose to be

successful, preapplication is vital, really, to reduce that regulatory uncertainty for each country's preapplication processes. So for instance these licensing topical reports in the U.S., vendor design review processing Canada and then these preapplication processes are going to help position us to officially enter the licensing processes in the near future in the U.S. and Canada.

And then finally, you know, from our perspective we see so much value in preapplication processes that we would really love to see other countries adopt similar processes.

CHAIRMAN HANSON: Very good. Thank you, Michelle. Michael, do you want to talk about this a little bit from the NRC perspective?

MR. DUDEK: Absolutely. Thank you, Mr. Chairman. So as you know, this is one of my favorite topics, preapplication engagement. As the Chief of New Reactor Licensing at the NRC, this is one topic that always comes up with new applicants. And I think I can summarize the importance and what it means to the NRC in an essentially understanding, an understanding, you know, really fostered in an environment of setting and understanding common

expectations between us and the applicants.

A lot of the applicants are new. They are not familiar with our regulatory processes, procedures and guidelines. So this gives them an opportunity to start engaging with us and start understanding and start setting those common expectations.

It also helps the applicants understand the NRC's process and procedures. As I said, some of these new applicants aren't aware of -- aren't seasoned, aren't aware of how we do things. There's a certain way that we apply some of the GDC requirements and so on and so forth. So it really gives them a leg up and an understanding of an early regulatory foothold, per se, of how we do things.

And really third, an understanding of the design. What is paramount in all of these efforts is for each applicant to, you know, highlight key aspects of their design, whether they are new and unique design features, first of a kind of evolutions or something that is going to be entirely different. When we get that application, we must understand how it works. We ask the critical questions and that gives us a clear and predictable path for licensing.

Okay?

CHAIRMAN HANSON: Yes. Thank you very much. So this is good. Because we kind of established, I think, a little bit of philosophical foundation of the discussion. And I want to drill down just a little bit and Mike kind of stay with you because, you know, the concept here of preapplication discussions can be a little bit abstract, right?

And I think we want to -- but I guess, you know, Michael staying with you, you know, what are some of the tangible results of preapplication from the NRC standpoint?

MR. DUDEK: Absolutely. And to easily answer this question, I often use an analogy is that us, the NRC, and the applicants are learning how to dance. And truly while we might step on each other's feet to begin with and it may be a little awkward, the more you do it, practice makes perfect. The more you do it, the better you get, the more understanding you have and the more that each organization learns. We learn from the applicant and the applicant learns from us.

As I reflect on your comments earlier today, Chairman Hanson, during your plenary remarks,

as the NRC continues to learn and improve, I think that's a key element in this aspect. And also, you know, early identification of potential safety, security and environmental issues. The earlier we can get these issues on the table and get them discussed and have early alignment on them, the better.

CHAIRMAN HANSON: That's helpful. I mean, there are a lot of different. I mean, Michael, thank you for that. There's a lot of different directions we can go with the whole dancing analogy. And, you know, we might have a fox trot and a shag and a waltz here among the panelists, cha-cha, I don't know.

But let me, you know, I'm going to kind of go back here in reverse order. And while acknowledging, I think, you know, Peter, you know, kind of alluded to some of the goals, I think, for Kairos, but Michelle, what specifically is GE Hitachi looking for in that preapplication process?

MS. CATTS: GE has been involved with licensing reactors for many years. And we do see the extreme value in preapplication engagement.

So like I said our goal is to create an

internationally adopted standard design for predictability in licensing and lower costs. Well, how do we get there?

We identified the needed exemptions to regulatory requirements and any alternate approaches to regulatory guidance and addressed those during preapplication engagement.

So, you know, what do we hope to achieve? We hope to create open and transparent dialogue with the regulators. We want to familiarize the staff with the technical details of our design. You know, they are highly beneficial from an issues perspective for ensuring alignment and understanding of regulatory expectations.

You know, it's one thing to read a regulation and provide a submittal. It's another thing to under expectations and what level of detail is needed for the NRC to actually complete their reviews. And we want to reduce regulatory uncertainty associated with key technical topics before an application is submitted.

And, finally, again, we want to position our reactor design to officially enter the licensing process.

CHAIRMAN HANSON: Okay. Thanks, Michelle. No, I really appreciate that. Tara?

MS. NEIDER: So as I mentioned, Natrium is a demo winner, and actually we're working collaboratively with GE-H on the design and licensing of a Natrium reactor.

And I guess the most important thing for me is that the regulations really have been set up for light water reactors. And this will be the -- this time period now is when we're first -- the NRC is first licensing the advanced reactors.

And that knowledge base has primarily been with the Department of Energy as opposed to the NRC. And I know the NRC has gone through a tremendous amount of training on advanced reactors. But this process is a new one. And when we go through a new process, we know that the -- what the expectations are tend to change over time as you see applications from others and as you get more mature in the process.

So I had an experience early in my career where we were licensing a spent fuel storage cask, and it had already been licensed for use at an existing power plant but then we were trying to get a generic license. And after we had submitted the

application, the standard review plan was issued for our storage.

And I remember going into a meeting and one of the NRC management people had said, I can't believe you have gotten so far into the application and you haven't followed the format of the standard review plan.

And, you know, I was very upset because in fact we had submitted our application before the standard review plan even existed. So, yes, we pulled it back and resubmitted it but that's really unnecessary. And I think these preapplication processes can help us avoid those things where we're totally aligned when things do change we can adapt easily and move forward.

It's really important for us that we convey to the NRC what our design is all about and what we're trying to achieve so that when they get the application, it's going to be a lot simpler to review. And once again, we just really need that licensing process to be streamlined. So this is a huge, huge help to us.

And we are following the draft guidance for preapplication, but we have added quite a bit to

that just because there are things that we specifically want to focus in on and make sure we get NRC input on.

CHAIRMAN HANSON: Thanks. You raise a really good point, right, that NRC staff had been getting up to speed on a lot of these technologies and yet we've still got a Part 50 process. It's a little bit of a square peg in a round hole kind of issue where even our understanding, we have to translate that for ourselves into, you know, the requirements maybe in Part 50 and then work with you all on what the exemptions are going to be from that. So I think that's a really helpful insight. Peter?

MR. HASTINGS: So Michael has never seen me dance or he wouldn't have used that analogy. I did mention in my initial response some of the things that we're looking for in preapp engagement, familiarizing the reviewer with our technology, buying down regulatory risk, hopefully reducing critical path review time for the application. So resolving the key issues upfront is really important.

In terms of the tangible benefit, we've elected to do that via topical reports. And for anybody in the audience that may not be familiar with

that process, that actually results in a preapplication NRC formal approval on a technical topic, which can then be applied directly within the application assuming that all of our conditions for its use are met. So that's really important.

And as Michelle said, the key here is regulatory stability. We understand that preapplication engagement is an effective tool in achieving a predictable outcome in the licensing process. And while we, like many others, believe that the reviews can and should be shorter, a predictable and stable outcome is probably the most important consideration, sending a signal to the market that the regulatory path doesn't lead you to a mine field is really important.

CHAIRMAN HANSON: Yes, no, I think that's -- the external parties to this, you know, they're not necessarily going to be front and center, but they're still relevant to the overall discussion. I think that's a great point.

You know, one of the great things about the NRC, one of the things I'm most proud of, is kind of the commitment on the part of the staff to be a learning organization and to want to improve and do

better in our processes.

So I wanted to have a little bit of a conversation, particularly with our three vendors here, about kind of what challenges you've run into. And I think we'll get as we move along in the conversation here some, hey, what are some things that NRC can be doing better?

So if there are pot holes, speed bumps, not to, you know, use another analogy, I don't know, divots on the dance floor maybe in which a toe or a heel could get stuck, what are some of those things from your perspective? And I'm happy to start anywhere. Tara, we can start with you.

MS. NEIDER: Sure. I guess the biggest challenge I see in a preapplication engagement is that we want to make sure that the right people are in the room. And we believe so far that has happened. And so we're very pleased with that.

But, you know, you really don't know until you submit something in writing as to what, you know, did we have one or two good people in the room that really wanted to engage, but there's three back in the office that have totally separate issues that we haven't addressed? So that's probably the biggest

thing.

Secondly, you know, those people that we're engaging with now may not be here in the future. So we might have to have, you know, a new training and engagement process.

And then finally, you know, I'm really pleased with the way that we're engaging with the NRC. And it seems to be very beneficial for both parties. But what I often hear from staff members is that it's always good during that honeymoon process where you're in that pre-engagement time. But once you submit something in writing everything changes. So we hope that that transition is going to be nice and smooth and that we actually do get the benefit out of these preapplication engagement activities.

CHAIRMAN HANSON: Michelle or Peter?

MS. CATTS: Yes, I can go next. You know, overall our preapplication engagements to the NRC at all levels have been really fantastic. You know, always there's, you know, some things that could be done better on both sides, I'm sure.

One of the challenges that I see for preapplication is the ability to predict the cost and

schedule associated with some interactions to ensure that the project stays on schedule and on budget.

I used to work for the NRC. I have a family that lives near nuclear power plants. I definitely understand the need for reasonable assurance of adequate protection of public health and safety. So I do realize some reviews take longer than expected to ensure safety. That's not what I'm talking about.

You know, sometimes it's difficult to predict the cost of some of the preapplication engagements. So, for example, the cost of preapplication meetings because you don't know how many NRC staff will be in the room.

Also licensing topical reports when they're submitted, the NRC performs an acceptance review. The acceptance review and the hours are not included in the NRC's estimate on the LTR hours and schedule. And that can actually be a significant contributor to the cost.

And then finally, you know, some of the LTRs have gone quite a bit over the NRC's estimated hours. You know, from our perspective though, the benefits do outweigh the costs. You know, we believe

these preapplication engagements have many future benefits for future applications. But for these projects to succeed, you know, we really believe there needs to be predictability in costs and schedule.

CHAIRMAN HANSON: Thank you. Peter?

MR. HASTINGS: Yes, hi. I agree with everything that Tara and Michelle said. One of the things that falls into the sort of keep me awake at night category is the notion that we get good engagement and commitments to transformation, all of which we've gotten but then, you know, others in the agency don't "get the memo" and that has not happened much.

Unfortunately though, we have experienced that with one of our own topicals where the one year review has turned into more than three years and not really for a good reason other than one particular office had to shuffle their resources and weren't able to accommodate the schedule.

And, yes, that's going to happen on occasion. We all understand, you know, those kinds of bumps in the road are going to occur. And generally we're still very encouraged but to keep on

the theme that we've sort of talked about a couple of times already, predictability is really important. And if we lose that aspect, we start losing control of other factors, like loss of credibility in the market and amongst prospective customers.

Another challenge is the notion that the preapplication engagement may not appear to represent the best return on investment. We have a committed 21-month review schedule, which is really good for our construction permit application.

Absent our robust pre-application engagement, it might have, what, 24 months? I'm not entirely sure but certainly not a dramatic buydown in time. And so some might observe that four years of focused preapplication engagement at a million dollars a year buys down only a handful of months of review and that may not be intuitively a good investment.

So I think there may be more to be done there to look for more opportunities to recognize the value of the preapp engagement in terms of even more tangible results once the application is submitted.

CHAIRMAN HANSON: Thank you for that, yes, very much. We've got several themes here, and

I want to give Michael an opportunity to kind of weigh in on some of this stuff.

I mean, you know, budget and schedule predictability, staff turnover, I think, you know, some of these folks might -- Michael, I know -- you and I know aren't the first ones to necessarily raise this. But I also know that these are issues that we're working on so I wanted to give you an opportunity to kind of jump in here a little.

MR. DUDEK: Absolutely. And I'll resonate with a couple of the common themes that we've heard, you know, predictable and stable license. How does the NRC do that?

And I would think that, you know, we do that in a couple ways. You know, it starts with an agency focus. And I think this group and everyone else, that may be timing and can get to the theme that the agency is focused on that. Both Commissioners, Commissioner Wright and Commissioner Baran mentioned, and you, Chairman Hanson, mentioned advanced and new reactors in much of their speeches in the plenary sessions this morning.

It is an agency focus. It is something that we're focused on. It is something that we're

trying to improve. It is something that we are setting the appropriate infrastructure for. And it is something that management is focused on and asking those questions, asking those hard questions about how can we do things differently? What have be we done before? What lessons can we learn? And how can we set, as Michelle said, that predictable budget and timeliness for these products that are coming in?

And the only way to do that is provide that infrastructure. That infrastructure is set at the NRC within NRR. We joined the NRR a couple of years ago. We have an amazing management team. It starts with Andrea Veil all the way down to my division management.

And hiring the new staff members, hiring the next generation, getting them in and trained, ultimately, very critical on handling the breadth and volume of information and applications that we're expecting over the next two or three years.

And then learning from our mistakes. You know, we pride ourselves on being a learning organization. What has been done during previous reviews? What things went well and what things didn't go well?

Currently, we're evaluating the NuScale DCA review. We're learning lessons. We've got lessons from all over industry, all over stakeholders. We formed an internal task group to evaluate those lessons. We're making the changes. We're taking a hard look at our guidance, our policies and procedures. And we are currently doing rulemaking, 50 and 52 rulemaking, which implements a lot of those lessons learned.

So I think that summarizes, you know, how the NRC can accommodate and the way that the NRC anticipates changing in the future.

CHAIRMAN HANSON: One of the things that I've become aware of is this core team concept, right, that I think came out of that lessons learned to address this issue of kind of staff turnover, you know, where we've got this core group of people that are really focused on a particular license application.

They're going to really be the subject matter experts. And then we're matrixing in people who will deal with maybe specific issues but that the kind of re-education or knowledge management challenges we've had, we're starting to get our arms

around that in those ways. So I think that's important.

MR. DUDEK: Absolutely, Mr. Chairman. And that goes back to the infrastructure. You know, we have an infrastructure here in NRR where advanced reactors has their piece and small modular reactors, light water reactors, has our piece. And the DANU advanced reactor piece is implementing that core team strategy. And it's working very, very well.

We have lessons to learn in it, and we've got a ways to go. But, you know, we are legitimately trying to do things differently and providing that predictable and stable licensing environment.

CHAIRMAN HANSON: Thank you. Let me ask Peter and Tara and Michelle especially, we got this in from the audience just now. And it's, can you describe how you balance the need for preapplication meeting between safety and environmental topics? Does this kind of really come down to site specific concerns?

I mean, for instance, Peter and Tara, now you guys both have sites. I think certainly, you know, Kairos had to have that as part of its construction permit application. And, of course, you

know, we know TerraPower is looking at the site in Kemmerer, Wyoming. So, you know, how do you balance that or are you finding most of the need to kind of really be more on the reactor design side?

MS. NEIDER: I can start this one.

MR. HASTINGS: Go ahead, Tara.

MS. NEIDER: Sorry.

CHAIRMAN: Sorry. I should have called one of you.

MS. NEIDER: So we've been covering both aspects in our preapplication meetings. And I'd say actually there's a lot of focus on the environmental aspects right now. And the reason for that is, you know, we have selected a site. We want to make sure that we've done all of that correctly. We're planning on -- one of our next meetings is one our water resources in our met tower.

The environmental regulations are a lot different than the safety evaluations. You know, the safety evaluations there's kind of a pretty clear path. But on the environmental, you have to, when you select a site, it's how do you -- you know, what about all these other places that it could have gone? So there is a delicate balancing act there.

And so we did spend a lot of time with the NRC on the site selection as well. And it's a part that I'm less familiar with so it has been very good engagement in that area as well. And I don't see any way not to go through that preapplication engagement with the environmental sites.

MR. HASTINGS: Yes. We've similarly had good engagement on both the environmental and the safety side. The tools look a little bit different because we've produced a number of topical reports that feed into the safety side.

Topical reports for procedural reasons and reasons associated with the topics that you're addressing don't lend themselves quite as well to be a good tool for the environmental side. But we've had very active preapplication engagement on the environmental side as well. It's a little less novel on the environmental side than on the safety side because there's not so much unique technology involved on the environmental side.

We've also, outside of Kairos specifically, as an industry we've had good engagement with the staff on the notion of making the environmental reviews more generic, to recognize that

nuclear energy has a very long history of having an overwhelmingly positive environmental impact and the fact that, you know, the environmental review is based on a procedural rule that's intended to inform the federal action, in this case the issuance of a license, as opposed to a compliance rule, like the safety side lends itself to.

So anything we can do to help streamline that process, make the environmental reviews simpler, more straightforward and try to reduce the burden of additional site specific evaluations that really in many cases duplicate the safety analysis that's already been approved at the last site will be a huge step forward.

CHAIRMAN HANSON: Thank you. And, Michelle, I wanted to recognize, of course, GE has a site now in Tennessee as well as the site up in Canada. So how are you all approaching this balance in interactions between, you know, the safety and environmental issues?

MS. CATTS: Yes, so, as a vendor, we generally focus on the design and the safety of the reactor design and usually the customer or the licensee focuses on the environmental aspect,

obviously with our input and our help.

So what we're doing for our safety and for our design is basically capturing key differences. So our BWRX-300 is the next generation of BWRs, and it's based off of the NRC already approved ESBWR design. So we're using preapplication for mostly ways to capture the key differences between the ESBWR and the BWRX-300 in these licensing topical reports to basically have the NRC review and approve these discrete topics ahead of time to approve efficiency and transparency and reduce uncertainty down the road. So that's really what we're focusing on right now is these licensing topical reports for these key or novel design aspects.

CHAIRMAN HANSON: Yes, thank you. Tara, I wanted to ask you a question and then I'm going to kind of branch off and ask Peter a similar question in a minute.

But, you know, TerraPower, you know, oftentimes we think of preapplication engagements as being focused mostly on topical reports. Which as Peter said, you know, one of the advantages of this topical report approach is some finality with regard

to the issues being evaluated.

But TerraPower submitted a number of white papers. And that's a little -- I don't want to call it out as being different, but I think it's different maybe from both Kairos and GE, and I wanted you to talk a little bit about the white paper approach that you're taking, how maybe that's different and how you're deciding between a white paper and a topical report, say, on a particular issue.

MS. NEIDER: Sure. As you mentioned, the topicals have a finality to them and the white papers don't. They're basically opinion pieces. The NRC is giving us what their thoughts are, but they don't have to hold to those things that they said in a white paper.

Natrium is driven by schedule. We have a very tight timeline. And so the white paper was very appealing to us because we got information back sooner.

And, you know, so far we have submitted a number of them. Two of them have been responded to. And really what we saw in those white paper responses is that, you know, we were aligned. The

NRC was aligned with our approach.

They did provide us some valuable input where we could, you know, strengthen some areas and be more, you know, go into more detail in certain areas than other areas. So it does drive our licensing process, and I think it's been very valuable so.

Topicals, we will still use topicals as well, you know, for things we absolutely need a certain decision now, but the white papers are great.

CHAIRMAN HANSON: Thank you, Tara. I've got another question here from the audience that I want to pitch to Mike and then offer an opportunity for the vendors to weigh in.

You know I've talked a lot about data and the importance of data for making regulatory decisions. And, you know, data validation for new technologies is going to be essential. And part of that is going to be an evaluation or approval of computational analytical methods, of course. And I know that's the subject of some topical reports that we've gotten, not just from the vendors here.

But the question for Michael is really how is the NRC going to provide kind of regulatory

predictability and certainty in the approval process for essential analytical and computational methods?

I mean, I think about this a little bit, right? In my RIC speech this morning, I said, show your work. You've got to show the agency how you got from Point A to Point B. So how are we kind of validating or putting our stamp of approval on those methodologies, some of which are pretty novel, that are coming into the agency?

MR. DUDEK: Absolutely. And that's the beauty of the preapplication engagement is that through these processes, through these discussions, through our actions, we gain alignment, and we gain understanding about these methods and these computer codes that the applicants are using.

Some of the new applicants aren't aware of the typical and standard suite of computer codes that the NRC uses in how we do business. And this allows them to have the opportunity to compare their numbers with our numbers.

There are several ways to do this in a preapplication engagement. You can put those methodologies and analyses in a topical report and get that "finality" that Mr. Hastings was talking

about. Or you can put a theology or a methodology in the white paper and get a set number of hours and get informal NRC feedback on that.

Also during preapplication engagements, we can open up an audit in which you can have those face-to-face discussions from the technical staff to the technical staff. You run the same code. Are we getting the same numbers? If you're on a different code, are you getting similar numbers within a bandwidth that makes sense? And that really fosters that environment, like I said before, of understanding.

We also have page turns. We also have public meetings in which we can discuss openly in a public forum or in a private forum. If it's proprietary software or proprietary data, we can discuss those items and gain alignment and understanding on all of that data so we're talking the same language, and we're using the same codes moving forward. Very critical.

CHAIRMAN HANSON: Yes. Thank you. Tara, Peter or Michelle, I wanted to -- just before Michelle -- I wanted to give everybody an opportunity, but I did want to note for the audience

out there, for some reason, I think on that main screen, Michelle's face is not appearing.

Michelle Catts from GE Hitachi is still with us, still part of the conversation. We can see her kind of behind the scenes here in Zoomland even if the broader audience out there can't. So, Michelle, I didn't want you to get lost out there. There she is. See we got her feedback fixed.

MS. CATTS: My feed actually just crashed. That's the fun thing about technology.

CHAIRMAN HANSON: So I wanted to -- I don't know if others of you wanted to kind of weigh in on this kind of analytical methods and approaches as part of that preapplication engagement process.

MR. HASTINGS: So from Kairos' perspective, what Michael described is exactly what we've been doing. Half of our topicals are essentially methodological in nature. And, yes, there will be some sample calculations in those but that is not what we're seeking approval on. We're seeking approval of the methodology.

And then often as part of the staff's safety evaluation, where qualification data are needed to validate certain aspects of the

methodology, those would be built into the conditions under which that topical could be used as part of a license application. So I think we're very closely aligned.

MS. NEIDER: I think from TerraPower's perspective, you know, Natrium is a big project, and we have multiple companies that are doing designs. So one of the challenges for us is limiting the number of codes that we're using because everybody has got their pet codes that they want. But this is an enormous effort to get all the code V&V'd. So we are trying to limit only those things in our application which we actually need to support that application.

There are a number of programs that we have that are optimization codes. And those optimizations are -- they don't need to be V&V'd, you know? We just have to show that what we finalized and decided on for the design is in fact valid.

So we are trying to reduce our scope somewhat to limit to what's necessary.

MS. CATTS: Yes, and for -- yes, I was going to let Tara speak for Natrium. But for BWRX-300, you know, a lot of our codes we already have them approved for ESBWR. So it's just really

updating those for BWRX-300.

And, you know, the licensing and topical reports, really the purpose of them is to describe -- you know, design criteria and methodology and acceptance criteria to meet the key regulatory requirements. And then when you actually go to implement the LTR, you have to verify that you're worked in the bounds of the LTR. So that's how we're approaching it.

CHAIRMAN HANSON: Well, there are lots of ways to kind of branch off of this discussion. But we just got one in from the audience that I think is really interesting and relevant. And I want to go right to it before I double back and do some other things.

You know, the level of detail in these preapplications is kind of one of the themes that has run through this. And, you know, and yet there's kind of a -- there's a dynamic tension here that I'll admit, I think, that's largely within the NRC, right, where we need to kind of convey expectations about the level of detail needed to vendors and yet we need to kind of be careful for regulatory predictability, uncertainty and other kinds of reasons, resource

management reasons, et cetera, that we don't kind of go on for lack of a better term -- you know, go down rabbit holes or go on fishing expeditions or what have you.

And a friend of mine described this to me as, you know, we have an agency of really top notch question askers. And not all of those questions all the time are relevant to the task at hand.

And so, you know, Michael, I want to hear from you a little bit about how the agency is kind of preventing in a way the kind of unnecessary expansion of the review in some cases and yet, you know, again, maintaining that balance where we are getting the level of detail that we need from vendors from COL applicants and others.

MR. DUDEK: Very interesting question and very tricky answer. I think that goes back to, you know, the ability of the staff where they see something brand new, they can ask questions, right? And that's always going to be the case.

Where you draw the line is that -- we are getting better in drawing that line. And that goes to directly my feedback to applicants in that whether it's a white paper or a topical report or whatever

we're reviewing, make sure that you're drawing that distinction. Make sure that it's a fulsome application with all the information in there so that we can fully evaluate it. And when we ask those questions, it can be very pointed in any holes or any areas that we see.

And that's critical because if we have a fulsome application with all the information that we need, that adds to that predictable and stable environment of licensing. It adds to reducing the time. It adds to reducing the cost. But if we don't have that fulsome application, and we're having to go and ask those critical questions, those questions take time.

And then once you do get a question, one question leads to two questions, leads to three questions. And that is a testament to the technical staff, but it's also a testament to the management team of, hey, we're focused on the principles of good regulation. We're focused on what is needed for safety. We're focused on the key regulatory differences of what we're seeing and what we've experienced before.

So we are learning those lessons. We are

trying to, as a management team, really trying to guide our staff and evolve our procedure and evolve our processes to a level of what do we really need to know now? What do we need to know in the future? What kind of level of finality can we provide for these topical reports and these white papers? And what do we need for the future for future applications and how all of this integrates into one final response, one final agency position on safety? So I think that's how we'd like to proceed.

CHAIRMAN HANSON: Yes. I've heard it said that management, you know, reviews every RAI, request for additional information, that leaves the agency.

MR. DUDEK: Well, that's one of the lessons learned that we're evaluating as we speak.

CHAIRMAN HANSON: Mm-hmm.

MR. DUDEK: And one of the lessons that we've learned. So while, you know, the staff comes up with great questions, you know, even the mid-level management, you know, asks the hard questions about how this is involved in safety, why is this important and really scrubs those.

They do go up in division management in

a lot of cases. And division management has got that high level umbrella picture where they can really evaluate that on a larger scale and say, hey, this is needed now or this is needed probably in the future.

CHAIRMAN HANSON: Thanks, Michael. Any feedback? I want to give Peter and Tara and Michelle an opportunity to weigh in here, too.

MR. HASTINGS: A couple of quick thoughts from me. I think, you know, what Michael said is true. I think we've seen improvement with regard to the appropriateness of the scope of the questions from the staff. We're never going to have a problem of the staff not asking enough questions. That's not going to be the problem.

An effective project manager or set-up project manager is an appropriate sort of management filter on the questions that come so that we can have confidence that the questions do have an appropriate regulatory basis. That is important. The receptiveness of the project management team and the management team, if we see that review going, you know, sort of too far afield, receptiveness to that feedback is really important.

It's also useful to note that if you have

a good relationship with the staff, a good engaged, you know, sort of collaborative relationship, there's going to be a lot higher I'll say tolerance for lack of a better term of questions that may not rise to the level of this warrants an RAI, but, hey, this staff member is curious about what's going on with this widget. And if you can answer that question over the phone and obviate it as a formal RAI and maybe it helps inform his or her review when the questions really are on point, that's useful as well.

So I have seen improvement. It is going to be an area for, I think, continued focus. There are always going to be, you know, incidents where we don't think the question is appropriate, but hopefully as we continue to progress, those are sort of the outliers.

CHAIRMAN HANSON: Thank you.

MS. NEIDER: Yes, this is kind of a joint effort here, as Peter mentioned, is that we do need to push back when it's necessary to push back.

You know, a lot of negativity has been about the NRC has made things too difficult, you know, and it has driven the nuclear industry out of business, those kind of things. And I think quite

differently than that. I believe that we did it as an industry. You know, the NRC was part of that but so was the industry.

We have to watch for things where engineers are just so proud so they want to tell all about the things that they did versus what's actually necessary for safety. And for each of the questions and each of the things we submit, I think that's important is you know, why are we doing this? Why is this necessary to be part of the application?

Because if you put too much in there, it always will have negative consequences, you know, because there's going to be some reason that you want to change something that's totally innocuous but now you have to go through a rigorous process to change those things.

So it's really incumbent on the staffers to consider whether their questions need to be asked but also with the applicants as to what information that they should be providing and why they are providing that information.

CHAIRMAN HANSON: Yes. Good points.

MS. CATTS: Yes. And, you know, my perspective, the NRC they are really good question

askers. For the most part, their questions are really good. But it is important to have the NRC management involved in the preapplication early on to ensure that the review is fairly focused, you know, what's being asked.

You know, also the goal of those preapplication meetings is that the right level of detail is provided so hopefully that will minimize RAIs in the future.

You know from our perspective, like Mike said, the NRC management should be thoroughly involved in the review of the request for additional information before they go out. And, you know, really step back as a manager and look at the big picture, you know, and ask yourself, does this question that we may send out, does it provide reasonable assurance of adequate protection or absolute assurance? You know, what exactly are you trying to get at? So just really kind of step back and look at that big picture before those RAIs go out.

CHAIRMAN HANSON: Thank you. Yes, very helpful. Very helpful. And very interesting. I think I want to kind of continue with this theme for

a minute. We got another question in from the audience, primarily for Mike about how are we kind of allocating resources among applicants on, you know, preapplication activities but just plain application activities?

Is it kind of first come, first serve and how are we -- you know, we've got an agency of already busy people working on a lot of different issues and how are we assigning resources to kind of the issues that are coming in before us because we want to be responsive to the people that are walking through the door with whether it's white papers or topical reports or, you know, construction permit applications. How does that process go?

MR. DUDEK: I love this question. And this is going to be my pitch in the fact that this goes back to infrastructure and expectations.

So the NRC has set up the infrastructure to be successful. We have two divisions very clearly focused on two different areas, whether it's advanced reactors or small module reactor licensing. When an applicant comes in, we assign a senior project manager and you meet. And that senior project manager starts interfacing and develops a backup and

a team to go along with him to ask those big questions. And we start interfacing with the appropriate technical staff. So that's the infrastructure that we have set up to be successful in this area.

And now my pitch to ensure that we're successful is really incumbent upon the applicants to let us know their timelines and schedules, whether it's right before the engagement plan or information to us on what is coming in and when. Because in some respects it is first come, first serve.

If you let us know, if you adequately communicate with us on what's coming in and when, we can plan. We can adequately budget. We know what's coming in. We have staff members set aside. We've provided the training. We can hire. As long as we know what's coming in, we can plan for it.

Now for those applicants that, you know, don't involve the regulatory engagement process and don't participate in preapplication as effectively as others and we're not aware of what's coming in, we're often surprised, and we can't budget.

We don't have the staff available to do some of those reviews or if it's a specialized or a

niche area, you know, we haven't done the outreach to those technical parts of the organization, we use the word matrix, the matrix organization to be able to provide that expertise in a timely and effective manner.

So, you know, it's just very, very critical while voluntary for the preapplication engagements to let us know what's coming and that's my pitch.

CHAIRMAN HANSON: Well, if I can jump in here, too, right, I mean, Mike we've talked about this a little bit and, you know, this is where a lot of things come together inside the agency, right, where we're using some tools --I keep coming back to -- in my mind I keep coming back to a point Michelle made earlier about the predictability of budget and schedule.

Well, part of that for us is actually looking at what some of these efforts have taken in the past so we can project in the future how long, how many people, how much money, et cetera, right? And then that allows us to better kind of allocate resources among all the demands that we have.

And also, of course, then there's hiring,

right? We want to make sure that, you know, we've got attrition like every other organization in the universe, and we want to make sure we're backfilling those positions and that we're staffed up appropriately to kind of meet the demands of the agency.

So it's a real kind of multifaceted effort, I think Mike, that you made a good point about.

I did want to kind of ask, I want to get down in the weeds just a little bit here and I also want to take the pressure off of Mike a little bit because I think a lot of the questions that are coming in from the audience are coming into him.

So I wanted to ask Peter and Tara primarily about this, you know, what kind of preapplication interactions have you looked at or are you having around kind of safeguards and to some extent security kind of more broadly?

Particularly for your facilities, Peter, I think we know that your proposing to use TRISO fuel, which hasn't been widely used yet. But how are you kind of approaching, you know, inventory and control issues and have you approached the NRC with some of

your -- or approach the staff?

MR. HASTINGS: That's a good question. And the short answer is not yet, but it is definitely on our list.

CHAIRMAN HANSON: Mm-hmm.

MR. HASTINGS: Not yet because it really doesn't have as much bearing on the construction permit as it will on the operating license.

A significant amount of the safeguards and security aspects that we will be dividing into in preapp space in advance of the operating license application are more programmatic in nature.

Now that said, there are security by design and safeguards by design aspects that we will definitely be focusing on as we pivot to the detailed design of the Hermes reactor.

And so where preapplication engagement will help inform those design decisions that will be made, you know, over the next several months, couple years, then we'll definitely be engaging to make sure that we factor that in as much as possible.

The more we can do by design, the less burdensome those programmatic aspects will be. And it's important for many of the people in the advanced

reactor community to have these discussions because there is no guidance out there today on Category 2 fuel, high-assay LEU many of us are using. Category 2 requirements are not particularly well understood right now. And we would like to engage both at an industry level and for individual applicants to make sure that in the absence of guidance the staff doesn't default to Category 1 guidance when it would be more appropriate for facilities to look a lot more like Category 2.

CHAIRMAN HANSON: Good points.

MS. NEIDER: And I would say we're kind of in the same position that Peter mentioned for his reactor. We did submit our safeguards program to the NRC and were audited. And that went very well. We expect to have approval for our safeguards shortly. And I would say that we are following the safeguards by design and security by design. However, we haven't really engaged with the NRC on that yet.

CHAIRMAN HANSON: Yes, thank you, Tara. I think that safeguard by design is something the NRC is just starting to look at. It's something I have an interest in but also I think Peter raised a number of good issues, too, right, where we are encouraging

the agency to -- a lot of the preapplication activities that you're going to have aren't necessarily going to be with the Office of Nuclear Reactor Regulation. There's this other office, the Office of Nuclear Material Safeguard Security, who also are going to have some input here particularly on the fuel side that's going to be important and not necessarily fuel fabrication but, you know, transportation and storage and other kinds of issues. So very, very interesting.

This was a question that came in mostly for Mike, but I'm kind of interested in the whole group's perspective on this. And it's a genuine question to kind of start from my perspective, which is does the submission of topical reports end, or white papers for that matter, kind of end when a construction permit application or a COL for that matter is submitted or are there kind of ongoing things that you either want to or intend to interact on?

And I guess, you know, the question really came in about, you know, how was the NRC looking at issues like constructability or ITAACs, which is integrated testing accepting kind of reviews

down the road, or inspection and oversight or operations? Or is it the case where, you know, a CP will come in and yet there might be still a desire for further engagement on some of these issues that may not be directly under review at any given time?

And I guess, Mike, I'll let you kick it off. But I'm hoping our vendors can weigh in on this issue as well.

MR. DUDEK: I think that's a testament to the capabilities of our staff. You know, our reactor assistance staff, for example, often has and has had topical reports being reviewed at the same time, multiple topical reports, being reviewed at the same as the design certification. And it can be a parallel activity.

It often is very challenging. You make a finding in one area. You have to see how that's integrated into the overall application. And we've learned some lessons on that. And that's part of what we're correcting now and some of the things that we're looking at in the future.

I anticipate this to continue to occur during several of our applications just because in my opinion the finality that you gain for a very specific

topic in a topical report and then parlaying that into an overall application has dividends and has that finality piece that does pay dividends down the road. And for most topical reports, they can be applied in multiple different areas.

CHAIRMAN HANSON: Thank you.

MS. CATTS: Yes. You know, from GE's perspective, you know, we would continue with licensing topical reports, you know, through construction permits and EPRI licenses. But, you know, again the goal is to be able to reference the license and topical report in those, you know, license processes, right?

So you've got to make sure you get it reviewed and approved to be able to reference it in your application. But, you know, some licensing topical reports you might need prior to construction permit. But some licensing topical reports you might not need until prior to the operating license.

So for instance you might want to get the severe accident source term figured out early on. But, you know, you might be able to handle control room type support center security requirements later in the operating license.

MS. NEIDER: Yes. And I would agree with Michelle that we'll continue to have a lot of engagement with the NRC on issues that are listed in the question.

The one thing in the question that kind of popped out at me that felt a little bit different was ensuring that the reactors can be constructed, you know, site constructability. And I don't think that's an NRC -- or should not be an NRC concern. That is our responsibility. We do have constructability reviews throughout our design process.

We are working with Bechtel, who is doing those construction reviews for us. And it's a real risk that, you know, you have construction challenges. But that's ours. It's not a safety issue. And I would push back on that. I think the best thing with respect to constructability is that we try to minimize the things that we commit to that don't have an impact on safety.

MR. HASTINGS: Yes, that and the component of how do we keep ITAAC from impacting the construction schedule? A different way of phrasing the question is a whole other discussion that could

take quite a bit of time.

On the topic of does the topical stop at the submittal of the application? As everyone else has said, it doesn't. It's a continuum, and it depends on how any particular report is going to be used, what conditions there are for its use in a subsequent license application.

We've got a construction permit under active review, and we still have four topicals that are still under review. So it absolutely doesn't stop.

CHAIRMAN HANSON: Thank you. And, Tara, good point about the constructability. You're right. I was reading it off the question. Right. Constructability is an issue for us only insofar as we're able to inspect ongoing construction with regard to safety parameters. I totally understand that.

And that was kind of the context in which I read it. It wasn't -- I didn't have in mind that we were evaluating whether or not you could connect Widget A to Widget B in a physical sense. So that's a fair point from you and thank you for that.

How have -- there's a question here about

kind of predictability of schedules. And it's a question for the vendors. And I guess, you know, there's a question I have about how are you -- you know, we're looking at our data about how are things going in terms of, look, we thought this review was going to take X number of days or weeks, and it took Y.

And we're looking at our own predictions for that. But how are those predictions kind of working on your end in terms of both the real data you're getting? And some of those changes, some of the deltas there are going to be entirely understandable. Well, you know, it took us a little long to respond to this question or, oh, we didn't quite anticipate that question.

But how is that predictability kind of shaping up in your own space and how is that kind of informing your engagement posture, I guess, kind of going forward?

MR. HASTINGS: I'll start from Kairos. Our track record is pretty good, and it speaks to, I think, the commitment of our company to do what we said we were going to do.

That hasn't always been the case in some

of my past lives to be honest. And that points to maybe a call for a little bit of humility on the part of developers to be willing to sort of raise our hands and say we said we were going to do this and for good reasons or bad reasons we didn't, and we're willing to acknowledge our role in that in terms of what our overall schedule looks like going forward.

MS. NEIDER: And I guess I could add to that, we do have a very challenging schedule. And we're committed to meeting our schedule. We have had some struggles with hiring people. I think we've hired really, really great people but our hiring ramp is pretty fast. So we are people challenged.

And we will just, you know, commit to if we do have delays we will provide those delays fairly early so that people can respond to that. But we are doing everything we can to meet the schedule dates. And so far on the Natrium project we've met all of our milestones. So we're doing fairly well, but it is a big challenge because there are so many developments going on right now in advanced reactors and light water reactors for that matter. So there is a limited staff in the industry.

MS. CATTS: For these projects to be

successful, like I said, they really need to be on track and on budget from both our side and from the NRC's side. You know, from our perspective, early engagement works best with the NRC. You have to develop the regulatory engagement plans, stick to the plan, you know, discuss the plan with the regulators, stick to it, stick to the time frames that we say we're going to submit something so that, you know, the NRC has their time to review it and that NRC can plan and budget their resources.

And one of the things I would really like to see, you know, coming from the NRC to private industry, I would really like, you know, to see the NRC run these reviews like a full project management process like you see in the industry with milestones, budget reviews, action owners, due dates, for real transparency and visibility so we can kind of see it's on track and on budget the whole way through the process.

CHAIRMAN HANSON: That's a great point, Michelle. And I'll put Mike on the spot just a little bit here, right? I mean, I've been around just enough capital projects to be dangerous and have been exposed just enough to tools like, you know, P3 -

Primavera and other kinds of sophisticated scheduling tools to be dangerous. I fully admit that.

But what about that, Mike? I mean, how are we -- you know, to what extent are we kind of leveraging some of these hard core project management tools in our reviews?

MR. DUDEK: So good question. We are in the -- we have come a long way over the last year in being able to be predictable and on budget. And we're getting better.

So I think that my applicants clearly see that this is a priority that I make. And I have daily, weekly and monthly briefings on my projects, on my budget, and I operate, you know, within the agency guidance, you know, clarity, openness, reliability and efficiency, you know, those are the core values that I tout, and I try to embody during all of my reviews.

And it goes back to that predictability piece. Are we setting realistic schedules? Are we meeting those schedules and how do we do that? And that's really incumbent on a management team to be able to brief that out, to manage those processes to be open.

If we foresee that the RAI process isn't going well, we need a second round of RAIs, I go out to my applicants immediately and say, hey, we're not meeting expectations. It's taking a little bit longer and here's why and that could endanger the review or that could lengthen the review. So that goes back to that fulsome details, replying to RAIs effectively and providing those detailed answers that the staff needs to be able to fully meet those schedules and those expectations.

As for the processes and procedures, they're improving. We now have RPS, the Reactor Project System, which we track and assign projects through, which has been incredibly key, you know, and we've only had that for the last two years.

So we are making progress. This is a focus. And as Rob Taylor will tell you that we're running this more as a business than anything else. Are we on schedule? Are we providing good customer service? Are we able to meet the demands and the timelines needed to be successful in front of the entire world for these new reactor applications? As I said, we're making progress.

CHAIRMAN HANSON: It's really good to

hear. And, you know, we can have -- this is another one of those branches where we can kind of talk about staff development in the NRC and building that expertise, and we've done so much to get smart on I think advanced reactors. Our Be RiskSMART framework has been critical.

And I know, you know, for me going back to my days as a consultant, I mean, some of the most useful training I ever had was project management professional training. I never did pull the trigger and go get my PMP certification. But it's still a framework and a kind of Heuristic that I use all the time to look at issues. So there's lots of kind of food for thought there.

I wanted to ask, you know, as an agency who has kind of both the responsibility to applicants and licensees to be transparent, to be predictable where possible, to be open, and we also kind of have this responsibility to the public, right, where we want to be as clear as we possibly can with the public about what we're doing and why we're doing it.

And to that extent and, you know, to that end, we have a lot of these interactions. A lot of preapplication interactions are public meetings.

And some of them can't be, right, because of security information or business proprietary information. But I wanted to get some thoughts from vendors and then Mike about the public facing aspect of our interactions and your thoughts and kind of feedback on that. Don't everybody jump in at once.

MS. CATTS: I'll start.

CHAIRMAN HANSON: Michelle will start.

MS. CATTS: I'll start. You know, from our perspective, interactions with the public are very important. We've been really trying to make our presentations, for instance the ACRS meetings coming up, things like that, try to make them as non-proprietary as possible, the slides, so that we can have more engagement with the public in these discussions. Because the earlier you get the public engaged, the more clarity you get early on to address any issues, right? So this only helps you in the long run to have, you know, early public engagement.

So I guess we've been really trying to make our slides as public as possible so we can minimize what's in the closed session and maximize what's in the open sessions.

MS. NEIDER: And I think -- I'll add to

that. For Natrium, I think we've been more public than most. And we can see that because, you know, we get targeted by anti-nuclears because we are making almost everything public. But, you know, we do have to keep some things separate because they're propriety in nature or have security issues.

But we do think it's the right thing. The public has a right to know. And we do try to be as public as possible.

There was one NRC meeting we were in where we were in the public part of the meeting and we planned to discuss it in the closed meeting and a question from the audience came out and they asked that question.

But in the public meetings, the process is the NRC responds to the questions not the applicant. So we knew the answer to it and the NRC answered incorrectly because we hadn't told them yet. So there is a little bit of an issue there. So I don't know if we should be speaking in the public meetings or not but that's one thing to think about.

MR. HASTINGS: We found the public meetings to be perfectly useful as well. It doesn't inhibit our discussion with the staff in any way and

wherever the information is public, we've been perfectly open with it as well.

I want to acknowledge that the staff is sort of the guardian, if you will, of what should and shouldn't be withheld from the public. And in early engagements with us on the topical report, we piloted what came to be known as the "no RAI" approach to reviewing the topicals.

And I was a little hesitant to use that term because it makes it sound like we're, you know, conducting discussions back behind the curtain somewhere and that was far from the truth. All we did was in collaboration with the staff short circuit through some of the bureaucracy around generating the questions and answering the questions.

So instead of an entire series of formal letters back and forth, the staff would send us questions. If we understood the question or with a brief conversation clarify the question, we would more often than not amend the report and submit it. And all the questions and our responses and the amended submittal all ended up on the docket just as if they had been a formal sort of letter writing campaign.

So really good improvement in the process without any, you know, obfuscation or anything needing to be kept from the public, and it was remarkably effective.

CHAIRMAN HANSON: Thank you. Mike?

MR. DUDEK: Well, as you know, Mr. Chairman, you know, openness and transparency is the bedrock of what we do at the NRC. So I can't tell you how valuable it is to me at every turn whether it's a public meeting or engagement on a document or even during the rulemaking activities and the public engagement we have on that, on the level of engagement that we have and the insightful comments that we get back.

I'll give you two examples. I mean, for the NuScale rulemaking and for other rulemakings that I've participated in, the level of insightfulness and just the quality of comments that we get back from some of those engagements really just make me step back and think. Because you're laser focused on a task and a lot of times you're not thinking about the big picture, and you don't know what you don't know. And a lot of these questions really make me step back and think.

And in some of the cases, our current efforts have really made us go back and evaluate what we're doing and how we're doing it. And so I truly value the openness and transparency of the NRC and that's what made me stay here for 20 plus years. I love it.

CHAIRMAN HANSON: Well, I think that's as good a note as any to kind of wrap-up here. I really want to thank our panelists, Peter Hastings from Kairos, Tara Neider from TerraPower, Michelle Catts from GE Hitachi. Thank you all very much for your willingness to engage and to give us, you know, the NRC some constructive feedback here. It's been enormously helpful.

I want to thank Mike Dudek for his good humor. He spent a lot of time on the hot seat this afternoon. And he handled it with a lot of grace. And I appreciate everything you do, Mike, and so forth.

I think we touched on a lot of really good themes here, you know, having a good conversation along that access of flexibility and predictability in regulatory space but also kind of in budget and schedule, the NRC's, I think,

commitment to learn from other reviews, like NuScale, and so forth and apply those lessons to the folks that are currently in front of us now, many of which we have with us today.

I think that, you know, we're looking and the agency is really preparing for, you know, a potential wave here of new applications and a diversity, I think, of applications that's really teeing up to be, I think, different.

And a lot of -- you know, even with kind of existing light water reactor technology, the technology has improved and the analytical tools have improved. And we're, I think, adapting to that in ways that I know will challenge the agency. And I've been pleased with the preparations that the agency has made so far even as I know we have more work to do.

So thank you all again very, very much. And thanks to the public for joining us. And with that, we'll bring it to a close. Thank you again.

(Whereupon, the above-entitled matter went off the record at 2:23 p.m.)