UNITED STATES

NUCLEAR REGULATORY COMMISSION

+ + + + +

MEETING ON THE STRATEGIC PROGRAMMING OVERVIEW OF

THE OPERATING REACTORS BUSINESS LINE

+ + + + +

TUESDAY, OCTOBER 24, 2017

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Commission met in the Commissioners' Hearing Room at the Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, at 10:00 a.m., Kristine L. Svinicki, Chairman, presiding.

COMMISSION MEMBERS:

KRISTINE L. SVINICKI, Chairman

JEFF BARAN, Commissioner

STEPHEN G. BURNS, Commissioner

ALSO PRESENT:

ANNETTE VIETTI-COOK, Secretary of the Commission

MARGARET DOANE, General Counsel

NRC STAFF:

VICTOR MCCREE, Executive Director of Operations

KATHRYN BROCK, Deputy Director, Division of Operating Reactor Licensing, Office of Nuclear Reactor Regulation

PAUL CLIFFORD, Office of Nuclear Reactor Regulation

BRIAN HOLIAN, Acting Director, Officer of Nuclear Reactor Regulation

STEVEN LYNCH, Project Manager, Research and Test Reactors Licensing Branch, Division of Policy and Rulemaking, Office of Nuclear Reactor Regulation

SHAKUR WALKER, Chief, Engineering Branch 3, Division of Reactor Safety, Region II

MICHAEL WATERS, Chief, Instrumentation and Controls Branch, Division of Engineering, Office of Nuclear Reactor Regulation

KIMBERLY WEBBER, Deputy Director, Division of Systems Analysis, Office of Nuclear Regulatory Research

MICHAEL WEBER, Director, Office of Nuclear Regulatory Research

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

(10:03 a.m.)

CHAIRMAN SVINICKI: Well, good morning, everyone, and welcome to those who have gathered or are watching online.

This morning our Commission meets for a meeting that has more content than we can fit into a morning, but we will do our best, but we will be having what we call a business line meeting and this morning it is a programmatic overview of the operating reactor's business line.

I know as a member of the Commission and now as Chairman I derive a lot of value from these business line meetings. It's not as corporate as it sounds.

We'll be touching on a lot of technical issues, programmatic and policy dimensions to the important work that is done not only by the Office of Nuclear Reactor Regulation, but all of the offices that work in capacities that support the important work of NRR.

So we will hear on a number of topics today from staff panel only, so it is a little bit of an inward look at what we are working on and how we are going about it, and I look forward to it.

Again, I know we'll have a lot of different terrain that we'll cover in the questions, but I appreciate the topics that we have arrived at today and I think we'll hear about some good progress on a number of fronts.

Before we begin though I will ask if my colleagues have

any opening remarks they would like to make.

(No audible response)

CHAIRMAN SVINICKI: No, okay. Then I will turn the beginning of the staff's panel presentation over to our Executive Director for Operations, Victor McCree. Victor, good morning.

MR. MCCREE: Good morning, Chairman. Good morning, Commissioners. We are pleased to be with you this morning to discuss activities associated with the operating reactors business line, which is the NRC's largest as you know.

Our oversight of the safe operation of 99 operating reactors and 31 research and test reactors is enabled by the collective effort of nearly half the staff in the Agency.

Our presentation this morning will feature just a few of the activities, but we cannot be successful without each of our partners.

For example, our Safety and Security Missions for Operating Reactors comes together in the Office of Nuclear Security and Incident Response, and, of course, our corporate offices provide essential staff through budget staffing information technology and other key functions.

We hope to leave you with a few key messages today from our presentation. First, we continue to challenge ourselves to be more effective, efficient, and agile in all of our activities.

Secondly, we are enhancing our application of risk insights across our program and sharpening our focus on safety as we regulate more efficiently.

And, thirdly, our staff have accomplished much over the past year, including addressing all of the Fukushima lessons learned for several plants, as described in our first closeout letter for the Clinton Station.

Slide 2, please. You'll hear from six other speakers this morning. First, Brian Holian, to my immediate right, the Acting Director of the Office of Nuclear Reactor Regulation, and Brian will share some examples of our safety and efficiency initiatives.

Kathryn Brock, to my immediate left, Deputy Director of NRR's Division of Operating Reactor Licensing, will discuss our licensing processes, highlighting how we are using risk insights in our licensing process.

Shakur Walker, to my far right, Chief of one of the engineering branches in Region II, will discuss the ongoing review of our ongoing review of our engineering inspections to find deficiencies and incorporate risk information.

Slide 3, please. Then, Steve Lynch, to my left, Project Manager in NRR's Division of Licensing Projects, will describe how we have approached medical isotope facility reviews with agility and innovation. Steve Lynch, to my right.

(Laughter)

MR. MCCREE: And then Mike Waters to my left, excuse me, a Branch Chief in NRR's Division of Engineering, will discuss our success in executing the integrated action plan for licensing digital instrumentation and controls.

And, finally, Kim Webber, to my far left, Deputy Director of the Division of Systems Analysis in the Office of the Nuclear Regulatory Research, will emphasize the expert services and collaborative mindset of her office.

With that, we'll begin our presentation with Brian.

MR. HOLIAN: All right, thank you, Vic. Good morning, Chairman. Good morning Commissioners. I am glad to be here leading off the team for the operating reactor business line.

I do thank our many partners, like Vic did, some of whom are at the table, but many of whom have representatives in the audience should we need help on any particular aspect of the business line.

I am proud of the business line, the way it tackles the many issues that we have. Our strength really is in our staff, the various leadership teams, engineers, scientists, mission support, legal, administrative staff, across many offices that give input to making sure that operating reactors are safe and secure.

I'll provide an overview on this Slide 4 here of some of the business line successes, priorities, and challenges.

Some topics I will only touch on since we have a representative here at the table who will go deeper, on a couple other ones I'll go a little deeper myself since we don't have a representative here at the table.

I just hope that we give you a good cross section of the many aspects of the business line today. My comments will focus on

these general areas and I will move to Slide 5 for the first area.

In May of this year you will recall that we had an important Commission meeting on utilizing risk insights to assist both licensing and oversight. Our focus on risk insights is appropriate.

We do have a large body of operating experience that we can reference over the years and we're taking advantage of that. Our risk-informed tools have increased over the years and our guidance has improved to take advantage of some of this operating experience.

We have a variety of risk-informed initiatives ongoing, some of which you see on the slide. The first one, 10 CFR 50.69, that regulation was put in place to allow us to modify aspects, the licensees to modify aspects of their design, testing, procurement, installation, and reporting using their plant-specific risk insights.

We have got seven applications in-house this year with two more expected this month and we have already had pilot results and we think we'll be well able to complete these reviews within our normal 12-month licensing metric.

The Risk-Informed Steering Committee is an ongoing meeting amongst many of our business line partners and we meet routinely with industry to ensure that we are prioritizing on the right issues.

During a recent meeting we had just two weeks there were 40 members split between industry and staff in the audience and we discussed a variety of subjects, 50.69 applications to make sure that we're following a template that was designed for those applications.

Tech Spec Initiative 4(b), which you've heard of, which allows licensees to extend their tech spec completion times based on their own risk insights, we discussed that.

We discussed PRA Fire Realism, the realism about risk assumptions that we use in the ROP, Reactor Oversight Process, for inspection findings. And we also discussed during that meeting a one-time license amendment we issued last summer, and I'd like to cover that for a minute here.

That risk-informed amendment allowed an extended time for a Palo Verde diesel to be out of service, up to 62 days. We have received stakeholder feedback both inside the NRC and external feedback raising both technical and process questions about the extension.

I believe we appropriately granted that one-time amendment. There are plant-specific reasons, which include different risk insights from plants on why we might grant an extension on one plant and not on another plant.

And with that said, you know, we do have some lessons as we look back on that review and approval. We did use appropriate guidance for that review, in particular, we have a Reg. Guide 177 that's even titled "Risk-Informed Decision Making for Tech Spec Extensions," and we concluded adequate margins existed.

But that being said, we have accumulated a variety of guidance over the years as we move to be more risk informed and some of that guidance is contradictory when you look at it. So we have a job

in front of us to clean up some guidance and make it more consistent and applicable.

Finally, the last quote on that slide, in response to Commission direction from May we are finalizing this week a Commission Paper, an Information Paper to come to the Commission which will include our plans on risk insights and our challenges that we are facing, so you can look forward to that paper.

Slide 6, please. The business line and the regions in particular, you know, do well on a variety of emerging technical issues, and I will briefly touch on these four examples.

As you are aware in 2012 we issued an NRC bulletin in response to a design vulnerability in electric power systems.

Interim compensatory measures were taken by the industry on this and NEI submitted an industry-wide initiative in 2013 to track installation of what we call open phase isolation systems at the plants to deal with an open phase condition in their electrical designs.

Staff already completed an initial inspection to verify that the interim measures are in place and we'll soon start a second inspection focused on the final designs being implemented.

Regarding cyber security, the Commission in this business line have led improvements that have ensured that our licensees are well protected from cyber threats.

We had a representative at this table last year during a business line from NSIR. They talked about that last year, and I'm updating you now that we've done a consequence-based approach, as

we have called it, for cyber.

We put a good framework in place, the Milestones 1 to 8 that you've been tracking, and this summer we began our inspections on the final milestones.

You know, as you have seen in the news cyber challenges continue and will continue. This business line, primarily through nuclear security instant response, the office, and our cyber inspectors in each region they continue their excellent work responding to cyber challenges.

I would like to note two items on cyber. One, we used insights from the operating reactor implementation of cyber as we coordinated with the Office of Nuclear Material, Safety, and Safeguards on their fuel cyber rulemaking package that just came to you.

And we recently responded to industry. They want us to continue to do lessons learned as we have been implementing cyber and we committed to them as we gather those insights that we will further evaluate the level of oversight in the cyber area.

As Vic mentioned on post-Fukushima actions I wanted to highlight two items, Vic touched on it. We just sent the Commission an update on the status of that and as you noted in there the first closeout of all post-Fukushima actions was done at the Clinton Power Station just a couple months ago and we expect to have similar closeout at seven other plants this year extending into next year.

And, second, as of August of this year all plants are in compliance with the order on spent fuel pool instrumentation.

Finally on this slide, the last emerging item that I wanted to highlight was an issue that happened at the LaSalle Station in February of this year.

LaSalle Unit 2 was in a refueling outage and they were doing a fill and vent procedure and in the high pressure core spay system a risk important valve failed.

Valve internals were replaced, they returned it to operable status, started up. The manufacturer of that particular valve updated their Part 21 notification.

They had had one previously and they updated it with guidance based on that failure and the industry continues to learn from that.

LaSalle Unit 1, the sister plant, shut down in June of this year and inspected the similar valve at that plant. The valve was still working but the wedge pin internal to the valve had failed and the internal showed damage.

Region III is overseeing the plant-specific aspects of this issue, which included a special inspection and issuance of a design control violation, and NRR is working on the generic follow-up for other valves industry wide.

Slide 7. I had to have a picture. I had a picture of an anchor darling valve, but that wasn't as exciting as this picture so I replaced that with this.

I didn't highlight on emerging technical issues, the business line's response to three significant storms that we had,

Hurricanes Harvey, Irma, and Maria. That's kind of normal business for the business lines in the regions.

You know, I became on one of them out of Region IV of a branch chief who had visiting the plant prior to the hurricane coming and he decided to stay over that weekend and stay at the plant through the next week so the residents could take care of their families during that hurricane, that's one example I wanted to highlight.

But this photo after the hurricane through Puerto Rico, you see Veronica Rodriguez on the lower right there, she organized with other members of the business line a food gathering weekend in D.C. where they got food and water and other supplies over to Puerto Rico. I just wanted to touch on that to show a little bit of the heart of the business line.

Slide 8. Besides these technical issues I want to note that the business line continually evaluates potential improvements and efficiencies. To start with we're working the decommissioning rulemaking as you are aware.

It will replace the need for numerous plant-specific exemptions and the rules on track. In March we published the final reg basis, or draft reg basis, sorry, and in May we published a preliminary reg analysis.

We held a two-day public meeting in May to facilitate public comments and we are right now finalizing the reg basis for publication in the Federal Register and we are on track for the proposed rule to the Commission by next May.

The Regions continue to interface sharing resources. Vic mentioned agility as one of the business line attributes and we want to live that out. The Region I Pilgrim 95-003 Team had participants from all the regions.

And another example is routinely on operating licensing resources, we've done that well over the last several years, sharing those resources across the regions in responses to surges and workload.

Within NRR we had a restructuring that was effective just the beginning of this month and we consolidated functions and we eliminated four branches.

To highlight just a couple of the changes we merged the Japanese Lessons Learned Directorate with another division which is now called the Division of Licensing Projects, and two branches are being maintained from the JLD to focus on completion of Fukushima actions.

In license renewal we coupled two divisions together. They do a lot of materials issues during their license renewal reviews so we added a couple of materials branches and that new division is called the Division of Materials and License Renewal.

I also highlight that the old License Renewal Division just gave the South Texas plant their licenses, which are the 88th and 89th plants for license renewal.

And, finally, on this slide we are working well with new reactors on early preparations and planning for the merger of the two

offices.

We have a transition team outreaching to the staff, we are evaluating organizational structures, and, of course, we are assessing and prioritizing the combined office guidance, so when that occurs.

Our licensing work also is in general going well, and Kathryn Brock will spend some time on this. She'll show you some good metrics.

We do get occasional questions from industry still about our licensing efficiency, how long it takes to complete an amendment, but I believe we do very well when we have aligned on priority and the application is well supported.

Slide 9. You know, the business line I think is doing very well but we can also improve, and this slide just highlights a few of the areas and some high profile focus areas that we have.

I have already talked about integration of risk insights, but we do have a plan with strategic and tactical actions.

A strategic example is one of the, the review teams that we are now putting in place to team up risk reviewers and deterministic reviewers where possible and that better integrates our safety evaluations from day one.

A tactical example, as I mentioned, is we included in this risk-informed plan the updated guidance so that we can make sure our risk guidance is coupled right with our deterministic guidance and all in one place for the staff.

On communications, I highlight communications, and I do that, Mike Waters will be talking about the digital I&C plan, and in particular on that significant focus area for us on digital I&C we have made it a key point from our leadership team to stress the importance of the staff telling both sides of the story.

They should be able to communicate industry concerns and staff concerns in these areas but focus on the next step for resolving the issue.

On accident-tolerant fuel we do have a plan, we're collaborating with our federal partners, we're meeting with the industry on their plans, and we need to make sure we look out far enough ahead and stay on top of the milestones as we complete that plan.

As I mentioned Kathryn will provide more details on these last two focus areas, but I want to briefly remark on the importance of them. Backfit, we've done a lot of work. CRGR is very active.

We'll take the opportunity this fall to refresh and review and the important aspects of this process, one with headquarters folks and with regional inspectors.

On licensing, we're doing a good job on our licensing reviews. We are estimating actual resources and communicating that to licensees, but we can continue to look for efficiencies in our reviews.

With that let me turn it over to Kathryn Brock.

MS. BROCK: Thanks, Brian. Good morning, Chairman and Commissioners. Thank you for the opportunity to

provide an update on the operating reactor licensing process, including a discussion of risk-informed licensing activities.

We have a success story to share with you. Our continued focus on timeliness, communication, and transparency has resulted in sustained improvements in the licensing process.

Since the last time we discussed the licensing program with the Commission we have continued to improve and optimize the licensing process through the use of controls and metrics.

The inventory of licensing actions greater than one year old is being maintained low, around 15 at any given time. As such, we have exceeded our congressionally-reported metrics for the quantity of licensing actions reviewed annually and the percentage of actions completed within one year.

While we continue to focus on the congressionally-reported metrics we are placing a greater focus on more detailed aspects of the licensing process, such as acceptance reviews, resource estimates, and discipline of schedule.

Slide 11, please. Before I discuss the metrics in more detail I wanted to share this illustration of licensing action closure times. The graphic shows the success we have achieved in improving the timeliness of closing licensing actions.

As you can see from the Fiscal Year 15 and 16 graphs the closure times for licensing actions was at about 12 months. The improvement for Fiscal Year 17 is visible with the peak closure times for licensing actions at nine to ten months.

In addition, the graph illustrates that many licensing actions are completed well below nine months.

Slide 12, please. In order to build on our success we continue to look at metrics that will improve performance. We designed new metrics that we report to the EDO on a quarterly basis.

These metrics help give us an early warning that there might be challenges in meeting our congressionally-reported metrics, and the more detailed metrics have improved our ability to monitor work and improve predictability both for NRC and the industry.

The graphic on this slide illustrates the status of these metrics. The three metrics include acceptance review timeliness, licensing actions completed within 25 percent of forecasted hours, and licensing actions completed within one month of forecasted schedules.

During an acceptance review we challenged the staff to make a decision in 25 days. Upon acceptance we project the number of review hours and total months required to do the review and we document it to the licensee, then we monitor those estimates and if we see they are beginning to get off track we discuss how to get them back on schedule.

We explicitly consider and usually accommodate licensing need dates, and more importantly we make commitments and work hard to stick to them.

The top graph illustrates the aggressive goal we set for ourselves in acceptance review timeliness. It's a new indicator and though we have improved performance we're not quite where we want

to be yet.

Slide 13, please. Acceptance review timeliness has been added as an internal metric because it influences the success in meeting our overall schedules.

As I mentioned earlier, we set a challenging metric for acceptance reviews and have been focused on initiatives to influence the success of this metric.

We want licensees to submit high quality applications and for the staff to follow the acceptance review guidance. If they do then the acceptance reviews can be completed on time, the safety evaluation can be completed within scheduled resources, and there will be few requests for additional information, or RAIs.

In an acceptance review we decide whether the applicant has provided the necessary information to enable an efficient safety review. When the application lacks critical information our reviewers must then invest the necessary time and resources to request information and then wait for the applicant's response.

By identifying insufficiencies early in the process the NRC and the licensee both benefit by not expending excessive resources.

By continuing to insist on quality applications and maintaining more rigor in following the guidance we expect the overall efficiency to increase.

We will also continue to be open with our communications. We have increased the use of audits to assist staff

understanding of the issues and our project managers continue in their critical role of communicating with the licensee.

We are using interdisciplinary review teams and encourage discussions at all levels which serves to gain early alignment and therefore improve the timeliness of actions.

In addition, we formed a multi-office management level forum made up of licensing division directors from each business line to make our licensing process more consistent across the Agency.

Slide 14, please. The workload management process has been effective in identifying difficult actions before we miss our schedules, raising issues to upper management and encouraging collaboration.

Key to the success of this process are the multiple discussions about licensing actions each month, including meetings with NRR office management.

As an example, where enhanced communications resulted in a successful review was Technical Specification Task Force, or TSTF-542, on reactor pressure vessel water inventory control.

This review was challenging technically, many submittals were expected, and the first reviews had a large number of review hours.

Through collaboration across the organization we identified an innovative approach to these reviews that has reduced the number of estimated review hours as we gain experience while also maintaining the appropriate safety focus.

In fact, the engineer who identified the review approach was recognized with an NRR Division Level Award called the RICE Innovation Award. RICE stands for Recognition of Innovation and Creativity Excellence and is meant to incentivize and recognize innovation.

Slide 15, please. We use RAIs as an important tool to get the information we need to make technical and regulatory conclusions. However, there have been concerns from staff and stakeholders regarding the effectiveness of this process.

We heard these concerns and we are making improvements. We conducted an RAI self-assessment where staff from multiple divisions performed an assessment of a sample of RAIs.

We found that adherence to guidance is satisfactory, the need for second round RAIs is low, and the majority of licensees responded to RAIs within 30 days.

We encouraged staff to use the guidance more consistently, we have increased training and encourage divisions to use lower level guidance or job aides to support reviews, and committed to conduct additional self-assessments periodically.

We have also shared this information with other business lines so they can benefit from our experience.

Concurrent with our self-assessment the Government Accountability Office conducted an audit of the RAI process that examined the NRC guidance for RAIs, assessed the number of RAIs issued over the past several years, and identified the strengths and

weaknesses of the RAI process.

Though the GAO did not have any specific recommendations for Agency action the staff will continue to focus on effective RAI development and will follow through with the recommendations for the NRC self-assessments.

Slide 16, please. Risk-informed decision making helps us focus on issues that are important to safety enabling improvements to both safety and efficiency.

We have been employing risk-informed approaches to regulations for years and the focus in this area is only increasing.

At an NRR Executive Leadership Team meeting the managers created a vision for risk-informed decision making that focused on three main objectives.

First, we wanted to help the staff better understand and apply risk information. Second, we wanted to refine our processes so that we can more thoroughly integrate risk information in a manner that compliments traditional regulatory approaches, and, third, we wanted to more broadly communicate our plans and successes using risk information.

In support of this vision and the objectives as well as in response to a tasking from the NRR Office Director, the staff formed a working group and drafted an action plan that established a schedule for completing these actions.

The action plan tasks will evaluate the appropriate use of risk insights and communicate their implementation to ensure

consistency in our reviews.

Slide 17, please. We also watching how we use our probabilistic risk assessment resources as we review the influx of new risk-informed actions. Therefore, we have modified NRR's main data tracking tool, the RRPS System, or Reactor Program System, to separately track risk-informed licensing actions.

This enables us to monitor review hours specifically for risk-informed actions and ensure we are conducting them in an effective manner. We believe that the resources needed to conduct each of these reviews will reduce overtime as staff becomes more proficient with them.

We also want to integrate risk into our reviews even if licensees don't designate a request as risk-informed. For example, we're developing a risk-informed screening tool that could be used to adjust the level of detail of the staff review using risk insights and other criteria.

We will also be developing procedures that can be used to incorporate supplemental risk insights, either qualitative or quantitative, if the licensees provide them.

Slide 18, please. After the accident at Fukushima Daiichi we issued orders for the mitigation of beyond design basis external events. Nuclear power plant licensees responded by developing FLEX strategies.

Licensees have installed plant equipment that is independent of AC power and would survive an external event.

Portable equipment is stored onsite that can provide power and water to the plant through various connection points and the availability of offsite resources that will be ready within 24 hours of plant notification.

Even though these modifications were designed to support licensees coping capabilities for beyond design basis external events they can and are being considered as viable mitigation approaches in other regulatory applications. We call this consideration Credit for FLEX.

Working with the regions FLEX has been credited in the reactor oversight process and used in the incident response and notification of enforcement discretion processes.

Licensing action review is another area where FLEX can be credited and we have credited FLEX in several licensing actions and have a plan to make this approach more efficient.

Staff from NRR, the Office New Reactors, and the Office of Nuclear Security and Incident Response are looking at how we may leverage our experience to credit FLEX.

In addition, our partners in the Office of Nuclear Regulatory Research are helping us with risk analyses that support, including FLEX strategies, in licensing and inspection.

Slide 19, please. While not unique to licensing, lastly, I wanted to touch on the status of backfitting activities by the operating reactor business line.

As you know, backfitting is an inherently safety-driven process. Understanding and maintaining the licensing basis is the

critical part of our regulatory infrastructure and controls unimposing backfits. Thus, the implementation of an appropriate backfitting process is essential.

Based on lessons learned and Commission policy direction the Agency has a renewed focus on backfitting processes and is increasing discipline and management oversight.

The EDO directed the Committee to review generic requirements to assess the guidance, training, and knowledge management that the Agency has on backfitting.

The EDO accepted the Committee's recommendations, added some tasks, and assigned these actions back to the staff in July. While we work on these actions we are already employing the Commission direction and the spirit of the EDO tasking on a daily basis as we make our regulatory decisions.

Updates are underway to Management Directive 8.4, which is our overarching internal guidance document for backfitting, as well as the associated NUREGs that describe the backfit and cost analysis processes, and these will be available for Commission review in April.

We are also developing required reset training for NRC managers and staff. All relevant staff and managers will have completed the training by the end of January.

The training will emphasize the licensing basis fundamentals, the importance of promptly raising and resolving safety issues, refresh and reinforce key concepts of backfitting and issue

finality, and heighten awareness of recent developments that will result in changes to guidance for considering backfits.

Additional more in-depth training will be held once we finalize the guidance documents and that training will be critical to ensure that employees are well versed in the procedures and regulatory fundamentals necessary to consider novel situations as well as those they confront in their day-to-day licensing and oversight.

This concludes my discussion of our sustained quality initiatives in the licensing program. I will now turn the presentation over to Shakur Walker.

MR. WALKER: Thank you, Kathryn. Good morning, Chairman, Commissioners. I appreciate the opportunity to come before you today and update you in our ongoing efforts to review the interim inspection program for efficiencies.

As a little background, the reactor oversight process was constructed with a number of baseline inspection procedures that provide independent verification that structure systems and components, or SSCs, are operated, modified, and maintained to ensure that they can perform their intended safety function during the design basis event.

Now recall that independent verification of licensee design changes is critical because it's the only NRC inspection that focuses on identifying latent conditions that could potentially compromise the safety system.

Now since the 1990s the NRC has conducted many

different types of independent inspections focusing on independent verification and over time these inspections have shifted from a verification of original design plant adequacy to an inspection increasingly focused on the licensee's ability to maintain the facility within its design and licensing basis.

This shift in focus was due in part to the fact that many of these SSCs had been inspected before.

So as nuclear power plants age and more equipment needs to be replaced the environment in which these SSCs operate changes and as a result the NRC focused on design verification shifts to ensure it includes latent design challenges as well as license basis functionality.

In addition, with the enhancement of risk assessment tools, enhancement tools, this focus has become much more risk-informed.

Slide 21, please. As a response to industry request to level out the effort over the triennial inspection cycle, in January 2016 the Agency revised its engineering inspections, specifically, it was a component design basis inspection, the modifications, and the 50.59 inspection.

In May 2017 the NRR initiated a working group to evaluate improving the effectiveness and efficiencies of our engineering inspection program and to make recommendations to the Commission, and this was being performed as a biennial review of inspection procedures and resources that is done as part of the annual ROP self-

assessment.

Now, specifically, the working group was tasked to implement transformational and out-of-the-box thinking to identify any existing gaps and eliminate any potential overlaps within our engineering inspection program to ensure the inspection program included aspects such as considerations for operator life extension, plant aging, and component replacement, as well as improve the overall effectiveness of our engineering inspections while still maintaining principles and good regulation.

The inspections within the scope of the charter are those baseline engineering inspections that are being implemented by region base inspectors which focus heavily on the adequacy of engineering analysis, compliance with code standards and the licensing basis, as well as verifying that no latent conditions have been introduced due to some plant design change.

Those inspections include the fire protection inspection, the design basis assurance inspection, the design basis assurance focus inspection, 50.59 in-service activities, as well as the heat sink inspection.

Slide 22, please. The working group is implementing the collaborative process to develop these recommendations with both internal and external stakeholders consistent with the recommendations made in the report of the Public Communications Task Force to the Commission.

The pace and schedule for developing options is

designed to maximize its collaboration and ensure proper consideration is given to all stakeholder positions.

The working group has made significant progress on outlining what is critical to consider in making this effort successful as well as the meaningful strides and our collaboration with stakeholders in development of recommendations.

In addition to establishing what our principle consideration should be the working group has also identified specific licensee activities that could potentially introduce latent conditions and compared those to our current inspection program.

The working group has aligned internally on a number of key points and identified critical topics that require further discussion with our external stakeholders.

Now some of the key points that the working group has come into internal alignment on are things like considering whether or not the heat sink and 50.59 triennial inspections could be accomplished as a focus sample during one of our comprehensive engineering inspections.

Those critical topics that require further discussion with external stakeholders are items like how should the comprehensive engineering inspection be modified to ensure that we can maintain and improve agility, focus, and relevance.

Also, what is the correct ROP inspection cycle, is it the current three years, could it be four years, maybe five years, as well as how could the proposed industry self-assessments, or how they have

been referred to recently as licensee performance verifications, be utilized within the scope of the ROP.

As the various options are being developed the working group will ensure a couple of things. One, that the reactor oversight process has the appropriate level of independent oversight of engineering activities.

Two,that the NRC will continue to emphasize industry challenges and licensee performance. Three, the NRC maintains the ability to identify latent issues that may have inadvertently been introduced due to facility changes.

And, lastly, but most importantly, that the NRC inspection staffing and expertise will remain sufficient to implement the NRC mission successfully.

Slide 23, please. An initial public meeting was held on June 6th to discuss our plan for this effort and for external stakeholders to provide their thoughts on the use of industry self-assessments, again, now being referred to as licensee performance verifications.

And since that kickoff meeting in June the working group has been proactively engaging with internal and external stakeholders on a successful path forward.

On October 11th staff from NRR and all four regions hosted another public meeting in Region II with industry and external stakeholders to discuss the status of the working group's efforts as well as discuss the use of licensee performance verifications within the ROP baseline inspection program.

And during that meeting it was recognized that stakeholders were noticeably more in line than in previous meetings, particularly with respect to early considerations that the working group had come to internal alignment on.

Additionally, stakeholders, such as the Union of Concerned Scientists, provided valuable feedback, such as expressing the importance of independent verification and the oversight from the NRC on our behalf and how vital the ROP has been in maintaining safety, identifying latent conditions, and increasing overall licensee performance.

The working group expects to have additional engagement with external stakeholders over time. Our next public meeting with industry is tentatively scheduled for December 12th to further discuss critical topics as well as discuss any additional stakeholders prior to developing our options.

We have additional public meetings scheduled to discuss proposed options, including the pros and the cons, and identify any specific options that require further refinement.

We will eventually conduct a final public meeting and present the draft positions to all the stakeholders, discuss the proposed options, and obtain and document any final feedback to include in our paper to the Commission.

This concludes my remarks and I thank you for your time. I will now turn it over to Steve Lynch who will discuss the medical isotope facility licensing status.

MR. LYNCH: Thank you, Shakur. Good morning, Chairman and Commissioners. Last year the NRC issued a 10 CFR Part 50 construction permit to SHINE Medical Technologies, or SHINE, for the production of molybdenum-99 using eight accelerator driven sub-critical operating facilities and one production facility.

Using the interim staff guidance developed for aqueous homogenous reactors and radioisotope production facilities the NRC staff, some of whom are pictured in this slide, completed its review of the SHINE construction permit application in 22 months, two months ahead of its 24 month goal.

Their review demonstrated the NRC staff's ability to effectively and efficiently review an application for novel technology.

Currently the NRC staff is nearing the completion of its second review of a medical isotope facility construction permit application submitted by Northwest Medical Isotopes, or Northwest.

If granted this construction permit would allow Northwest to build a production facility for the processing of low-enriched uranium targets irradiated at existing research reactors.

The efficient review with the Northwest construction permit application was supported by applying lessons learned from the SHINE review.

Using previously developed templates the NRC staff issued clear, focused requests for additional information and it is on track to complete its safety evaluation report for this review within 24 months from docketing the application.

In addition to construction permit application reviews the NRC staff is also engaged in the review of license amendment requests supporting molybdenum-99 production.

In January 2016 the NRC staff issued a license amendment to Oregon State University for the irradiation of prototypical low-enriched uranium targets at the Oregon State TRIGA reactor.

And in May of this year the University of Missouri-Columbia, or MURR, submitted a license amendment request for the production of molybdenum-99. If granted this license amendment would allow MURR to irradiate two low-enriched uranium targets in the reactor reflector.

MURR is expected to submit a second license application to support the processing of these low-enriched uranium targets and hot cells featuring General Atomic's gaseous extraction technology.

Slide 25, please. Looking ahead, the NRC staff anticipates receiving operating license applications from SHINE and Northwest within the next year, coinciding with the beginning of construction of each of these facilities.

While licensee uncertainty and the timing of these actions creates potential budget and resource challenges, the NRC staff continues to actively prepare for upcoming applications and oversight activities to support licensee schedules.

In December 2015 the NRC staff published the Inspection Manual Chapter 25.50 establishing a construction inspection

program for non-power, production, and utilization facilities designed for medical isotope production.

One of the primary objectives of this construction inspection program is to verify the effective implementation of a licensee's quality assurance program with respect to design, procurement, and construction of the facility.

Inspections will be commensurate with the risk of the facility, focusing on the most safety significant structures systems and components.

In preparation for the review of operating license applications the NRC staff has considered the need for additional security measures to apply to the SHINE and Northwest facilities and has proactively communicated potential security considerations in closed meetings.

The NRC staff has also formed an interoffice task group to consider updates to its non-power reactor operational inspection procedures and operator licensing requirements to accommodate medical isotope facilities.

The NRC staff is working to ensure an effective transition from oversight of construction to oversight during operation.

Slide 26, please. The NRC's efforts to license facilities dedicated to medical isotope production support U.S. national security interests and nuclear non-proliferation policy objectives by contributing to the establishment of a domestically available and reliable supply of molybdenum-99 without the use of highly-enriched uranium.

As part of this effort the NRC staff coordinates its reviews as necessary with the National Nuclear Security Administration, which is responsible for the material management and minimization conversion program dedicated to the conversion of research reactors and isotope production processes to the use of low-enriched uranium, fuel, and targets throughout the world.

In addition to coordination with other federal agencies the review of medical isotope facilities often requires collaboration across offices within the NRC, which may challenge the availability and prioritization of resources.

However, through the establishment of the Molybdenum-99 Working Group the NRC staff demonstrates its agility by ensuring that the necessary expertise is available to readily respond to incoming license requests and emerging technical questions.

In addition to the medical isotope reviews conducted in NRR under 10 CRF Part 50 this interoffice engagement has allowed the NRC to issue materials licenses out of Region III and also develop guidance for medical use to applicants and licensees and the Office of Nuclear Material, Safety, and Safeguards.

NRR staff responsible for licensing medical isotope facility facilities also participate in the development of new rulemakings to ensure the appropriate applicability to these facilities.

For example, NRR staff participates on a working group tasked with development emergency planning requirements for small modular reactors and other new technologies.

Beyond its immediate licensing responsibilities the NRC staff actively engages with agreement state representatives to clarify a regulatory jurisdiction.

Most recently the NRC staff discussed licensing considerations for a new demonstration project proposed by SHINE with the Wisconsin Department of Health Services.

Recognizing the role of the United States in establishing reliable molybdenum-99 production capabilities the NRC staff participates in internationally-attended conferences, such as the annual Molybdenum-99 Topical Meeting organized by the National Nuclear Security Administration. At these meetings the NRC staff shares the status and best practices of its licensing reviews.

Slide 27, please. The NRC staff's licensing of medical isotope facilities has demonstrated its ability to apply the existing regulations and guidance to technologies other than traditional light-water reactors, such as the Oregon State TRIGA reactor pictured on this slide.

Based on this experience the NRC staff is working to create a more responsive and efficient technology-inclusive regulatory framework to better accommodate current and future licensees.

For example, the NRC staff has developed a proposed rule to streamline the non-power production or utilization facility license renewal process, reducing the burden on both licensees and the NRC staff.

The proposed rule would eliminate license terms for

certain classes of licensees, require licensees to submit an updated final safety analysis report to the NRC every five years, provide an accident dose criteria of one rem total effect of dose equivalent for non-power production or utilization facilities other than testing facilities, and the final rule is expected to be published and fully implemented by 2020.

Additionally, lessons learned from the medical isotope facility reviews is being leveraged to support pre-application interactions with potential advanced reactor applicants proposing to construct and operate research reactors.

In advance of the upcoming merger NRR staff is working closely with the Office of New Reactors to identify the need for guidance to support the licensing of these facilities.

I will now turn the presentation over to Mike Waters.

MR. WATERS: Good morning, Chairman and Commissioners. I am happy to be here today to discuss the progress we have made in improving regulatory predictability and confidence with the innovative action plan for digital instruments and controls.

We have also made good progress in approving new digital systems for use by our licensees. In a moment I will highlight some of these activities.

First, as background, the U.S. reactor fleet continues to pursue digital upgrades as a key strategy for addressing obsolescent issues, improving plant reliability, and reducing maintenance cost.

The Commission in SRM-15-0106 directed us to develop an innovative strategy to modernize the Agency's regulatory

infrastructure for digital I&C for both operating and new reactors.

The Commission directed the staff to consider broader context regulatory challenges, including common cause failure, the use of 50.59 to make certain upgrades of NRC approval, and incorporation of the Institute of Electrical Electronics Engineers IEEE Standard 603 into regulation.

The staff provided their innovative action plan in May 2016. The plan is focused on these areas and other priorities identified by staff and industry.

The Commission also directed us to hold frequent stakeholder interactions to reach a common understanding of regulatory challenges, priorities, and potential solutions to address them.

So far we have participated in more than 30 meetings on these activities. These include meeting for working level discussions with industry to exchange information and develop draft guidance documents. Let me now discuss the specific activities.

Slide 29, please. The industry has reported that they continue to make digital upgrades to the non-safety related and balance of plant systems under 50.59.

For example, almost all Korean plants have converted to digital feedwater systems under this process. However, some stakeholders have expressed reluctance to pursue upgrades for safety-related equipment because of the risk of adverse NRC inspection findings.

The staff has worked to achieve a common understanding with industry on specific challenges. Some include a need for clarity on addressing common cause failure likelihood and the level of detail that is needed for the 50.59 qualitative evaluations.

To address near-term needs the staff this summer issued a draft supplement to Regulatory Issue Summary 2002-22. The risk supplement contains the endorsement of NEI 01-01 and provides clarifying guidance for the use of qualitative assessments.

The guidance is even primarily addressing upgrades for auxiliary and safety support systems. A few examples of these may include upgrades of both the regulators and chiller controls.

The staff is currently resolving stakeholder comments and it anticipates issuing the final risk supplement next month for immediate use by licensees.

In parallel to this effort the staff is currently reviewing proposed Appendix D to NEI 96-07, which is NRC guidance for 50.59s. Appendix D provides an evolved approach from NEI 01-01 guidance, especially in the areas of screening digital changes and evaluating malfunction likelihoods against the licensing basis of the plant.

The staff has achieved a general alignment with industry on these issues and other technical concerns. We anticipate completing our technical review early next year and then proceeding with a formal regulatory guide endorsement.

If endorsed, Appendix D will provide durable guidance with more clarity and flexibility for all types of digital system upgrades.

Slide 30, please. In the past year we have approved several new digital systems. We approved Diablo Canyon for an updated record protection system and Hope Creek for a new digital power range monitoring system.

We have also approved new digital technologies as part of our topical review process. This year we approved the Lockheed Martin field-programmable-gate-array, FPGA, digital platform and our colleagues at NRO in coordination with NRR have recently approved the NuScale FPGA platform.

Industry stated that there is a need for several more upgrades to digital protection systems in the coming years. They have stated that they would submit license amendments once there is greater confidence and regulatory certainty and efficiency.

The staff has also worked to achieve a common understanding with industry on specific challenges in licensing, some include the confusion of overlapping regulatory guidance and the amount of design detail and testing information that is needed before NRC makes a licensing decision.

NRC technical reviewers have also identified areas where redundancy can be eliminated on review and where the volume of document submittals can be reduced.

To address these challenges the staff has streamlined our digital license process guidance. In Interim Staff Guidance Number 6, ISG-06, the staff is working with an industry working group to develop a revised draft for best guidance for early next year.

The staff anticipates a major digital I&C application will be submitted later in the year using this draft guidance.

Finally, addressing potential common cause failures remains the highest technical priority to support upgrades with both the 50.59 and license amendment process.

We are continuing to review industry draft technical guidance for addressing common cause failure. That guidance is focused on applying defensive design measures to prevent common cause failure and determine its likelihood.

The guidance could be used in part to determine the scope if further defense-in-depth assessment is needed for a digital system. At the same time we are updating our regulatory position on common cause failure, including the potential use of graded approaches.

We are concerned of opposed industry guidance, current technical knowledge, and operational experience with today's digital system. We anticipate writing a paper to the Commission on the common cause failure position by summer of next year.

Slide 31, please. In summary, we will continue to closely engage stakeholders on regulatory challenges and make thorough progress to support digital upgrades.

This is an Agency-wide effort with significant collaboration among our experts at NRR, NRO, research, the regions, and other offices. The staff will write shortly an annual update paper to the Commission with the status of all of the IAP activities.

And, finally, the staff is participating in IEEE-603 standard development activities as previously directed by the Commission. That standard is expected to be finalized by IEEE in mid to late next year.

As the standard gets closer to completion the staff will begin to evaluate it for incorporation by reference into a regulation under 10 CFR 50.55(a).

We will continue to engage the Commission as appropriate. Thank you. Now I will turn it over to Kimberly.

MS. WEBBER: Thank you, Mike. Good morning, Chairman Svinicki. Good morning, Commissioners. The Office of Nuclear Regulatory Research collaborates closely with NRR and our partner offices to provide the necessary analyses, tools, information, and expertise.

In light of an uncertain variable and changing environment we continuously monitor business line priorities to ensure our work aligns well with regulatory needs.

We work daily to improve our effectiveness, efficiency, and agility in collaboration with partner offices and our international and domestic counterparts.

For example, during the last year we have supported the following licensing activities and oversight activities. The staff have performed thermal hydraulic reviews for MELLLA+ application, license applications, allowing licensees to operate safely at higher power levels.

By performing thermal hydraulic analyses using our TRACE code as well as full-scale testing we have identified fuel heat up conditions and are confirming safety during potential power instabilities.

We have been preparing for future reviews of accident-tolerant fuels and other new fuel designs. The Office of Research, NRR, and other business line partners are working together to prepare the NRC for batch-loading of accident-tolerant fuel, including considerations associated with fabricating and transporting fresh fuel.

We are also developing agreements with the Department of Energy and with the Electric Power Research Institute to leverage data and information that will support our reviews.

We have also been advancing the NRC's use of risk-informed decision making by collaborating with NRR and the regions to develop the technical bases needed to incorporate FLEX strategies and related plant modifications into the Standardized Plant Analysis Risk, or SPAR, models.

This will better position the NRC to model realistically the risk of the as-operated plants in our risk informed evaluations while enhancing the technical bases for evaluating licensee incorporation of these plant modifications in their risk-informed license submittals.

As we provide the support we also seek to ensure their analytical capabilities are sustainable by preserving and sharing knowledge, publishing high quality results, training license reviewers and equipping them with the tools needed to confirm safety.

Slide 33, please. I mentioned previously our focus on effectiveness, efficiency, and agility. We are making substantial progress through improved coordination and communication within our office and with our business line partners.

We have strengthened accountability and improved planning, prioritizing, tracking, and reporting of our research projects. As you may be aware we have implemented a more transparent and efficient process for tracking and reporting on our projects in response to requests from the Congress and from you, from the Commission.

One of the key contributions that we make in fulfilling the mission is providing expertise in analytical capabilities. While we have been rightsizing our workforce commensurate with our workload we have been enhancing our expertise and capabilities by conducting research and placing greater alliance on and developing NRC employees with this expertise.

As directed by the Commission, for example, we have been advancing the state of the practice in conducting a site-wide Level III PRA for the local site in cooperation with Southern Nuclear Company.

By conducting much of this work in-house we have enhanced the knowledge and skills of our employees as a key feature of this project.

We are also participating in the pilot on enhanced strategic workforce planning leveraging core capabilities established by the Commission for our office nearly 20 years ago.

Following the EDOs approval in early July we have

already begun the pilot by training our supervisors, identifying and evaluating core positions, projecting workload, and assessing how this workload will impact workforce needs for our office.

Slide 34, please. In addition to relying on our own experts we leverage strong partnerships with U.S. research organizations, such as DOE, the National Institute of Standards and Technology, U.S. Geological Survey, and EPRI, among others.

Through these partnerships we amplify our research programs ensuring our awareness of cutting edge developments that are important to nuclear safety and security while reducing unnecessary duplication of effort.

As an example, and is pictured on this slide, we have been cooperating with NIST in assessing the causes and impacts of alkali silica reaction in concrete, which emerged several years ago as a concern at the Seabrook Nuclear Power Station.

As another example, we have been exploring with DOE whether and how we can utilize its nuclear safety codes to augment NRC's analytical capabilities at a reduced cost.

Office of Research staff have been making arrangements to use DOE's suite of nuclear, thermal hydraulic, and fuel performance codes developed through the Consortium for Advanced Simulation of Light-Water Reactors, or CASL, and the Nuclear Energy Advanced Modeling and Simulation, or NEAMS, programs.

This would leverage DOE's investment of hundreds of millions of dollars in high-performance computing systems, codes, and

models, which may help us confirm safety in regulatory applications, such as licensing of accident-tolerant fuel and advanced non-light-water reactor designs.

Next slide, please. We also rely on and leverage our well-established relationships with our international counterparts that support resolution of nuclear safety and security issues.

Today, more than 75 percent of nuclear power plant operation experience is generated outside of the United States. Tapping into that experience and technical expertise helps us accomplish the NRC's mission and advances nuclear safety.

Through more than 70 implementing agreements with over 30 countries we gain access to experimental data, plant safety analysis, and analytical tools and codes.

We use this information to refine our reactor safety codes through multilateral development and sharing of code modifications while reducing the overall costs to the NRC.

As an example, through our international code sharing program we receive a couple million dollars per year in membership fees in addition to high quality technical contributions from participating countries for NRC code validation and development purposes.

Additionally, these relationships ensure rapid excess to experts when incidents or nuclear safety events occur around the world.

The Office of Research partners with the Nuclear Energy Agency on complex research projects. Collaborative research projects through NEA yield a significant average return of about 10:1 on

our investment.

For example, NRC participates in the NEA Halden Reactor Project which performs research on fuels, materials, human factors, and digital systems. Our EDO recently gave a keynote address at a Halden meeting just last month.

Overall this program costs the NRC roughly $1 million per year and we obtain benefits of roughly $18 million worth of experimental results which are critical to advance, for example, thermal hydraulics analysis and access peak cladding temperatures in support of fuel license topical report reviews.

This concludes my brief summary and I will turn the presentation back to Vic.

MR. MCCREE: Thank you, Kim. Chairman, Commissioners, as you have heard this morning the people who work to ensure the safety and security of operating reactors and research and test reactors are at the heart of the Agency's mission.

As we execute our mission we continue to note your spirit of effectiveness, efficiency, and agility, and we routinely see evidence of this ethos in both what we do and how we do it.

We are building on our successes in areas such as the Fukushima lessons learned and licensing processing improvements and we're also leveraging risk insights to make well-founded safety-focused regulatory decisions.

The dedicated people in the operating business reactor line collaborate across the program and among the business lines to

make this possible and I would like to thank them for all of their efforts.

This concludes our remarks and we look forward to your questions. Thank you.

CHAIRMAN SVINICKI: Thank you, Victor. And thank you to each of the presenters on the panel and those who helped you prepare for today and pull together a lot of information. We begin the question and answer period today with Commissioner Baran. Please proceed.

COMMISSIONER BARAN: Thank you. Brian, you mentioned the staff's efforts to prepare for accident-tolerant fuel applications. Currently NRC's regulations recognize only two types of fuel cladding for a full core -- Zircaloy and Zirlo. The regulations also recognize only one type of fuel pallet material, uranium oxide. But vendors are looking at other cladding and pallet material such as silicon carbide and uranium-silicide.

Because these new materials are not addressed by our regulations, licensees would need to seek regulatory exemptions to use them, and that's not very conducive to innovation and fuel design. There was a draft final rule that would address this issue that has been pending before the commission for more than a year-and-a-half. I voted on it 14 months ago. The 50.46(c) rulemaking would move to a technology-neutral, performance-based approach that would apply to all cladding materials and fuel designs so applicants would no longer need to seek regulatory exemptions from the existing requirements.

Does the staff agree that finalizing the 50.46(c) rule

would better position the agency to handle the expected accent-tolerant fuel applications for full core loads? Would having technology-neutral requirements make more sense than having requirements for just two particular cladding materials and one pallet type?

MR. HOLIAN: Well good, that -- that will bring some back to seven months I spent in research a few years ago. But the answer, yes, we have looked ahead to see -- exemptions could be used for that as compared -- compare this to the decommissioning rulemaking where we are able to apply exemptions and deal with the technical situation that way. That rulemaking has a piece into it, which would make it more performance based to -- to enable a variety of fuel options to come in and pass performance-based criteria. So it would be conducive to have that generic planning in place -- or, generic review criteria that applicants would have to satisfy and make that open. That information is publically available to them now, so they should be able to utilize that if they were to come in early before that rule was out.

COMMISSIONER BARAN: There's also an important safety component to the 50:46(c) rulemaking. New research findings from an extensive research program call into question the technical basis of the existing regulation. The latest science shows that the combination of temperature and oxidation limits established in the current regulation are not stringent enough to prevent embrittlement of the fuel cladding. In addition, the existing regulation does not address the new degradation mechanisms revealed by the latest research, such as breakaway oxidation. Is that right?

MR. HOLIAN: So, yes that -- there are two parts to that rulemaking, really. One was clarifying the rule to be open to different fuel types. And then the second was based on research done. We thought that this oxidation aspect -- we wanted to clarify aspects of the technical basis that they would do. So that review was done as part of that rulemaking package that went up. A look was done at the plants to look at how much margin they have. But that research is a piece of that rulemaking that's right.

COMMISSIONER BARAN: In the absence of adequate regulatory requirements the NRC staff has been performing annual safety assessments of each nuclear power plant in order to ensure that there is no imminent safety hazard related to the integrity of the fuel cladding during a design-basis accident. Essentially, the staff is conducting after-the-fact, backward-looking reviews to see if the fuel at each plant would have performed safely during an accident in the prior year. Is that right?

MR. HOLIAN: Well, yes and -- yes and no. Let me answer that with what little I know. And I might need some help on this from a Tech staff. But in general, when the rule went up -- and my memory serves me correct that -- looked at this a little bit on turnover -- we did an assessment then on the rule going forward with what information we had from Research, did we have a safety issue right away that need to be addressed?

And a technical assessment -- I believe it was back in 2011 -- confirmed with a plant-specific look at each plant that significant

margins were in place. They looked at fuel operating history and an assessment was done. The look back that you referred to is every year we reaffirm that those margins are still good by looking back at the operating history. And I know that gets done out of DSS and I don't know if -- there we go. Paul Clifford is there to help me, thank you.

MR. CLIFFORD: Yes, I will -- yes, the initial assessment was done in 2011 where we worked with the industry by the PWR Owners Group and the BWR Owners Group to assess plant-specific safety relative to the three new degradation mechanisms that were -- identified as a result of the research at Argonne National Labs.

And we were able to show positive margin by taking credit for improvements in cladding performance and improvements in -- in ECCS evaluation models to show this -- that the plants would operate in a safe manner. And then every year we -- we reaffirm that, as was mentioned -- by looking back through all the changes that have been done for each and every one of the operating power reactors to reaffirm that margin.

COMMISSIONER BARAN: We look at the changes that the plants made in the preceding year to see if that eroded the margins and it would cause a safety issue?

MR. CLIFFORD: Right. So each time we perform a safety assessment, it is essentially a snapshot in time. And then -- and then as time progresses you're moving away from the margins that are -- that are known. So each year we then reaffirm the margin. So it's a look back at the previous operating cycle.

COMMISSIONER BARAN: Right. And -- and we need to do this because the existing regulation would not prevent licensees from taking actions that would reduce the margins?

MR. CLIFFORD: That is correct. The margins that are identified in safety assessment are not being tracked by the licensees. They're not controlled by the tech. specs. So they're not even documented in the plant's FSAR.

COMMISSIONER BARAN: Okay. And so is this -- is this kind of oversight approach one we use in other areas? Waiting till the end of the year and then seeing whether a plant has made a number of plant changes permitted by the regulations that would put it in an unsafe condition?

MR. HOLIAN: Well, let me -- let me scratch looking back at other examples. You know I -- we are provided tools, you know, rulemaking, orders, generic communication for this -- as I look back on items and rules -- station blackout rule, you know, brought up a technical concern about electrical. And we did that via rulemaking knowing we had a concern about electricity supplies to a plant. Generic -- so that -- that speaks to the timing of an issue and can you do an operability that the plants are safe as-is while you do a rulemaking to come into place? Which I think is the -- the basis of your question.

Generic Safety Issue 191 that we've been wrestling with for years on some performance. That's a similar issue where we looked at the margins that we had -- and we continue to do that as we finalize the issues. We put in bigger strainers as an initial case, but

then we had additional technical questions come up. So we are continuing the Technical staff to assess margins as we take the time we need to finalize the fix for that. So those are a couple that come to -- come to mind that are similar approaches for dealing with operability and design issues that take a while.

COMMISSIONER BARAN: Okay. Well I -- I appreciate what the staff is doing here. I know you are not in a great position because the staff's view is you should address this issue by rulemaking. That hasn't happened yet. And so you're doing the best you can to ensure reasonable assurance of adequate protection of public health and safety. Listening to what we're doing doesn't give me a lot of confidence that we're really managing that. If this rule is not issued, is the staff going to consider other regulatory tools to address the issue such as orders or generic communications?

MR. HOLIAN: Well, we can look at that, Commissioner. The -- you know, it -- the rule was an initial step the staff thought was appropriate for this issue. If that didn't happen, as I mentioned, we -- we've seen evidence that the industry -- PWR Owners Group, BWR Owners Group -- well aware of this issue.

So getting that information out, the research out, the SECY paper out itself -- has shown promises. Our Technical staff gets that information. We look at that information is being considered when we do regular reviews, like power uprates, our staff is questioning along that area. And we've seen evidence that the industry is well aware of this issue and factors that into their fuel analysis.

So, we can -- we can handle it now. We can handle it in the future and look at some of our other tools to make sure that that information's out there at all the licensees and fuel vendors, really.

COMMISSIONER BARAN: All right, well I hope we will be able to issue the rule in the near term because I think we need to resolve this issue. I'd like to briefly turn to the engineering inspections that Shakur discussed earlier. The NRC staff recently held a public meeting as part of a broad review of ROP baseline engineering inspections. And in that meeting an industry proposal to replace portions of the baseline inspection program with licensee self-assessments was discussed. It was mentioned a little bit during the presentation today. As I understand it, this would basically turn some NRC inspections over to licensees to do themselves. Is that your understanding of this proposal? And is that something the staff is actively considering as an option?

MR. WALKER: Well, I appreciate the question. It's very early in the process. The industry -- during that October 11th meeting the industry just provided a very rough draft of what licensee performance verifications would look like. But, you know, we understand and appreciate that we need to have an open, collaborative dialogue about all of the options and all the recommendations and positions from the -- from the industry. And this being one of them we are taking it under consideration. But it is still too early to see how it's going to work.

Now the industry still has to develop guidance, how it

would be implemented, how it would look. You know, they just have a very rough structure that they presented. We planned for another public meeting at the middle of December and we're looking forward to seeing what industry and NEI specifically has to present during that time on what they're position is for how these licensee performance verifications would be implemented. And they're also looking to us for -- to provide input. So it's a very collaborative process to see how that would be utilized -- if utilized in ROP.

COMMISSIONER BARAN: Okay. It sounds like it's pretty nascent at this point. But these are baseline inspections we are talking about, right? These are basically the core of NRC's oversight of reactors. So, you know, I guess we -- part of this process should really be asking kind of the big-picture question here about -- you know, what's the role of the safety regulator? What's the role of the operator? Should we really be considering have licensees inspect themselves instead of us doing -- conducting baseline inspections? That would be a really significant change to our inspection approach.

MR. McCREE: Commissioner, if I might add, one of the understandings that we're going into this initiative with is one, recognizing that this is not a case of first impression. We have history within the NRC oversight process -- actually, prior to the ROP -- of allowing what was referred to as licensee self-assessments in the engineering area. We've done it in service water inspections, they were called SWPs, and in other areas. So we do have some history in having licensees perform -- I guess what they're now being called is

licensee performance verification activities -- and that NRC would consider -- actively consider the results of that in deciding the scope, the resources, the timing of its independent inspections.

So we have some history and we're taking advantage of that as we're considering this current proposal. During Shakur's presentation I listened in very closely, one of the things he talked about was that we would ensure happens through this effort as we consider it, is the appropriate level of independent oversight of engineering activities that were for specific issues. He also talked about the importance of NRC maintaining our ability to identify latent issues, et cetera, et cetera.

So I have a sense of confidence that we're doing about it with the right principles in mind. That there's no intent to divorce or transfer to our licensees the independent responsibilities that we maintain. So we will carry that forward and make sure that the Commission is aware of the results.

COMMISSIONER BARAN: Okay, thank you.

CHAIRMAN SVINICKI: Thank you. Commissioner Burns.

COMMISSIONER BURNS: Thanks, and I again thank you all for the presentations. You know, obviously with the operating reactor business line there's a broad scope of activities of little reactors, big reactors, international reactors and all that. So all sort of facetiousness aside, let me -- let me follow-up a little bit on the baseline inspection issue.

In one respect -- I mean, I can understand there's, you know, an interesting balance. We can look at the international framework. Who is responsible for safety? Primarily the operator. The regulator has to be there to confirm that there were the operator, the licensee is meeting its goals.

And you know, I know in terms of the inspection program's change over the years, are there things -- and I don't mean to put Shakur or Rick or anybody -- Brian -- anybody else on the spot, but sort of -- maybe even asking the question is if intuitively is there something we look at now in terms of our -- the inspections and maybe ask ourselves is there a value added to how we are conducting that inspection? Are there places where you might pull out -- and you may have touched on it a bit in your presentation, Shakur, that you would say are where we sort of question -- we do it because that's the process and we should follow our processes until we modify them. But where we sort of ask ourselves about the value added in terms of how we're doing it?

MR. WALKER: Good question, Commissioner. And yes, we did have a lot of discussion when we first kicked off this effort on, hey, let's put everything on the table. Let's look at -- you know, because again, we're tasked with transformational thinking. Out of the box. What is it that we do? And let's identify where these existing -- if there are any -- potential gaps or overlap. And so that overlap section is where we can say, okay, we do this, but is there a more efficient way? Are we doing something that's redundant? And then,

you know, that's being done? Or it could be done better in another one of our inspection procedures.

And some of those things were the heat sink inspection, for example. We do a tri-annual heat sink inspection that's done every three years at a site. And we also have a resident inspector portion of that. But we've discussed, could that be done as part of a focus sample? As part of one of our comprehensive engineering inspections as well as the 50.59 inspection? Those are some of the examples.

And we've had that on the -- we've put that out there. We've had the discussions with the external stakeholders and industry during our public meetings, and they were in alignment with them. They thought of some of the same things as far as what are the -- some of the things that could be done better that we do, but could be done in a different way? Brian?

MR. HOLIAN: Yes, Shakur, thanks. And Commissioner, I agree with everything Shakur said and I just wanted to add one point here. It hopefully came out in the beginning of Shakur's presentation was, this is normal process for us. The ROP demands that we look back every year or every two years, you know, and take a look to do kind of what you said. Make an assessment of that.

Historically we have looked at items -- do we need to go out and RAD dose out there if we can -- do we need to walk around independently, or can we look at data provided by the licensee? Look at performance indicators and substitute that for inspections? So the

ROP calls us to do that. That's what initiated this review was hey, let's take a look at Engineering. We've done some changes in the past. Let's look at it again.

So it calls for us to self-assess, you know, where should we be putting our time? License renewal with latent items? Plants age more, so take a little bit more of those samples and do that year to year.

COMMISSIONER BURNS: Okay, thanks. Actually, a question I know Vic spoke at -- in Norway at the Halden -- the celebration there. My question on Halden, and I can't remember from my NEA days is Halden has been around a while as a facility. Is there some -- just talk in terms of lifetime. Because I know we do get a lot of -- you know, not only us, I think as I said that there's a -- you know, in terms of leveraging, you know, the funds that go in -- that we and others who participate and then get a lot.

So is there -- I don't know if that came up in the discussion there in terms of looking at the life span of the Halden Reactor. And if there are other alternatives. I vaguely recall some project in the south of France that they were looking at. A potential research-type facility.

MR. McCREE: I don't have the dates offhand. Mike, do you want to speak specifically to that?

COMMISSIONER BURNS: Yes, thanks, Mike.

MR. McCREE: That subject did come up during the course of the meeting.

COMMISSIONER BURNS: Okay.

MR. McCREE: There was an end date or end time period for the Halden Reactor. And yes, there is some vision of the project in France at Cadarache, perhaps.

(Simultaneous speaking.)

COMMISSIONER BURNS: Okay. It was Cadarache, okay.

MR. McCREE: Replacing Halden. But Mike, do you want to give more detail?

MR. WEBBER: Sure. Mike Webber, Director of Research. You are correct, Commissioner, Halden has been around since 1958. And we have been one of the longest surveying partners in the Halden project. They have come up against a license renewal review, so Norway, as the regulatory authority, is making a determination about whether to extend the license for the Halden Reactor.

And that's where some of these questions related to waste management emerge. And so we are in the process of preparing a paper to send up to the commission to advise before we would enter the next period of the Halden project. And that begins in January.

COMMISSIONER BURNS: Okay. All right, thanks. Thanks, Mike. Talking on accident-tolerant fuels -- and are it is obviously -- in the industry there's a big push in terms of this. And how do we see the sort of coming together on the research end?

Because I know there is research out there, you know, ongoing. We're interested, obviously, in the results. But, you know, I am hearing a lot and I am sure -- and I know if I am hearing it, the staff is hearing it in terms of timelines and, you know, desired time frames.

But, you know, obviously, you know, research take time to ensure its quality, to ensure its usability. So what can you tell me on it?

MS. WEBBER: Yes, so we have been working collaboratively across the agency to put together a plan. And the focus of the plan is really to engage with our external stakeholders to understand what research activities they are performing, what their time schedules are, to include experimental programs at the Idaho National Labs.

There is some longtime horizons for some of the research activities. One of the key assumptions in the plan that we are developing is that we will need to rely on the National Laboratory experimental results to provide some information for our confirmatory analytical capabilities, such as our analytical codes. So that's a key assumption in our plan at the present time.

As you know, research is expensive. And so we are trying to leverage their activities. Another part of the plan is to stay very closely connected to what they're doing in terms of when they're doing it, what they're doing, where the gaps may be. And then we will try to assess the gaps and try to figure out what's the best and most cost-effective approach going forward?

COMMISSIONER BURNS: Okay, thanks. Let me talk -- turn to Steve Lynch. In terms of the SHINE facility, and obviously we are moving to -- or preparing for construction phase -- have you all been talking to NRO in terms of lesson -- granted, it's a different scale and a different type of facility. But have you been talking to NRO about, you know, lessons learned from a construction inspection program that might have some value to you all as you prepare -- as the staff prepares for that phase at SHINE and others?

MR. LYNCH: Yes, we have had those talks with NRO. NRO actually authored the construction inspection program that we wrote for the SHINE facility and the Northwest facility. And actually last year we held a public meeting with SHINE where NRO presented and shared some of those lessons learned with the Applicant as well -- of what we've learned from their construction projects. So we've talked internally and shared some of those thoughts with the Licensee as well.

COMMISSIONER BURNS: Okay. And in terms of the potential design changes and the implementation of the demonstration projects -- sort of -- if you can tell me sort of where that is and what are sort of the next steps up ahead.

MR. LYNCH: Sure. So the demonstration project -- China is essentially planning on conducting some short duration tests with their -- a prototype of their accelerator and the neutron multiplier. And based on the material that they will need for that, they will be completely under an agreement state license for their demonstration project. So the NRC doesn't have direct involvement in that.

In terms of design changes for the facility, we are planning some public meetings with SHINE beginning as early as December of this year to start talking about some of their process changes with respect to their chemical processing, and also a little bit on the administrative side talking about maybe potentially staggering construction and beginning operation of some of their operational units.

With respect to how that may impact construction, one of the things we will be doing is going out to the site approximately two to three months before construction begins -- so, late winter, early spring -- to have a table-top exercise with SHINE where we can set expectations that the inspectors will have while we're on site. But also for SHINE to show us what their design control packages look like.

COMMISSIONER BURNS: Okay.

MR. LYNCH: And this is assuming when we go out there that we have not received the final safety analysis report yet.

COMMISSIONER BURNS: Yes.

MR. LYNCH: Because we have set the clear expectation that if we do not have the final design when inspectors go out on site, they need to have some idea of what they're looking at -- of what the current design is.

COMMISSIONER BURNS: So, the design changes, would they be assessed as part of the operating license review? Is that how it works?

MR. LYNCH: Yes, it's -- yes.

COMMISSIONER BURNS: Okay.

(Simultaneous speaking.)

MR. LYNCH: We will evaluate the design changes.

COMMISSIONER BURNS: So the -- what I will call the traditional, or the two step?

MR. LYNCH: Yes.

COMMISSIONER BURNS: Okay. All right. Thanks, very much.

CHAIRMAN SVINICKI: All right, thank you all. I will just go into some specific questions I think here. Some have been touched on. I think everyone has mentioned accident-tolerant fuels -- or, I think advanced technology fuels is also being used with the same acronym.

We know that there is interest in the insertion of lead test assemblies. Some of our licensees are interested in that and have engaged the agency regarding the broad parameters of how many and where in the core those could be inserted at different levels of NRC review and approval, a license amendment versus coming in under standing provisions that allow the insertion of such items in the core because of course any -- even the fuels we have now had to be qualified in some fashion. So in order to qualify fuels you have to begin somewhere to irradiate and collect data.

How is the staff -- have we been successful in developing the broad criteria to guide the industry before they come in? Or develop proposals of, again, how many perhaps lead test assemblies and where -- just to give them some general guidance on

what they might be proposing?

MR. HOLIAN: I will start. Kathryn, you help me. It's a timely question. We had a public meeting a few weeks ago on this subject really with two or three different vendors -- or utilities -- that are looking at lead test assembly insertions. And quite honestly, you know, we gave them mixed answers because our history has been mixed. But from a safety perspective, you know, that's okay. But we are trying to firm that up.

So let me just clarify that in the past lead test assemblies have gone in historically through the years of operation here for different fuel assessments and designs. We have reviewed them in a variety of methods -- inspecting under 50.59 where the licensees can make those changes. They actually do whole core reloads under 50.59 these days. Historically, they used to come in for license amendments early on, but they realized they could do that under 50.59.

So lead test assemblies, the NEI guidance -- gives guidance on use of 50.59. Tech specs do touch on lead test assemblies. So some plants have a tech spec that's either more specific or less specific. And so some plants have used an existing tech spec for their lead test assembly applications. And as you mentioned, license amendments. That's always a possibility to come in.

We are firming up that guidance to utilities on the use. We're doing that. We've been working with OGC to verify that our guidance goes out and we are looking at the product to get out. We

will get -- we will follow up that meeting with individual licensees so they are clear that they can come in. Not really a safety issue on the types of questions we have. Really just a documentation of how we will affirm our review. Kathryn, anything to add?

MS. BROCK: I would say you got just about everything. But it is important that we will be getting back to the licensees who have an imminent need -- an information need -- we promise by the end of this month. So we will start there, but we will also be looking towards the generic approach and making sure we are clear in our guidance working with industry.

CHAIRMAN SVINICKI: Okay, thank you very much. Turning to the medical isotope production case. Steve, you presented an approach at the construction permit stage that was able to take a regulatory framework perhaps not developed for the specific technology and adapt the use of that. Do you feel when the staff gets to the operating license phase, that same approach -- that will still be workable for you at that phase?

MR. LYNCH: Yes. And the one thing we are doing to make sure that we are staying on top of our regulatory framework is looking at any new rules that are in development throughout the agency to make sure that the applicability wouldn't interfere with any of our licensing activities. For example, emergency planning rulemaking that I talked about, then also the financial qualification rulemaking that's in development.

CHAIRMAN SVINICKI: Okay, thank you. A lot of our

discussion here this morning has been about a -- I think a whole series of improved processes and things that -- I will say NRR particularly has taken under development and put in place. There was commission direction at one point for NRR to do what's called a business process improvement review. And I was supportive of commission willingness to modify that direction in light of, again, a rather comprehensive look at structure and process that went on for this business line and within NRR.

A broad question I might have is where the changes have had positive results for this business line and for NRR? Victor, is there any systematic look at recommending those lessons learned and improved processes in the materials or security area? Other programmatic elements that could -- could benefit from that?

MR. McCREE: Chairman, thanks for your question. One of the things that we do systematically in our quarterly performance reviews, quarterly strategic alignment meetings is identify, recognize areas where a business line or an office has produced good work from an initiative -- whether it's an effectiveness, efficiency or an agility initiative. And we consciously ask ourselves about the adaptation of such an initiative in the other business line -- in many cases already, what we have seen and realize is that that outreach has already occurred.

Some of which has been chartered by the offices and sometimes it's not chartered, it just happens, which is I think organically where we want to -- what we want to achieve is that the effectiveness,

efficiency, and agility -- the ethos of Project Aim is occurring systematically. Whether it's an institutional effort or, again, it's just an organic effort. And there's specific of that that I can share with you at some other point comprehensively.

But RAIs is an example. The licensing process improvement -- some of the initiatives in terms of institutional controls are being considered across the business lines. And there may be others, Brian, that you can -- do you want to -- Kathryn?

MS. BROCK: One example where we have been talking amongst the business lines is we have gotten together a group of division directors from each business line to talk about how we have commonalities in licensing processes, and where we might not be so common. So we are looking to find ways to be more consistent across the agency where we can.

We might find in some areas, because of the variety of different types of licensees and how we communicate with them, that that might be tricky. But for the most part, like Vic said with RAIs, acceptance reviews, how we communicate with the staff. I think we can make some good progress there and illustrate commonalities.

CHAIRMAN SVINICKI: Thank you for those examples. And it's good to hear that some of it just occurs more synergistically. It doesn't need to have its own process for sharing. We have mentioned that business lines require the participation of a lot of different organizations. So that might be the -- one of the ways that it occurs.

But speaking of new tools, the Replacement Reactor Program System is a very significant new tool that, by my assessment, gives new capability for work planning and for the monitoring of work in progress. Some elements of that I think were -- went live more recently. How is that going? I don't -- Kathryn, maybe you want to comment on that.

MS. BROCK: The RRPS system is something we have been using and improving on and really looking forward to because what we're finding is the more data we have the more certain we can be about how our performance is and then plan for improvements in the future. And so I mentioned one of the -- one of the things we are going to be looking at is specifically risk-informed reviews. We are going to specifically be tracking the timeline on those so that we can see are we -- we think we are getting better as we go, as we have more experience with them, but the data will be able to show us how we are improving or where we need to focus.

CHAIRMAN SVINICKI: And I appreciate that you highlight that area covered with the -- a light touch today just because there was so much material to cover. Were some of the specific initiatives that this business line is trying in advancing risk-informed decision making, and it was kind of baked into a lot of different things that you talked about today.

You had mentioned pairing safety reviewers that were more deterministic in approach with those who are more risk oriented. What have been some of the outcomes of doing that? I know there is

probably a good transfer of knowledge. But beyond that in terms of just performance and program execution, have there been specific outcomes you've observed?

MS. BROCK: Well we find when we pair the risk reviewers along with technical reviewers that we can stay out of those silos. For example, when we develop safety evaluation -- safety evaluations, we can be doing it concurrently and they can be talking as they go so it isn't each technical person, technical reviewer develops their own material and then it's put together at the end. We can drive efficiencies and knowledge management by working together as we go.

CHAIRMAN SVINICKI: I do, fair or unfair, it's my observation that, I think given the expansive nature of this business line, you probably are trying more things in terms of risk-informed decision making. And you're just touching more licensing items over the course of any given year. So I do hope in reference to my previous question that that same kind of synergism is happening with the materials area and other programmatic areas. In some ways you all, just given the op tempo of your business line, you're leading the charge on some of this. So I am glad to hear that there is some synergistic conversations happening.

Just before I close I would like to turn to Kimberly. You mentioned the Office of Research being a pilot of the Strategic Workforce Planning Initiative. And so I know that an early step in that -- and I think you even made reference to it -- was trying to look over the horizon and identify the core competencies and capabilities that you

had to be certain were vibrant and that you were safeguarding those competencies in-house looking over the horizon. Did you feel that the knowledge of projected workload and subject matter areas gave your organization good confidence in identifying those areas at this point?

MS. WEBBER: Well so at this point we -- we do have a strong understanding of what our core competencies are. And we are still trying to evaluate the work load. We have just started that initiative. We had a meeting a week or two ago to talk about what the -- what the work might look like five years from now.

And while it is primarily a decline in resources, we do have to find ways to maintain those core competencies. And so we will be looking to do that. So our analysis hasn't been completed yet. It's slated to be completed later -- probably in the early March or early -- late-winter timeframe. So it's still -- we are still going through that right now.

CHAIRMAN SVINICKI: Well I thought it was really exciting that Research had decided to be one of the pilots. I don't know if you volunteered or you ended up as one of the pilot offices, but I think if you can take a high confidence, high fidelity look at this then that would make me confident than any organizational element should be able to take this on. So I appreciate you all being willing to be a pilot on that. And again, I thank everyone for all the information we've covered today. I would ask if my colleagues have any other questions?

(No audible response.)

CHAIRMAN SVINICKI: If not, thank you all again and we are adjourned.

(Whereupon, the above-entitled matter went off the record at 11:43 a.m.)