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TECHNICAL SESSION - T2

LICENSING AND OVERSIGHT LESSONS FROM THE PANDEMIC

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TUESDAY,

MARCH 8, 2022

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The Technical Session met via Video-Teleconference, at 1:07 p.m. EST, Darrell Roberts, Deputy Executive Director for Reactor Programs, OEDO/NRC, presiding.

PRESENT:

DARRELL ROBERTS, Deputy Executive Director for Reactor Programs, OEDO/NRC

CHRISTER VIKTORSSON, Director General, Federal Authority for Nuclear Regulation

BISMARK TYOBEKA, Chief Executive Officer, National Nuclear Regulator, South Africa

TOSHIYUKI KOGANEYA, Director of Oversight Planning and Coordination Division, Japan Nuclear

Regulation Authority

STANLEY FREEMAN, International Relations Coordinator, International Cooperation & Assistance Branch, OIP/NRC

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P R O C E E D I N G S

(1:07 p.m.)

MR. ROBERTS: Good afternoon and welcome back to the -- we apologize for the slight delay in getting started here for this session.

I am Darrell Roberts, the Deputy Executive Director for Reactor Programs at the U.S. Nuclear Regulatory Commission, and I am truly honored to serve as the chair for this technical session on Licensing and Oversight Lessons Learned from the Pandemic.

As the COVID-19 pandemic continues to evolve worldwide, I believe this is an opportune time to discuss our experiences and lessons learned as regulators during the pandemic.

Throughout these past two, and now going on three years, communities across the United States and around the world have experienced insurmountable losses and been forced to reorient the way they interact and how nuclear regulators -- and nuclear regulators are no exception.

Despite these challenges, the responsibility to continue the licensing and oversight activities of our nuclear programs has

remained our professional mission.

Over time, we have adapted and transformed our programs in ways that have enabled us to meet our respective missions.

I am confident that the lessons learned we've had throughout the past two years will continue to inform how we operate as regulators, and I look forward to sharing the NRC's experiences as well as hearing from my three distinguished international colleagues on their unique perspectives on this topic.

Before we begin, I would like to take this time to introduce our three highly esteemed panelists starting with Mr. Christer Viktorsson, who is the Director General at the United Arab Emirates Federal Authority for Nuclear Regulation, or FANR.

Mr. Viktorsson has over 35 years of experience in nuclear regulation and safety. Additionally, he has extensive experience in nuclear policies and in the preparation and application of national regulations, international standards and peer reviews.

He has held central positions at the Swedish Nuclear Safety Authority, OECD Nuclear Energy

Agency, and the International Atomic Energy Agency.

Next we have Bismark Tyobeka, who is the Chief Executive Officer of South Africa's National Nuclear Regulator.

Dr. Tyobeka has more than 19 years of experience in the nuclear field. He has held positions with the IAEA and Eskom, just to name a few.

He has served as a visiting scholar at the Netherlands Nuclear Research and Consultancy Group and worked as an international research associate here in the United States at Idaho National Laboratory.

Dr. Tyobeka is also an internationally acclaimed nuclear engineering expert and has served as a member of the International Nuclear Safety Advisory Group since 2015.

And then next we have Mr. Toshiyuki Koganeya. He is the Director of Japan's Nuclear Regulation Authority's, or NRA's, Oversight, Planning and Coordination Division.

He has worked in the field of nuclear regulation since 2011 and was responsible for the response to, and the investigation of, the Fukushima

Daiichi accident from 2011 to 2013 in the Nuclear and Industry Safety Agency of the Ministry of Economy, Technology and Industry, or METI, and the NRA.

Mr. Koganeya has also served as an international assignee within the United States' NRC for one year where he and I first met in NRC's Region III office and has since incorporated that experience into Japan's oversight program.

Currently, he is responsible for the implementation of Japan's oversight program responding to the COVID-19 pandemic.

So, again, I want to thank you all for being here to support this session especially considering the very large time differences between the United States and your respective countries.

And before I begin, I will note that there will be a question-and-answer session following all of the panelists' presentations.

So, please feel free to enter your questions in the chat box provided on the screen and we will get to as many of those questions as possible at the end of the session.

I will now begin with my presentation about the NRC's licensing and oversight lessons

learned from the COVID pandemic.

So, if you can pull up my slides, there they go. Thank you. Okay. So, I'll start with the next slide, actually.

So, I'm sorry, go back -- okay, there we go. Stay there. Yes, sorry, go back to the -- I'm sorry, go back to the next slide again. Got a little confused.

Alright. So following the declaration of the COVID-19 pandemic in 2020, the NRC began taking all necessary steps to protect public health and safety, including the identification of regulatory requirements that could pose challenges during the pandemic and the areas where the staff believe that temporary flexibility, such as exemptions, would not compromise the ability of licensees to maintain the safe and secure operation of NRC-licensed facilities.

Regarding the first bullet you see, organizational agility, the COVID-19 public health emergency had a potential to challenge the NRC's ability to maintain its mission.

To ensure our organizational agility was maintained, we stood up an internal group, the NRR COVID-19 Communication Team, or NCCT, which was led

by division management to respond to key challenges and priorities such as oversight, operator licensing and fatigue rule exemptions, just to name a few.

For public health -- excuse me, for public and industry engagement the NRC hosted 10 public meetings with industry to understand licensing needs and support licensees' mitigation of COVID-19.

Regarding the use of public web pages, COVID-19-specific web pages were established to answer frequently asked questions in specific topical areas and to communicate to the public what actions the agency had taken both generically and plant specifically.

For focus workload management tool for related licensing actions, a focused workload tracking tool maintained on the NRC's internal SharePoint site was created to track all COVID-19 licensing actions for both power and nonpower reactors.

This list was used to inform management of the status of licensing actions and used for resource planning considerations.

Regarding the framework for expedited reviews, the staff issued letters in various topical

areas describing the criteria and the conditions under which it would be able to expedite review of licensees' requests for relief or exemption from certain regulatory requirements.

The letters conveyed the information that licensees would need to provide to us to facilitate the expedited review.

For internal temporary staff review guides, NRC also issued temporary staff guides documenting expectations for reviewing, and is issuing, COVID-19-related exemptions that supplemented the routine exemption review processes.

They were intended to enhance efficiency in responding to the needs of the licensees and the public. Now, the temporary staff guides will sunset once the COVID-19 pandemic emergency ends.

Next slide. For our initial response, NRC developed new guidance to perform oversight activities during COVID-19.

The guidance addressed completing inspection samples by establishing hybrid teams and conducting remote samples where needed, and maximizing telework while still maintaining some reduced onsite presence.

Now, NRC continued performing the baseline inspection program and initial operator licensing examinations; however, certain inspections were either delayed or deferred, including security force-on-force inspections, some radiation safety inspections, emergency preparedness and plant outage inspections.

Now, without counting security and EP inspections, NRC inspectors completed about 88 percent of the nominal samples required in the NRC's baseline inspection program. Nevertheless, the NRC performed activities to ensure reasonable assurance of safe plant operation.

In the area of recovery, as the situation evolved, the staff continued updating inspection guidance to accommodate for surges and changes due to COVID.

In November of 2021, for example, the NRC returned the inspection program protocol to the pre-pandemic status and determined that additional inspection activities were not necessary as a result of the pandemic.

For lessons learned, the NRC staff captured lessons learned during the first year of

COVID and is currently taking a broader look at lessons learned as the pandemic continues.

So, far, the staff found that there is no remote substitution for some of the onsite functions performed by inspectors.

Throughout the public health emergency and associated lessons learned efforts, it was acknowledged by NRC and licensee staff that the ROP inspection procedures include multiple provisions for in-person or onsite inspection activities that cannot be sufficiently performed remotely, for example, security performance observations, NRC review of licensee in-service inspection exams, safety culture interviews during problem identification and resolution inspections and plant equipment walkdowns during engineering inspections and resident plant status, all examples of things that need to be done in person.

However, the inspection activities during the public health emergency have provided some insight into activities that can be performed effectively from any location provided licensee support is sufficient.

For example, review of licensees' records

and documents by inspectors can be performed offsite effectively and efficiently.

Additionally, video conferencing and file sharing technologies have been used successfully during inspection interviews with licensees' technical experts.

Current and recent NRC lessons learned efforts are exploring the expansion of inspection activities during routine periods to include offsite review of records alongside onsite verification and observation of licensee personnel and equipment.

However, the extent of large-scale NRC adoption of expanded inspection practices will likely be limited by the industry's willingness to develop and adopt a consensus standard on information sharing with the NRC.

Next slide, please. So, 2020 started off as a normal inspection year, as anyone could imagine, with one force-on-force inspection completed at the V.C. Summer station.

And then in March of 2020 in response to the declaration of the COVID-19 public health emergency, force-on-force inspections were suspended while the staff developed a temporary force-on-force

inspection framework.

Now, this framework would adopt the necessary conditions to maintain effective regulatory oversight while ensuring the health and safety of both licensee and NRC inspection staff.

And by August of 2020, a modified force-on-force inspection procedure resumed that would focus on some selective elements of a licensee's protective strategy as opposed to the full strategy in normal force-on-force exercises.

Additional modifications to the force-on-force program were completed in February of '21 that allowed the inspectors to evaluate the full licensee strategy utilizing the minimum number of participants possible.

This effort allowed the NRC to resume its oversight role while still maintaining a balance of safety to licensee and NRC personnel.

Additionally in 2021, the staff developed a temporary staff guidance document that outlined a process for licensees to submit a hardship request based on established criteria that would prevent them from safety conducting an NRC-evaluated force-on-force exercise. These licensees would be inspected

under the procedure that was developed in 2020.

For calendar year 2022, the staff's inspection plan is a tiered approach that includes reverting back to full force-on-force inspections with some allowances to use the other two modified approaches established during 2020 and 2021.

Next slide, please. And in the area of materials, the Office of Nuclear Material Safety and Safeguards recently completed an evaluation of a nuclear materials and waste safety inspection program during the COVID-19 pandemic.

This effort assessed the various practices, adjustments, processes and inspection techniques utilized to implement the nuclear materials and waste safety oversight programs during the COVID-19 pandemic.

Based on the feedback received externally and internally, this effort gathered best practices and documented how each business line in NMSS implemented the inspection programs and developed recommendations to enhance certain aspects in the implementation of these inspection programs during their routine implementation and beyond.

The outreach included a series of surveys

and interviews in all levels of the organization, meetings with the grievance states and public meetings.

In November of 2021, the working group that took on this effort issued its report and concluded that the NMSS oversight programs remained effective in accomplishing its important oversight mission since the Agency implemented mandatory telework two years ago and concluded that the staff continued to demonstrate creativity, innovation, flexibility and resiliency to best accomplish the objectives of the inspection programs in NMSS.

As a result of this assessment, the working group provided recommendations that are detailed in the report to enhance the implementation of these programs during the COVID pandemic, any future pandemics or public health emergencies, and to enhance aspects of the current framework for the oversight programs based on what we experienced in recent months.

And as you can see here, this slide provides the key aspects of those recommendations and I won't read them. They're pretty apparent to you there regarding onsite inspections, the option to

employ flexibilities and specific inspection guidance that is warranted for pandemic preparedness.

NMSS management is considering these recommendations and they already have had their first set of alignment meetings and will soon direct action as appropriate.

And this is not a once-and-done effort or assessment. We continue to monitor the implementation of these programs during the evolving conditions of this pandemic and we will continue to adapt, assess and enhance any aspect of the program as needed.

And with that, I will now turn over to our second speaker, Director General Viktorsson from the UAE's FANR.

Director General Viktorsson, the floor is yours.

MR. VIKTORSSON: Thank you very much, Darrell. So, if I can have the slides, please, I will walk you through our response. There they come.

So, let me give you a brief overview of the licensing and regulatory oversight activities that we focused on during this pandemic, mainly 2020, 2021 and now starting 2022 -- next slide, please --

which gave me an opportunity to brief you about the completion status of the Barakah Nuclear Power Plant Project, which comprise four reactors, and our journey of licensing and regulatory oversight, and then some challenges and opportunities during this pandemic.

Next slide, please. So, you can see the four reactors from this picture and there are two reactors now in operation and Unit 3 and Unit 4 are still under construction, but are completing essentially all the construction. So, we are presently reviewing the license -- operating license application for Unit 3.

Next slide, please. Next slide, please. So, this is the time line of this entire Barakah project that started in 2010, essentially, with siting activities and then we continue to get the license application for construction at the end of 2010.

We issued the construction license in July of 2012 for Units 1 and 2, and Units 3 and 4 two years later.

And inside the square are the essential things that have happened during these pandemic

years. We have issued the operating license for Unit 1 in February 2020, and also another license related to --mainly to the storage and handling of spent nuclear fuel.

And then Reactor No. 2, the operating license was issued one year later and the corresponding fresh fuel (phonetic) licenses also.

And then at the end at the right-hand side of this time line is where we are now. We are reviewing license application for Unit 3.

Next slide, please. So, I just wanted to show you some interesting facts about the efficiency gains when you have reactors that are almost identical.

So, for example, the request for additional information for Unit 1, we have almost 2,000 such requests from our staff.

We used also outside technical support organizations. We had -- we did 267 inspections. We had findings over 400 and the process took us five years.

If we look at Unit 2, first of all, we did all of the work with our internal staff without the need to engage external technical support

organizations.

We have much less request for additional information. We conducted almost the same, similar number of inspections. We had less findings and we did this operation in about eight months. Only eight months.

Next slide, please. So, this is just -- I'm not quite sure of this. This is our Regulatory Oversight Program and the various elements that are the basis of decision-making.

And we can study this afterward, but we worked hard on this matter during the pandemic. That's why I showed it today.

Next slide, please. We're showing the various modules of this oversight model or system. We have a module for inspection, one for events that happens, one for licensee change requests, one for the plant status and one for operation experience.

So, this is all helping us to document and keep track of all the information, inspection reports and regulation of various events from operating experience, et cetera.

Next slide. So, it is just to show that even during the pandemic, the regulatory framework

needs to be updated.

So, we worked continuously during 2020, 2021 and we will continue 2022 on updating various regulations and regulatory guidance.

For example, emergency preparedness for accidents and the safe transport of radioactive materials and also on other topics, so we are presently, for example, reviewing the safeguards regulation, but also certification of plant personnel based on experience.

We do this in the past frequently and we continue during the pandemic for this work and relying largely on IAEA safety standards, but also the specific experience that we got from the operation and construction (phonetic).

Next slide, please. So, this is just the four squares or quadrants to show that the inspections continued in 2019, '21 and we have continued roughly the same amount of inspections.

We have benefitted from the resident office we have in Barakah. We started with five experts to supervise the day-to-day operations. We have increased to seven and we will increase to eight staff in the near future when all the reactors are in

operation or close to operation.

Next slide, please. So, this is also to show a little bit of the -- in the gray to the left there are the licenses that we issued, which I already talked about.

And we continue to participate as much as possible in various activities such as the Gender Equality Group that has been created. We arranged some webinars ourself on the impact of COVID-19. We continue to participate as much as possible with the Vienna (phonetic) Conference and in the Fukushima Conference. We hosted an IAEA workshop on regulatory practices for newcomer countries in particular where we had many countries from the region taking part and that was face-to-face meeting, et cetera. We have arranged also, which I will come back to, the IAEA ConvEx-3 exercise last year.

Next slide, please. So, the ConvEx-3 exercise was a particular challenge, of course, considering the large amount of participants that we wanted to have in order for the exercise to be effective and we managed to get a very successful exercise at the end with international and national participation.

So, we have various emergency centers nationally involved. We have human resources, we have many, many, many staff or people taking part in the exercise. And we have many international laboratories, more than 100, taking part.

We had participation from the IAEA. We had a few monitoring teams coming from France, Korea and U.S. and IAEA. And we had also international observers in our offices but also in Barakah.

Next slide, please. So, this is just to show how resource-intensive the arrangement of such a big international exercise is.

The decision was made to organize this in the middle of 2019 and we had preparations and discussions with the IAEA about scenarios and other details, but the most intensive work started in June of last year and then it continued along this line up to the actual exercise, which was in October last year. And now, we are evaluating the lessons learned and the IAEA report will also come soon.

Particularly, what's interesting for me was that the field troops that came from outside countries, according to the systems I mentioned, worked very well together with our own monitoring

team.

The compatibility of instruments was great and we could get a fantastic response thanks to the efforts of all these international and national teams.

Next slide, please. So, some of the lessons learned, which is that which we need to further detail the arrangements that we have with neighboring countries and we started such cooperation already with Saudi Arabia.

And we have also an emergency center in Kuwait, the Gulf Cooperation Center in Kuwait, and we need to discuss further and to harmonize various procedures and other stuff.

And also to harmonize the approach behind the protection of emergency workers where we had a little bit different points from the different entities. And we need to improve already to various monitoring procedures that we have.

And inside, kind of the same. There are programs that we need to improve, there are instructions that we need to improve and the INES rating, for example, was not very straightforward. But in the interim summary I would say it went very

well, but there are details to improve.

Next slide, please. Next slide. So, this is just a picture from the emergency or the exercise itself, which shows some (audio interference) and it was a very extensive exercise involving many, many parties internationally.

And you see that on the field troops, they are monitoring in the environment, they are sampling, they are taking samples to laboratories and all these participants (phonetic).

So, we can move on to the next slide. So, the roadmap that we developed for our entire COVID-19 response was that we have before the pandemic started, a business continuity plan and health and safety and environment policy in place, and that the interaction between these two is very, very important and shown to be very, very beneficial.

And then when the pandemic started in the beginning of 2020, we established a working group in order to give advice to the leadership on what type of decisions are needed and what should be the direction of our oversight.

We developed and started a command center which reported directly to me. And (audio

interference) now been correlated to, we call it the team, that follows and monitoring the pandemic and its impact on our regulatory work and it feeds the strategic planning for the next years to come.

Next slide. Next, please. So -- next, please. So, as I said, there are many challenges, but also opportunities.

So, we -- as I said, we established this business continuity working group and we had a work-from-home system which was implemented very quickly. In about two weeks we could move our staff to work from home and give them their VPN access.

And we also had to frame a culture of how to cope with this new norm. And so, we have many workshops with the staff and making sure that it was understood.

And also awareness sessions on mental health and ergonomics while working from home is very important. And it continues -- we'll continue, particularly the mental health part is a long-lasting issue that we will continue to work on.

Next slide, please. So, to summarize, we have the regulatory oversight that continues. We kept the health and safety of our staff.

We had a proactive response. We worked remotely. We followed all government directions and essentially we had control of the operational plan.

Of course the international work, for example, was very influenced, but essentially for the oversight it could continue.

Next, please. So, we also took the opportunity to establish stronger infrastructure and capacity building.

So, we have introduced an operational safety simulator in our headquarters. We have quite intense internal training programs and our experts.

And we have been operating with the industry with the Nawah Management and we have now essentially eight staff taking part in the Senior Reactor Operator certification training and we will graduate them this week -- at the end of this week.

Next slide. So, the group to the left, those are the ones that are joining the reactor operations -- Senior Reactor Operations Training Program.

We have also two female, Emirati females (phonetic) working as the resident inspector together with our experts -- experts from various countries.

We have -- we sent our first female to join the Safeguard Leadership Program at the IAEA and we have quite good gender balance in management. We have 21 males and 19 females at the director and management levels.

And next slide, please, which is the "Thank you" slide. And I hope this gave an overview of how we reacted to the pandemic in the -- from the UAE. So, thank you very much for your attention.

MR. ROBERTS: Thank you, Director General Viktorsson, for your very comprehensive presentation. FANR has certainly risen to the challenges your organization has faced during the pandemic most notably overseeing the commissioning of new reactors in your country, and I look forward to hearing questions from the audience on your very informative presentation.

I will now turn to our third speaker, Dr. Tyobeka, CEO of South Africa's National Nuclear Regulator.

Dr. Tyobeka, the floor is yours.

MR. TYOBEKA: Thank you very much, Darrell, and good day, good afternoon, good evening to my colleagues, Christer and Mr. Koganeya. It's a

pleasure to be here and I look forward to an engaging session.

You will drive the slides for me from that side. We'll move straight to the next slide, which is the Table of Contents.

I'm going to give you an introduction on how we got here as far as the evolution of the pandemic is concerned.

I'm going to give also a brief account of the operator's response -- initial responses by the operator, then our regulatory response, look at the current status as far as infections at the nuclear power plants are concerned, and generally the lessons learned.

Just for background to our audience who may not be aware, South Africa operates a two-unit PWR, which is the only nuclear power plant in southern Africa.

And this is a French design, which produces almost 2,000 megawatts of electricity when you have both units combined.

Next slide. So, like any other country, at some point we had to declare the pandemic a national disaster and the country government

introduced a package of extraordinary measures to combat public health emergency.

The goal, of course, was to flatten the curve of these infections and cabinet introduced and developed what they called the national Coronavirus Command Council, which enforced a national lockdown for an initial period of 21 days from midnight of the 26th of March 2020.

This lockdown was subsequently extended for a number of times and will show in the subsequent slides.

Currently, the national state of disaster is still in force and it is hoped, and the president has promised in his State of the Nation Address a week ago, that this will be lifted come the 15th of March 2022.

From the 1st of May in 2020, a new approach was initiated that included easing of lockdown restrictions based on what was called "risk-adjusted strategy" to allow some opening up of the economy.

This new strategy consisted of, and still consists, of an alert level with five levels. This would allow for flexibility and responsiveness and to

reduce the need to amend regulations in the future. We are currently, as of 1st October 2021, at Level 1.

Next slide. As you can see from this slide, the top left you will see the waves that we've gone through.

We've gone through four waves and you can tell that the most aggressive wave was the one inflicted -- was the third wave inflicted by the Delta variant. The peak of this wave was approximately at about the 29th or maybe, let's say, August of 2021.

Subsequent to that you can see the Omnicron peak, which resulted around the 25th of January 2022.

On the bigger table to your right you can see that the levels that I spoke about, the alert levels, Level 1 to Level 5.

We started off with Level 5 in March of 2020 for 25 days. This was adjusted subsequently to Level 4 and then -- in May and Level 3 from June to August, and that sustained for about 77 days.

Level 2 for 53 days from 18 August to 20th of December 2020. And Level 1 stretched the whole of September -- all of September until after Christmas of 2020 where we experienced another spike

in the pandemic. So, for 98 days.

You can see how it evolved all the way until now where we are in Level 1 for a record more than 158 days.

So, it means we have stabilized and it's important to mention that each level of course corresponds to the strictness of allowed activities, in other words, the level of restrictions as far as movement of people, as far as gatherings, as far as events and so on.

Next slide, please. Now, to start with, Eskom, which is our operator, introduced 14-day quarantine periods internationally and return from those that traveled internationally and were returning from high-risk countries. And this was in preparation for the outage activities.

You would remember that we use a lot of international skills for our outage period because with just two units, it would be very expensive to be self -- 100 percent self-sustainable even for outages that have been after 18 months or so.

They supplied PPE to staff in critical positions and commenced with thermal screening. All meetings were virtual. Initial access to control

rooms was suspended, except for operators, safety engineers, specific maintenance personnel who supported the control rooms.

They also reduced staff onsite in order to not only have -- in order to only have the required personnel onsite, so-called critical personnel.

They continued to categorize staff into two teams that would alternate working onsite and also establish an offsite team.

And this offsite team won't perform any work onsite, but they stay in self-isolation at quarantined conditions until called upon to assume duties in the event that onsite minimum resource requirements are challenged.

Eskom also introduced mass testing before outages of all workers and implemented the requirement for 72 hours negative test result, in other words, if you do not have a negative test that is younger than 72 hours, you would have -- you would be required to do another -- to perform another COVID test.

Now, they also went on to develop a number of -- a model which tested the number of scenarios, and this model focused on staffing

strategy for the operating unit, in particular, critical staff, namely maintenance, operations, radiation protections and security to protect employee health and safety while it's ensuring plant safety and plant operations.

You can see on the graph to your right that if you, for example, look at a sample of 100 staff members and assume worst-case scenario of six percent of them susceptible to COVID infection, then it would take you at least about five days to get 50 percent of your staff infected, and then you can see the recovery as the curve begins to rise.

So, what this tells us was that Eskom could, from these scenarios, make critical decisions of whether to have standby shifts and staff -- personnel on quarantine so that they could strictly ensure that at no point do they have below the number of critical resources onsite. So, the safety of the plant had to be assured in both short-term as well as the long term.

Now, with these models they could conclude that higher infection rates would lead to too few people to operate the plant, which, of course, as you can see from the graph, was a shot-term risk.

And then, in that regard, the risk of onsite transmission is higher, but you will have a decrease in staff density, you will provide defense in depth, and you will reduce work to get through the peak.

On the other side if you had lower infection rates, the main risk would be that plant material conditions will continue to degrade because you would have fewer staff onsite, which may imply that you would have had to postpone some of the maintenance or delay some of the maintenance.

And on the flip side you will have lower risk of onsite transmission and you will have an increase in staff density, and you will have no additional defense in depth required and ultimately perform all normal work.

Next slide, please. On the side of the regulator we put in place measures for Business Continuity, like Christer said, in fact, before the pandemic.

Three weeks before the pandemic we had performed a wide-scale test of the effectiveness of a business continuity model.

And we had about 36 of our -- we had a

cohort of about 36 staff members from all critical areas working from home for three weeks and, lo and behold, just less than a week after that drill, COVID lockdown happened.

So, without business continuity, the measures included travel restrictions implemented as the lockdown regulations of government, continued engagement with the operators and applications from would-be licensees via electronic media, we ensured that all incoming and processing of urgent licensing requests and associated reviews continued as per normal.

Although the access to the nuclear power plant site under new conditions was possible, the planned site inspection activities were rescheduled where possible and where not very urgent.

We continued to do monitoring of plant and operations performance by online access of live plant information, plant databases and logs.

Where possible, going forward working remotely will be encouraged. Now, what we have seen from the effectiveness of our oversight using a combination of means has assured us that for future pandemics our business continuity model is robust and

effective and, therefore, we would not hesitate to adopt the remote working as part of -- as familiar part of our working modes.

We procured and issued PPE to all employees and contractors and we implemented work rosters to ensure minimum staff at work and also to assist social distancing.

Next slide. We continued to direct nuclear power plants to evaluate impact of the national lockdown restrictions on the effective implementation of the nuclear power plant emergency plan and to develop contingency plans as appropriate, demonstrate the efficacy of the emergency plan and communicate with the public in terms of their readiness.

There were consents from interest groups on the effectiveness of the evacuation model for the Koeberg Nuclear power plants during lockdown conditions considering, for example, that public transport was grounded to a halt and, therefore -- and of course our evacuation model also features public transportation.

That is why we demanded or required of Eskom to demonstrate that even in the -- under the

given circumstances of a total lockdown, they do not have -- they still can demonstrate that the emergency plan was quite effective and continued to communicate with the public to assure them that in terms of any eventuality of an accident, all would be good to go.

We directed the nuclear power plant to perform control room habitability studies and analyzed the possible infection scenarios to ensure that the operability of the main and emergency control rooms was up to speed.

Next slide. Now, the current status. As you can see from the graph, you see a number of phases from the beginning to date, and you can see that Eskom has implemented a mass testing effort.

And at each stage you can tell -- you can see the number of positive cases that were identified from mass testing.

And the last one denotes the fourth wave of COVID where a number of tests were identified and removed. So, big numbers were tested and a few were identified as positive and removed.

At Level 1 for more than 150 days, regular laboratory staff were required to be at work at least three days per week.

The operators were busy at the time with major refurbishment outages. In fact, currently we are going through an outage at Eskom at the Koeberg Nuclear power plant, which was initially scheduled to include the replacement of steam generators and that was subsequently postponed, delayed to later after winter.

And Koeberg is still meeting staff numbers as per the nuclear license requirements and we have no active cases at the present in the operating units.

Seven positive cases have been reported the past week at Koeberg with six active cases. The country has entered into the fourth wave as we speak.

What lessons have we learned from this? Initially due to the uncertainty of infection rates and the impact of the pandemic on availability of the sources to safely operate the nuclear power plant, we've adopted a precautionary approach.

The operator was required to demonstrate that adequate staffing is required for the short and the long term, in other words, for operations short term, and for outage, maintenance and testing -- for the long term, that refers to the outage and

maintenance and we continued to require them that they must conduct mass testing.

The staffing strategies had to be developed and implemented during different waves of the pandemic especially during this recent fourth wave with the omicron variant with the higher infection rates. Certain functions were challenged.

The staffing strategy had to be flexible enough, for example, changing shift rosters, putting in additional staff, et cetera, to ensure minimum staffing levels were not compromised.

Implementation of various COVID protocols, especially mass testing, ensured that the onsite transmissions were kept as low as possible.

Next slide, please. I already mentioned that we have certain interest groups that question the safety of the NPP during lockdown and the need for the NPP operation in light of lower image demand as well as this viability of the emergency plan during a pandemic.

Now, you recall that due to lockdown a lot of industry had to shut down. And those that operated, only operated at the very, very bare minimum and, therefore, the demand for electricity

was very low.

And so, part of the -- and the new strategy was to demand that since that nuclear power plant is really not essential at this point, it must be shut down.

Prior concerns related to impact on evacuation assumptions, mass care centers, et cetera, during the strict lockdown periods as well as the readiness of local authorities to deal with simultaneously both the disaster, in other words, the pandemic itself and nuclear images.

So, the regulatory emergency plan exercise subsequently was conducted, including testing offsite response organization's readiness and some improvement actions have been identified and addressed.

Communication from both the operator and the regulator had to be adjusted to address the concerns from the public.

In general, the lessons learned prior to the pandemic we piloted the work from home, as I already said. During the pandemic, work from home has been implemented in a graded approach depending on the alert levels.

The reviews and assessment tasks have not been negatively impacted at all. In fact, we have seen an increase in productivity from the work from home.

Inspections during strict lockdown were primarily conducted virtually, although options remained for site visits if deemed necessary.

In general, all planned compliance assurance activities were completed and currently our inspectors are onsite almost on a daily basis for this major outage of refurbishment that we are currently engaged in.

There was no need to adjust our regulatory framework as a result of the pandemic. As a regulator, however, we had to be responsive and adjust some of our regulatory and work practices.

With that, I'm at the end of my presentation and would be very happy to take questions when the time comes. Thank you very much.

MR. ROBERTS: Thank you, Dr. Tyobeka, for your very informative presentation. I greatly appreciate hearing your perspectives on how the pandemic has impacted your organization's operations and remained confident in the NNR's continued strong

regulatory activities.

Now, I will turn to our final speaker, Mr. Toshiyuki Koganeya, director of Japan's Nuclear Regulation Authority's Oversight Planning and Coordination Division.

Mr. Koganeya, the floor is yours.

MR. KOGANEYA: Okay. Thank you very much for introducing me. It's my great pleasure to come back here to RIC because, as Darrell introduced me, I used to be a program assignee (phonetic) in the NRC and I learned a lot about the NRC's ROP.

So, I am very happy to be here to make a presentation about our oversight program and licensing program during the pandemic.

So, the next slide, please. Okay. I'm going to present about three points. One, is the impact of the pandemic in Japan in general.

And the next one is regulatory activities, how our activities modified or changed during the pandemic, licensing, oversight and other activities. And then finally, I'm going to show you our lessons learned from the pandemic.

Next slide, please. The next slide, please. So, this slide shows the COVID-19 positive

case in the past two years.

As you can see, we have four times national emergency which was declared, and now the fourth emergency is now continued. And based on this emergency situation, all activities are also modified or a little bit changed.

And in the area of this site, as you can see, we also have another problem as NRC internet access is not -- was not available over the past one years because of the cyberattack we had.

So, we need to renew our whole IT systems. So, during that period, we didn't use any internet access.

Next slide, please. And also this is the cumulative number of deaths in Japan. We now have almost 24,000 deaths in total for the past two years and there are many people very concerned, afraid, of this pandemic. So, many social and economic activities are also restricted.

For example, for the first national emergency many schools closed. Many restaurants, shops are also open limited hours.

For example, restaurant will shut down about 8:00 p.m. or something and then no alcohol

provided. So, these types of activities also affect on our regulatory activities.

Next slide, please. So, the -- next slide, please. So, I want to show typical activities of licensing here.

So, for the licensing process we had a lot of communication meeting with licensees. As you can see in these photos, before the pandemic we had face-to-face meeting almost every week.

And, as you can see, there are two sides. And the left side is our side, regulatory staff. And the right side, the staff from the licensees.

So, every week we had two hours, three hours of meetings to discuss licensing basis and so on, but after the pandemic, the right side photo, you can see only three or four guys. This is our staff. And the licensee is connected through virtual systems. So, we communicate now with these types of conference systems.

So, this is the -- also the very, you know, they are distant because many licensee staff no need to come to Tokyo to have a face-to-face meeting.

So, and also they have a lot of technical staff participate in this meeting. So, this type of

meeting have some merit for the licensee.

Next slide, please. Okay. This is oversight situations. So, our new inspection program is very similar to the U.S. NRC ROP. We have the baseline inspection by the resident inspectors.

As you can see in the photos, during the pandemic our resident office, the people are divided into two groups, as you can see in these photos.

So, they have a different room and they basically didn't have the physical contact in order to avoid causing a cluster in the region branch.

So, they had a different room and they visited to the site almost every day. And then they do this type inspection, as we did before the pandemic, but we had a little bit restriction on communication with the licensee.

For example, some regulator asked not to enter the actual rooms to avoid causing the COVID cases to the operators.

So, that type of restriction existed still, but we visit almost every day to the site and do the walkdown and to communicate with licensees and so on.

Next slide, please. For the team

inspections, which is done by the headquarter specialists, so they have to have a visit to the site. But as you can imagine, the Tokyo area, we have a lot of positive cases. So, the many licensees asked us not to come, the specialist.

And also they -- we restrict business trip especially in the first emergency period. So, that's why I show you this. Our team inspection, some of the inspections are postponed especially during the first quarter of 2020.

And also we sometimes have a very difficulties about the specialist because, as you can see that second bullet, if we dispatch the inspectors, they stayed near the site for two weeks before entering the site. So, they have to stay at the hotel for two weeks before the inspection.

We did sometimes these type of activities, but this is very, very significant because the inspectors have to stay for three weeks in the hotel. They cannot visit to the site. So, we didn't do it after the first national emergency ended.

But also there we applied many remote activities such as preparation phase, document check

and our -- we get through the internet their record and document and we check these type of document, licensing document.

Next slide, please. So, other activities. So, our commissioners, we have five commissioners, and every Wednesday we had an open commissioners meeting and we decided some regulator activities, decision-making, but we -- these types of meeting we did face-to-face, but now they are -- we have a hybrid of the remote and the face-to-face meeting.

As you can see the left photos, this is a typical remote commissioners meeting. Under the center photos we had the inspectors counterpart meeting every quarter.

Before the pandemic we had face-to-face meeting, but during the pandemic we had remote meeting. So, the resident inspector can participate in this meeting in their branch.

And also the right photo, this is thermometers and disinfectant at the entrance of the Emergency Response Center because we had several emergency drill through the year.

So, the many responder come to the center

and there, at that time, they have to -- we check their temperature and they are -- we ask them to have this disinfectant. So, this type of measure also we are now still doing.

Next slide, please. Next slide. So, the lesson learned. So, the -- during the pandemic, we have -- we use a lot of remote technologies and this is, in some cases, very useful improving our effectiveness and efficiency.

And also the -- our job practice not only the regulatory bodies, but also the licensee, also changing more remote mode, job style. And now, maybe 40 percent, 50 percent of our staff work at remote who are home.

And the fundamental measures such as distance or masks and disinfection are very essential to the COVID-19 pandemic.

And NRC has -- NRA has more remote interaction with licensee especially in the licensing process, but with oversight site activities such as walkdown and communication with the licensee staff in the site, internal communication are very essential for our oversight of nuclear facilities.

Okay. That's all my presentation.

Thank you very much.

MR. ROBERTS: Okay. Thank you, Mr. Koganeya, for your very comprehensive presentation. It's always interesting to hear from our colleagues at the NRA.

And I do apologize for mispronouncing your name earlier --

MR. KOGANEYA: No, no, that's alright.

MR. ROBERTS: -- especially given the number of years you have worked in the past. It's always a pleasure to have the opportunity to work with our colleagues that we've hosted here as international assignees such as yourself.

So, now before we go to the Q&A, I'd like to queue Spencer for a live poll question. Spencer?

Spencer, you have the polling slides? Can you spotlight those? I see it. Okay. Okay. So, the polling question, what measures to protect the health and safety of inspectors and plant stuff during inspections do you feel were most useful?

And the poll is live, so the answers are changing as we speak. And it looks as if remote inspections is getting the lion's share of the response with nearly two-thirds of the respondents

selecting that as the most useful measure that was taken during the pandemic to protect the health and safety of inspectors and plant staff during the pandemic with mask requirements coming in second -- a distant second, I might add -- and then the other measures, distancing, increased cleaning, rapid testing all lagging the first two answers.

Verification of vaccination status looks like it's receiving a negligent response. So, okay. We'll keep the live polling going for a few seconds and then we'll turn it over to Qs and As, questions and answers.

We have about seven minutes left and I'll ask the first question that was posed to me in the chat box, which is for me, directed at me, the NRC.

With regard to EP drill participation, how many drills did the NRC participate in and were they all remote? Thank you.

And so, the response to that, I would just say that the NRC did grant some exemptions to EP exercises during the pandemic.

I don't have the exact number of those or of the number of drills that we actually participated in, but we did participate in all EP onsite biennial

exercises for which an exemption was not granted per 10 CFR 50.12.

And all of these that we did observe required the EP inspectors to be onsite; however, there were safety measures such as some of the examples you saw in the poll question that we just posed such as social distancing, masking, et cetera, but none of those caused issues with the NRC's inspector's ability to complete the EP exercise observations.

So, hopefully that is sufficient for that question. I will now go to the next one in the queue, which is addressed to Dr. Tyobeka.

That is, with the alert level being shifted to Level 1, will the company remain in a partial remote work status or will it adopt a hybrid approach model or do you plan to return to onsite work at 100 percent?

Dr. Tyobeka?

MR. TYOBEKA: Yes. Thank you very much, Darrell, for the question.

As a matter of fact, today we had our executive committee meeting of the NNR and we -- part of the discussions involved around -- revolved around

our future plans for the attempt to work.

Currently, we are on an occasional basis. We require that all staff without comorbidities be present at the office for three days a week.

And that accounts for about 98 percent of our staff members. So, three days a week in the office, two days a week at home.

Obviously, the site inspectors, most at the site office, more or less 100 percent back to work all the time and they go to sites because we are busy with a major refurbishment project at Koeberg and major outage.

However, the discussions today made a few observations, one of which is we have begun to pick up some staff disengagement as a result of an extended work from home.

There is some kind of fatigue -- work-from-home fatigue, if you can call it that, that has began to set in and we have decided at executive committee meeting that we will require -- as soon as the president announces the lifting of the state of disaster expected to be by the 15th of March, we will require that all staff be back to work 100 percent and that would be for a period of two weeks.

After which, we would most likely revert back to the partial -- the hybrids. And this is done precisely to sort of remind people -- remind people that, folks, you are still fully employed and you still have got -- it's a responsibility of you to deliver.

And, therefore, we want to, in a way, reenergize them for two weeks and then most likely revert back again to a hybrid model until we know what the future holds for the pandemic. Thank you.

MR. ROBERTS: Thank you, Dr. Tyobeka. That's a very interesting approach to reentering and returning to the workplace. Appreciate your answer.

Now, Spencer, I'd like to queue up another poll -- live poll, if we can, before we close out the session.

Do you see it? Is it posted? Spencer? Spencer, if you could maybe have it spotlighted?

Okay. Alright. I can see it now. Live poll, which of the following actions made necessary by the pandemic do you feel will have the most detrimental long-term impact on plant operations and safety?

And I see a large spread, if you will, of

response and percentages. It looks like increased attrition is leading the responses with 39, 40 percent, followed by deferred maintenance, and then reduced hiring coming in third. And that seems to be the trend as more responses come in.

And it is true that attrition is a concern probably both here and abroad in the international community as people look for different career paths and whatnot as a result of the life changes that occurred as a result of the pandemic.

It's caused many people to reevaluate priorities, work/life balance, career choices and the like. So, certainly increased attrition is a concern by many people.

Deferred maintenance at the plants can understand. Obviously, there was concern about work that could not be done as a result of people not being in the workplace or activities that had to be deferred as a result of the pandemic.

And then reduced hiring, of course, is also -- sort of goes hand in hand with the increased attrition issue.

Alright. Those results are continuing to come in, but I do notice that it is 2:32. So, we

are a couple minutes past the allotted time for our session.

So, I do want to take the opportunity again to thank our distinguished panelists for their time and their insightful presentations and perspectives. The RIC would not be a success without your participation.

I also want to thank the audience for your attendance at this panel today and I wish you a good rest of your day and please enjoy the rest of the RIC.

And with that, our session has concluded. Thank you.

(Whereupon, the above-entitled matter went off the record.)