

Canadian Nuclear  
Safety Commission

Commission canadienne de  
sûreté nucléaire

Public meeting

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280 Slater Street  
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Salle des audiences publiques  
14<sup>e</sup> étage  
280, rue Slater  
Ottawa (Ontario)

*via videoconference*

*par vidéoconférence*

**Commission Members present**

**Commissaires présents**

Ms Rumina Velshi  
Dr. Sandor Demeter  
Dr. Timothy Berube  
Dr. Marcel Lacroix  
Dr. Stephen McKinnon

M<sup>me</sup> Rumina Velshi  
D<sup>r</sup> Sandor Demeter  
M. Timothy Berube  
M. Marcel Lacroix  
M. Stephen McKinnon

**Secretary:**

**Secrétaire:**

Mr. Marc Leblanc

M<sup>e</sup> Marc Leblanc

**Senior General Counsel:**

**Avocate-générale principale :**

Ms. Lisa Thiele

M<sup>e</sup> Lisa Thiele

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Ottawa, Ontario / Ottawa (Ontario)

--- Upon commencing on Thursday, June 19, 2020  
at 9:00 a.m. / La réunion débute le jeudi  
18 juin 2020 à 9 h 00

**Opening Remarks**

**THE PRESIDENT:** Good morning and welcome to the continuation of the meeting of the Canadian Nuclear Safety Commission.

Mon nom est Rumina Velshi. Je suis la présidente de la Commission canadienne de sûreté nucléaire.

I would like to begin by recognizing that I am conducting this virtual Commission meeting from Ottawa, in the Unceded Traditional Territory of the Algonquin peoples.

Je vous souhaite la bienvenue and welcome to all those joining us via webcast.

I would like to introduce the Members of the Commission that are with us today, remotely: Dr. Sandor Demeter, Dr. Timothy Berube, Dr. Marcel Lacroix and Dr. Stephen McKinnon.

Ms Lisa Thiele, Senior General Counsel to

the Commission, is also joining us remotely, and Mr. Marc Leblanc, the Secretary of the Commission, is with me on the podium today.

I would like to mention that we are in the midst of the National Public Service Week and I wish to recognize public service generally and CNSC employees specifically for doing an extraordinary job these last 12 months and showing great resilience, professionalism and diligence during the pandemic, and ensuring that the CNSC did not miss a beat in its regulatory oversight role.

On behalf of my fellow Commission Members, I want to thank each of you for ensuring the Commission continues to meet its important obligations and mandate.

Thank you.

I will now turn the floor to Mr. Leblanc for a few opening remarks.

Marc...?

**MR. LEBLANC:** Thank you, Madame la Présidente.

Bonjour, Mesdames et Messieurs. Mon nom est Marc Leblanc. Je suis le secrétaire de la Commission.

J'aimerais aborder certains aspects touchant le déroulement de la réunion aujourd'hui.

For this Commission meeting, we have simultaneous interpretation. Please keep the pace of your speech relatively slow so that the interpreters, who are not in the room and are working remotely as well, are able to keep up.

To make the transcripts as complete and clear as possible, please identify yourself each time before you speak.

La transcription sera disponible sur le site web de la Commission dès la semaine prochaine or the following week.

I would also like to note that this proceeding is being video webcast live and that archives of these proceedings will be available on our website for a three-month period after the closure of the proceedings.

As a courtesy to others, please mute yourself if you are not presenting or answering a question. We can mute you remotely, but we cannot unmute you. So when you are asked a question, then you have to manage the unmute button.

As usual, the President will be coordinating the questions and to avoid having two people talking at the same time we will ensure that we are

monitoring who have raised their hands from a monitor that is in front of us.

During the questions, if you wish to provide an answer or add a comment, please use the Raised Hand function.

Merci, Madame la Présidente.

**THE PRESIDENT:** The first item on the agenda today is a presentation from the Independent Electricity System Operator, or IESO, on the duties and role of the IESO in Ontario, with a focus on the supply gap identified in the IESO's 2017 Long-Term Energy Plan and the impact on nuclear power plants. This is outlined in Commission Member Document CMD 20-M15.

I wish to note that representatives from CNSC staff and Ontario Power Generation are joining us for this item, to be available for questions.

I will turn the floor to Mr. Peter Gregg for this presentation.

Good morning, Mr. Gregg. The floor is yours.

**CMD 20-M15**

**Oral Presentation by the  
Independent Electricity System Operator (IESO)**

**MR. GREGG:** Thank you very much.

Hopefully you can hear me.

**THE PRESIDENT:** Yes, we can. Thank you.

**MR. GREGG:** Okay, great. Thank you very much.

Pleased to be here today to join you and to share a bit about what we do at the IESO, so thank you very much for the invitation.

I am joined by my colleague Leonard Kula, our Chief Operating Officer.

I will do the first part of the presentation and then hand it over to Leonard for the next part.

I would just start by saying we all know it's an exciting time to be in the electricity business, we are experiencing an awful lot of change across the sector broadly. We have new technologies, we have new entrants into the market, we have new business models and I think importantly we have new consumer preferences. Consumers

are much more engaged. But despite all of this, nuclear remains the backbone of Ontario's power system.

Could I go to the next slide, please. I don't think I have -- there we go.

So I would like to start with a few words about who we are at the IESO and what we do.

Our primary focus is planning and operating Ontario's power system and the wholesale electricity market through which we secure the lowest cost resources to meet the province's energy needs. That involves forecasting demand and modelling the availability of resources so we can balance that supply and demand.

Our work covers multiple timeframes. We need to think 20 years out before a new power plant is needed and that goes all the way down to second by second balancing of that supply and demand. Energy flows must stay within equipment limits, especially important as Ontario's greatest part of a much larger integrated created serving millions of customers across North America.

Our control room, which I have a virtual image of behind me, and our control room operators play a role that is analogous to air traffic control. We move electrons safely to where they need to be, rather than



moving airplanes. Our mandate really has us ensuring system reliability, but doing so in a cost-effective manner. It really is the balance of those two things: reliability and cost-effectiveness. We do this through collaborative leadership, bringing different organizations, different viewpoints and interests together.

We have other areas as well beyond system operations and market operations. We also have a smart metering entity, so smart meters connected to homes and businesses across Ontario. We manage energy efficiency programs for the province. We settle the wholesale market on a daily basis and we also invest prudently into innovation and research, with assistance from partners.

From our unique vantage point we have an important role to play as Ontario's electricity sector integrator. Independence from market participants, including Ontario Power Generation and Bruce Power. It is important to note that we do not own assets. We are independent from all asset owners and we have no financial stake in the sector, which is important that we are therefore able to make decisions that we believe are in the long-term best interests of the Province of Ontario.

Obviously we have a close relationship

with Ontario's Ministry of Energy, Northern Development and Mines, which sets policy for the sector. I like to think of it as we are informed by policy in our decisions, but we also have a role to play by informing policy decisions. So it's a two-way street and a good collaborative relationship.

Next slide, please.

I will talk a bit about the impacts of the pandemic, which I'm sure we have all been focused on. This will help give you greater insights into what we do and how we do it, so I will spend a few minutes on this.

As we saw non-essential businesses closed and most Ontarians staying at home, working from home, demand for electricity began to take a different profile beginning in mid-March. The graph on the screen compares hourly demand in March and April, similar days in previous years, and shows just how much demand has changed since the start of the pandemic.

On average, demand has been 6 to 18 percent lower than we would normally expect at this time of year. That said, there have been increases in some customer segments and decreases in others. Residential demand, as you would expect, has gone up as customers stay

home and we are especially seeing that on these warmer weather days where we are really seeing the impact of air-conditioning load and today will be no exception. And commercial demand expectedly has dropped as businesses closed in order to comply with provincial orders.

In addition, the timing of the morning peak has shifted to later in the day. As people are no longer getting up, rushing to get off to the office, we are seeing that morning peak spread out and pushed back a little more. And interestingly, there has been limited impact on most large-scale transmission-connected industrial electricity users.

So the IESO continues to work closely with market participants to understand how the pandemic is affecting their operations and how these impacts will influence the system today and tomorrow.

Next slide, please.

So a little bit on capacity and production by fuel type. That would be on the next slide.

We are fortunate to have a broad range of resources in Ontario. We have gas, we have wind, solar, hydroelectric, bioenergy, demand response, which is electricity users responding to signals from us to reduce

their consumption, and of course nuclear power, which is 30 percent of Ontario's installed capacity. A diverse supply mix is one of our true strengths in Ontario and supports reliability and resilience.

Nuclear and hydroelectric are the workhorses of Ontario's fleet. Nuclear is responsible for nearly 60 percent of energy production, as shown on the graph on the right. Most of our supply comes from generators connected to the high voltage transmission system, but contributions from embedded resources are growing. These distributed energy resources now represent around 4400 MW.

If you look carefully at the yellow representing nuclear on the graph, you will see it produces far more energy than you might expect based on its installed capacity. You heard me say it's 30 percent of installed capacity, but it contributes much more energy than that. That's because unlike intermediate or peaking resources, our nuclear units are considered baseload and they run almost all of the time, obviously with some exceptions, but we rely on them heavily.

As you know, it is costly to shut down a nuclear unit and generally once it's down it can't be

returned to service for a couple of days. I would say units at the Bruce Power Plant were designed to provide some flexibility, which is extremely valuable to the system and enables us at the IESO to safely and efficiently respond to changing grid conditions. That has been really valuable to us over the last several weeks when we have been in sort of low demand situations. That ability for flexibility and manoeuvrability at Bruce has been very helpful.

In addition, Ontario has a very stable electricity system, in part because the Bruce Power Plant and OPG's Pickering and Darlington plants anchor it in two places with large stable masses of rotating inertia that stabilize frequency and voltage and by doing so provide a buffer against some types of system disturbance.

With that, I would now like to hand it over to Leonard Kula, our Chief Operating Officer.

**MR. KULA:** Thank you, Peter, and good morning everyone.

Could we move to the next slide, please?

I am going to talk a little bit about working with nuclear asset owners and, as I have a tendency to speak rather quickly, I am going to try to slow down to

respect the abilities of the translators to keep up.

As the market and system operator we deal with all participants, all generators, all transmitters, and we try to do so in a fair and equal manner, but nuclear has a special place for us given the unique nature of that generating facility. So we have a much more heightened relationship with our nuclear asset owners and operators.

Our relationship with them incorporates a number of different engagement mechanisms, formal and informal. We place a high priority on open communication and information sharing, which helps to ensure safe and reliable operation of the grid.

Our interactions with the nuclear asset owner operators are constant across our real-time operators, our operational planning team and our long-term planners. That was evident through the last three months as we dealt with changes across the system, changed expectations for electricity demand which impacts the operation of the system for generators and transmitters and we had a constant flow of communication across many timeframes with the nuclear asset owner operators.

As Peter mentioned, we are interconnected with other electricity systems in North America. Ontario

is part of the Eastern interconnection, which is the largest interconnected machine in the world, with a total combined capacity of about 650 GW. So in order to maintain reliability of that large interconnected machine, the IESO and most market participants in Ontario are subject to reliability standards developed and enforced by the North American Electric Reliability Corporation, or NERC. NERC oversees interconnected power system reliability in Canada, the continental U.S. and Northern Mexico. Part of these standards obligate us to understand nuclear plant safety requirements, to incorporate them into our analyses and to operate the system respecting those requirements.

We also work closely with market participants in Ontario, including OPG and Bruce Power, and with NERC on the design of reliability standards, their implementation and enforcement.

To ensure we have effective coordination, we also maintain interface committees with both OPG and Bruce Power, referred to as the IESO-Nuclear Interface Committees. Each committee has an executive sponsor from the IESO as well as the nuclear operator and discussions include a review of nuclear plant interface requirements, power system events and other operational issues.

Nuclear generators also engage with the IESO through our Reliability Standards Standing Committee.

Training is another way we engage with nuclear operators and ensure we all have a shared understanding of processes and priorities.

Nuclear units play an essential role in restoring electricity service after major disruptions. It is essential that we maintain Class IV power to nuclear facilities to support their safety systems.

We have a publicly available Ontario Power System Restoration Plan that gives the framework for restoration and it's clear in that document that our number one priority in a restoration -- following a system event when we have to restore the power system, our number one objective is to restore Class IV power to the nuclear stations.

To ensure everyone is on the same page, we hold joint training sessions that cover system restoration and a broad range of other operating conditions on an annual basis.

IESO operators also participate in nuclear simulator training at each of the stations, generally every other year.



As noted, the IESO works with nuclear asset owners across all time horizons, from 20 years out right up to what is known as real time. We share information on system conditions, things like severe weather, geomagnetic disturbances, with nuclear facilities on an ongoing basis, providing time for both of us to develop operating plans or identify system or plant limitations. To the extent possible, we don't want surprises.

The IESO also approves planned outages based on system reliability criteria. That is for both generators and transmitters. In real time, generating plants in Ontario are dispatched economically to balance supply and demand but, in an emergency, these generating plants may deviate from our dispatch instructions to meet safety, environmental or legal requirements, including CNSC licence conditions.

Expanding on what Peter spoke of, Ontario, as you know, has a 13,000 MW nuclear fleet, less any outages that are ongoing at that time. At times, Ontario demand dips below 10,000 MW -- earlier this spring Ontario demand was 9700-9800 MW -- and in those times it leaves us with what is known as surplus baseload generation

conditions, or SBG.

Over the years Ontario has benefited from the manoeuvrability of units operated by Bruce Power, in particular because of their ability to keep reactor power at full and reject steam by bypassing the turbine and sending it to the condenser to reduce the electrical output and allow us to continue to balance supply and demand. Manoeuvring units is a tool that we rely upon to manage SBG conditions when they are high, specifically in the spring.

By way of context, there are other activities that we exercise. In advance of manoeuvring a nuclear unit, we will export energy economically to neighbouring jurisdictions, we will spill hydroelectric, we will reduce the output of wind and solar facilities. And in a typical economic ordering, nuclear manoeuvres occur after all of those things.

You may be reassured to know nuclear bench strength runs deep at the IESO. One of our Control Room Managers, our Lead Trainer, our Senior Manager of Resource and Plan Assessments and one third of our on-shift managers are former nuclear operators. In fact, I spent the first decade of my career designing and troubleshooting control systems at Bruce, Darlington and Pickering.

Slide 6, please.

I'm going to speak a little bit now about refurbishments and retirements.

As you would expect, managing nuclear refurbishment outages and/or retirements while maintaining the reliability of the Ontario power system is a complex undertaking that requires close coordination between the IESO, nuclear asset owners and other affected parties.

What you see here on slide 6 is the last publicly available schedule reflecting plans for Darlington, Pickering and Bruce, but COVID-19 has already impacted some of the work planned. OPG and Bruce Power are the ones who will communicate any changes to their respective schedules, but we are going to receive information from them and provide that best next information to you in a refreshed schedule through the release of our next Planning Outlook.

Regardless of how the refurbishment and retirement schedule is adjusted, you can be assured that the IESO is taking all necessary precautions and measures to ensure reliability.

A key aspect of managing these refurbishments and regular maintenance outages is the

constant communication between the asset owners and the IESO. Our information-sharing processes, protocols, pathways are working well and we are confident we can manage this period without undue impacts to reliability.

Slide 7, please.

I have already made a brief reference to the Annual Planning Outlook. Planning is essential to a reliable, sustainable and cost-effective electricity system.

In addition to what we have shared so far, your invitation to us indicated you are also interested in information about a supply gap that emerged during our long-term planning process during the nuclear refurbishment and retirement period, but before we get to that we want to share some information on our latest major planning product, the Annual Planning Outlook.

The Annual Planning Outlook, or APO, is a 20-year forecast for Ontario's electricity system. It includes projected electricity demand, an assessment of resource adequacy, an examination of transmission and performance indicators such as an emissions outlook, and identifies the province's need for energy and capacity.

And by way of explanation, capacity is the

amount available to provide electricity and energy is the second-by-second delivery of megawatts to balance supply and demand.

The goal is to provide timely and transparent information about future electricity needs on a regular basis to guide investment decisions and market development. The 2019 version of the ATO, which was released actually in January of this year, identified a supply gap in the coming years when nuclear units come offline for refurbishment or retire, in the case of Pickering. The outlook also accounts for scenarios with and without the Pickering extension, and we have options should we need to deploy them.

Although Ontario's energy requirements for the next 20 years can largely be met with existing and available resources in Ontario, a summer capacity need does arrive in the 2020s. This need is limited, occurring for a few short hours of peak demand each year, meaning that future resource requirements are peaking in nature.

We're currently developing an interim annual planning outlook that will provide updated analysis for the next five years to account for the impacts COVID-19 is having on our forecast. For example, the pandemic has

resulted in changes to demand for electricity as well as the schedule for the nuclear refurbishment program.

The IESO continues to explore ways to meet Ontario's capacity and energy needs in the coming years, such as developing acquisition tools to acquire the necessary resources. We're considering several viable options, such as relying more heavily on imports, increasing the amount of demand response, leveraging new technologies, such as batteries, and even the construction of new generation.

The latest demand forecast will be released next week at the ISO's stakeholder engagement days, while the updated resource adequacy assessment and interim APO will follow shortly after in early July. And on schedule, the next full Annual Planning Outlook, that's the 20-year outlook, will be released by the end of the year. And with that, I will turn it back to Peter.

**MR. GREGG:** Thank you, Len.

Could I have the next slide, please?

It's our final slide, just to wrap it up. It has been a pleasure to join you today. We do hope we shed some light on who the IESO is and the work that we do, assure you that the processes for the IESO and nuclear

collaboration and coordination work very well. We have a shared focus on safe and reliable operations and nuclear energy is a valued contributor to Ontario's energy sector.

And with that, we'd be happy to take any questions that you've got.

**THE PRESIDENT:** Thank you, Mr. Gregg and Mr. Kula for a very informative presentation.

I'll open to the floor to the Commission Members for questions and I'll start with Dr. Berube.

**MEMBER BERUBE:** Good morning, and thank you for coming and thank you for your presentation. It's nice to see you.

Obviously for us, nuclear is very important, especially the NPPs. The bulk of Canadian nuclear capacity is located in Ontario and directly affects you and us. And so therefore we need to talk on a regular basis, obviously.

I believe -- is this the first time you've come before the Commission?

**MR. GREGG:** It is for me, certainly, yes.

**MEMBER BERUBE:** Okay. I wanted to specifically address the supply gap here in Pickering. For us, it's one of these things that we have to address,

obviously, because of the nature of your supply forecast and demands. Also because the fact it takes quite a bit of time to actually analyze any changes in the nuclear fleet, as you can appreciate. You've probably been around long enough to know this very, very well.

So the question I have for you is this: What is the predominant restraint here with regards to the supply capacity in the time frame of '23 to '26? Is it generating capacity, is it transmission capacity? What's your choke point on this?

**MR. GREGG:** I believe the generation capacity. I'll start, and then I'll hand it over to Leonard. And as Len indicated in one of his slides, we're looking at the refurbishment and retirement schedule. And so when we look back to the 2019 annual planning outlook, that schedule was laid out well.

One of the considerations we're looking at now is how does the current pandemic actually affect those refurbishment schedules. And so when we look at those units being offline either for retirement or refurbishment, that really does create a gap that in that version of the planning outlook showed a capacity gap developing in 2023.

And Len, I'll hand it to you for any more



detail you might have.

**MR. KULA:** Certainly, and thanks for the question.

Yes, I'll echo Peter's comments. The primary gap is with regard to generation, not transmission.

There are some choke points in transmission. There are some resources, say, in the northwest of Ontario that can't easily deliver to southern Ontario. An east-west tie is being built to go ahead and address that. When that's completed, then it moves the choke point to basically in the Barrie to North Bay corridor. So there are some transmission limitations there.

There's a little bit of a transmission limitation coming from southwest Ontario towards Toronto. The transmission system in the eastern Ontario, say from Ottawa to Toronto, is a little bit underutilized, frankly.

And so there are minor choke points here and there, but generally the predominant impact is coming from the amount of supply available.

**MEMBER BERUBE:** And just to add to that, any idea what the gap is in terms of gigawatts, I mean, or megawatts? What are we talking about?

**MR. KULA:** The supply gap is about 2,000 MW; roughly, you know, the amount represented by Pickering.

**THE PRESIDENT:** Okay, Dr. Demeter?

**MEMBER DEMETER:** Thank you very much for your presentation. It's a pleasure to hear about [indiscernible - poor quality audio] know much about your [indiscernible - poor quality audio]

**THE PRESIDENT:** Sorry, Dr. Demeter, we can't hear you well.

**MEMBER DEMETER:** Oh, okay. Is that better?

**THE PRESIDENT:** Maybe you're on mute?

**MEMBER DEMETER:** Is that better?

**THE PRESIDENT:** Much better, thank you.

**MEMBER DEMETER:** Okay, and I will change my speakers. Okay.

Thank you very much for the presentation and a pleasure to hear you before us and understand a bit about your organization.

Given the timelines to addressing future energy gaps or variations, some of these timelines are, you know, five to 20 years for how you want to address them.

And you talked about having some influence on policy decisions.

How do you deal with the sort of long-term decisions that are made now that will take five to 20 years to come to fruition to manage future energy needs? So if you want to start plant X, you have to plan for 10 years, or plant Y, you have to plan for five years. How much influence do you have on a sort of big broad-scale infrastructure decision-making to manage literally decades of energy needs down the road?

**MR. GREGG:** You've identified one of the big challenges we have as an organization and I think one of the big challenges any jurisdiction likely has. And it's a combination of art and science, I think.

The science part, we're able to through our regular publications based on our analysis identify reliability needs that are going to be out in the future that need to have solutions put there to solve them. And so we can do that and present the need.

But then, you know, part of the art is working collaboratively with all the players across our sector to get their perspectives and inputs on what those solutions are. And as I mentioned, we're not the asset

owner, so we try to take as objective a view as we can and what's in the best long-term interest of the province. And we're synthesizing that information, integrating that information, and giving policy advice to the government.

It is sometimes difficult, as you might expect, where I think the political cycle tends to be much more near-term focused, and it's sometimes difficult to get decisions made that are longer-term focused. That is a balance we've got to work with. And I find that the best way we can do this, I think if we are seen by the sector broadly as transparent, that we listen well, that we don't have a bias around solutions, that we're trusted, essentially, that really helps things.

So I think making sure we're connected with the sector, and we're not always -- pretty much any decision we make doesn't make everybody happy. It'll make some people unhappy and some people happy. But what I want is that it's really -- they trust the process we've gone through, trust our analysis and our judgment, and that we can move forward with confidence.

**THE PRESIDENT:** Dr. McKinnon?

**MEMBER MCKINNON:** Yes, thank you for the presentation. I found it fascinating to hear about how it

all works.

Both of you mentioned reliability as being obviously very important to maintain, and the buffering effect that nuclear power has as providing baseload. And it's likely with, you know, the closure of Pickering and possibly other stations or units that, you know, the mix of power generation could change in the future. So how is that future reliability influenced by a reduction in that nuclear baseload? I didn't really appreciate how important that was until you pointed it out.

**MR. GREGG:** Yes, that's a very interesting question, and again, I'll start and then hand it over to Len.

But we've been on this journey for some time now. I mentioned the amount of distributed energy resources we've got on the grid now. It's 4,400 megawatts. So that is down on the distribution system. It's there. It's part of the mix. We've also seen large investment in grid-connected wind and some solar as well. So we've seen a real mix of variable generation come on.

And as the reliability coordinator, that has been a challenge to sort of see that shift where we have -- you know, for decades we had large-scale generation

plants, one-way power flows. And that was a system we were used to and could maintain reliability effectively. But now we've got a proliferation of smaller variable generation resources. We've got flows going in multiple directions, and we've got five interconnections to the province as well that we have to manage. So it has become more of a challenge, but I'm pleased to say, with the investments we've made in technology and in training of our people, we've been able to maintain a reliable system. And we're confident we can do that in the future.

We do expect there will be a shift again, as you mentioned. Len mentioned storage. We're all across North America really thinking about how does storage play. And it's an interesting resource because it takes energy, but it also gives back energy. And how do you manage that on the system? There are obvious reliability benefits, especially capturing that variable generation resource and having it available to us is an advantage, but having it fit into our energy market constructs is a certain challenge right now.

Len, anything you'd want to add to that?

**MR. KULA:** Certainly. Thanks, Peter, and good question.

Building on Peter's points, I think an interesting thing to look at is Ontario relative to other jurisdictions across North America. And I'll come at it from two perspectives.

One, relative to other market and system operators, Ontario has a very diverse resource mix. We've got nuclear; we've got material amounts of gas; we've got material amount of hydroelectric, which has been a workhorse for a century. We've got wind; we've got solar. And as Peter mentioned, now smaller players like demand response. In many respects, the Ontario resource mix as it sits currently is the envy of many jurisdictions. Our gas fleet is sitting on large -- you know, well interconnected with gas producers, and we've got large storage in the Sarnia area. So we've got great diversity, great fuel security that goes along with it.

I know in other jurisdictions they are seeing a change of that, you know, a reduction in that diversity. California, for example, is you know seeing its nuclear plants shut down. Their gas generators are at risk because of environmental concerns around their gas storage basins. They've got large amounts of solar that they can't adjust. And so they have a heck of a time balancing.

So Ontario, from a resource diversity, is in a really, really good position. It's anchored by the nuclear fleet. And so as we've said already, 13,000 MW nuclear fleet. When Pickering retires, it's a 10,000 MW nuclear fleet.

Our peaks in Ontario are in the 22,000-23,000 MW range. It's a far cry from our all-time peak of 27,000-plus MW in I think 2005, because of more resources, as Peter said, being put onto the distribution system, because of conservation programs. So nuclear is a key piece of that, so it anchors it.

One additional point I'll make. From a future perspective, and we're starting to see this with our neighbours, they are moving away from fuel diversity and moving more towards geographic diversity. And so with the increased amounts of renewables being connected, you're going to start seeing the importance of transmission to move megawatts from where the sun is shining and where the wind is blowing. And so you're going to see that increased need for regionalization in the things that we do.

Ontario participates in that. We are a significant exporter. Ontario's fuel mix, you know, a few years ago before the refurb started, we were 90-plus per



cent of non-emitting resources. That comes with a low fuel cost and, combined with a low Canadian dollar, means that when Ontario has more supply than demand, we are exporting it economically.

And we've seen that during the COVID impact. As demands fell in Ontario, as they fell in New York, as they fell in Michigan, we continued to export because our gas fleet is efficient, our nuclear is a low-cost fuel supplier. We've got wind; we've got solar; and we've got hydroelectric.

And so Ontario is already participating in that through the economics of our supply mix. And so we're already starting to feel the effects of this notion of regional diversification in the supply and consumption of electricity.

**THE PRESIDENT:** Dr. Lacroix?

**MEMBER LACROIX:** Well, first of all, thank you very much for this presentation. It's very interesting and fascinating. And I do agree with you, Ontario has a remarkably well-balanced portfolio of electricity generation, if we compare it to other countries.

In your planning, you mentioned the possibility of relying on imports. And I was wondering

what are you looking at when you import electricity? Power or energy? And the reason for asking this question is that there is a misunderstanding among the media about power and energy. And now it's time for you to demystify this question related to the import of electricity.

**MR. GREGG:** Len, you take that.

**MR. KULA:** Certainly.

Very good question. So I made a point of -- in my presentation, in my comments -- of making the distinction between capacity and energy. So capacity is the availability to provide energy, and energy is the actual delivery of energy itself. And both are important.

So we currently import energy for -- we currently import energy to balance supply and demand. And that happen in our five-minute spot market all day, every day. As I mentioned, we've been exporting heavily. While we export, I think we exported 20 terawatt hours of a 140-terawatt-hour system in Ontario. We exported 20 terawatt hours last year, if my memory is right. We also imported six terawatt hours, depending upon supply and demand and the hour of the day. That is an energy transaction and that's been going on forever. But it certainly has, you know, manifested itself in the way that

we operate our wholesale electricity markets.

And flashing back to May of 2002, we opened the wholesale electricity market that year. There was high demand, higher than expected demand in Ontario, and we balanced supply and demand through economic imports. And that's an import of energy.

When we talk about reliance upon imports, what we are talking about is a reliance upon imports to provide capacity. So Ontario currently -- and this isn't broadly known -- but Ontario has -- is already exporting capacity in small amounts. So there are certain Ontario generators that we do not rely upon that actually enter into capacity acquisition mechanisms in New York and in other places, and they actually sell capacity. And we have agreements between us as the Ontario system operator and our neighbouring system operators to make sure that we can deliver that capacity, that energy, should that be called upon. And so Ontario's already exporting capacity.

And we are setting up the mechanisms now to go ahead and import capacity. And so if we had a capacity need, so that's in anticipation of an Ontario peak of 20,000 megawatts, let's say for sake of argument that the economic choice was to import 100 megawatts of

capacity, then that's capacity that we would rely upon. So that if Ontario was short, and if New York was short, we would expect New York to ship those megawatts, because we had that capacity obligation.

So oftentimes this gets confused. So there is a, you know, a narrative that says we can shut down Ontario generating stations and import from a neighbouring jurisdiction. But the distinction is, is that it's often an import of energy, but for Ontario reliability, we would need to insist upon an import of capacity.

**THE PRESIDENT:** Thank you. So maybe if I could ask you to put up slide 6. And question for -- well, we'll start with Mr. Gregg. One of the reasons why I was very much looking forward to you coming and making a presentation on your APO is around this particular slide and to do with the Pickering life extension that you're showing there for the period 2023 to 2026.

Mr. Gregg, you mentioned how -- you know, you used certain adjectives on how you'd want the sector to see you as, you know, transparent, listen well, trusted, independent, trust the process, et cetera -- exactly the same way we want our stakeholders to see us.

And it was in 2018 that this Commission approved the licence for Pickering where for operation purposes it's got a licence 'til the end of 2024. And this was a second extension that OPG had requested. There was a lot of public anxiety, concern, and ire about the extension.

And then to see this APO that actually shows that there could be further extension of the Pickering units questions our process and the veracity of our process that we have just approved, been given reassurance that the units will shut down in 2024, and within a year there is another provincial agency that's making certain assumptions in its planning outlook that those units could run -- may be required to run longer.

And so my question to you is -- and I know you're updating your plan and something is imminent, and I'm sure you'll recognize that if there was the option or the intent of running those Pickering units longer, the licensing process is a long process that will require and we will demand a lot of public engagement and consultation. And certainly as a Commission, we do not want to be backed into a corner.

So I want to make sure, one, that you --

and I know you do, I just want confirmation -- that you understand that the whole licensing approval process is a long process. But when's the earliest heads-up we're going to get that there may be a likelihood of a request for those Pickering units to run past their current licence, which for operation purposes is the end of 2024?

**MR. GREGG:** It's an excellent question, and I do understand your concern.

And I think it probably speaks to -- and I was asked was this the first time I've presented before the Commission, and it is. But it probably speaks to a need for us to likely coordinate a little better ourselves between the two entities because when we put our planning outlook together, as I mentioned, we engage with a diverse set of participants and stakeholders and gather all of that information.

And so when we're looking at any particular unit's desire for extension, that would be information not developed by us, but information that we would be gathering from the market and then reflecting in our plants.

And I think it's that -- we do understand, obviously, that licensing is a very long, comprehensive --

necessarily comprehensive process. We respect that. And the last thing we want to do is push you into a tough spot around your processes.

So I do think it probably speaks to better engagement between our two entities as we're putting together our plan, and I'm happy to commit to that. And maybe when you're closer to the actual planning piece, so anything you would add to how this information gets developed.

**MR. KULA:** Thanks, Peter.

And yes, I agree with you and I understand the concerns.

So as Peter said, we take the information from the asset owners based on what they expect to undertake. And so if -- so the request or the heads up on a potential extension to Pickering, I believe, would come from OPG through an application to extend their licence.

They have been in conversations with us and others around that potential, and so I expect that the next step would be something that OPG would undertake if they, in fact, went ahead and did so.

With regard to the not wanting to be backed into a corner, and I understand that sentiment and

understand timelines, we understand uncertainties in all of our plans. There are uncertainties around other elements of supply. There are certainly uncertainties around demand.

And so our plans give us the best this point in time insights as to what we think is going to happen, but we would always be prepared for moving forward with plans and ensure reliability, whether Pickering was there, you know, in 2025 or not.

And so we would have no intention of backing you into a corner. We would make sure that we were covered under all circumstances.

**THE PRESIDENT:** Thank you.

So maybe I will turn to the asset owner, OPG. And we've got a few people online here.

Is there an expectation of the Pickering units past end of 2024 as we sit here today?

**MR. VECCHIARELLI:** For the record, this is Jack Vecchiarelli. I am the Vice-President of Nuclear Regulatory Affairs and Stakeholder Relations for OPG.

I also have John Mauti with us and, in a moment, I'll also ask him to add to my comments.

What I would like to basically mention



here is that OPG fully understands the terms and conditions of the Pickering power reactor operating licence. And we understand that Commission approval is necessary to operate any unit past 2024.

You did ask, Madam Velshi, about the timing. We do have a licence condition 15.4 to inform the CNSC in writing of any intention of operating Pickering reactor unit past 2024 by the end of 2022.

So in terms of formal communication, we do have a licence condition that we are obligated to comply with.

As for Pickering plants going forward, I will invite John Mauti to elaborate on that.

**MR. MAUTI:** For the record, this is John Mauti, Chief Financial Officer for Ontario Power Generation.

So yes, the IESO is correct in that we did approach them and worked with them as we had looked at the operations of our Pickering facility and in the planning that we were doing that would take us out to the end of '26 and '27, identify the potential to -- and the proper shutdown sequence for the units, be able to operate the plants, potentially, through the year 2025 as well.

We did inform them that it was fully dependent on the results of the licensing application and concurrence from the CNSC, but we felt that it was appropriate for the planning exercise for the upcoming five, six years to look at those opportunities.

We worked with the IESO to ensure that it was economic to the system to operate those units given the different options that the IESO has in front of them, so we did our analysis, they did theirs and then -- and I believe we landed at the same spot to conclude that on the assumption that the units were safe to operate and we got those regulatory approvals done, that there would be value to the system to operate longer.

So it's always been an understanding that it was contingent on that -- the licensing process going through its necessary channels.

**THE PRESIDENT:** Thank you.

Maybe I'll turn to OPG. Maybe Mr. Jammal can comment on the licensing process and if OPG were to wait till the end of 2022 and come with a request to run some of these units through 2025, this -- does that give sufficient time both for the licensing process and however that may unfold and if the Commission decision is a no,

then presumably the IESO has a lot of other contingency plans and is not dependent on those Pickering units.

Mr. Jammal?

**MR. JAMMAL:** Thank you, Madam President. It's Ramzi Jammal, Executive Vice-President at Canadian Nuclear Safety Commission.

The question is, as mentioned, that there is a licence condition that is binding for OPG in order to meet. Your question with respect to the licensing process, at what time they should come for approval, currently, as it was mentioned, they must come to us prior to December 31st, 2022 with their intent with respect to the phased-in shutdown of the site.

If there are any changes from what the Commission has approved, that is a change outside the licensing basis so they have to come to the Commission for approval and then the licensing process kicks in with respect to the hearing process and the approval by the Commission.

We are in discussions with OPG, Staff, that is, in order to make sure that the timelines are respected and, if there are any changes, we'll be informing the Commission ahead of time.

So we'll be providing you with the updates with respect to the annual regulatory oversight reports on an annual basis, and that's one of the issues we'll be raising to the Commission in October-November, depending on the timeline associated with the ROR.

We'll keep you abreast, at minimum, at the ROR and a status report with respect to the intention of OPG. But I'm fully aware that Staff and OPG are in discussion prior to the last, being December 31st, 2022, with respect to the intent.

With respect to the safety, Staff will not recommend any operations beyond 2024 as established by the safety case unless we have assurances that the safety margins are maintained.

**THE PRESIDENT:** Thank you.

And maybe last question to IEA.

So your interim APO, which is imminent, does that also indicate the Pickering units running post-2024 as an option?

**MR. GREGG:** Len, can you confirm?

**MR. KULA:** Offhand I don't know, but I wouldn't believe that to be the case.

**THE PRESIDENT:** Thank you.

So we'll follow that closely.

OPG, I see you've got your hand up. You wish to add something?

**MR. VECCHIARELLI:** No. It's Jack Vecchiarelli here.

Nothing further to add. Thank you.

**THE PRESIDENT:** Okay. Thank you very much.

Again, Mr. Gregg and Mr. Kula, thank you very much for coming and presenting today.

And I do agree with you. I think we should look for opportunities to just be coordinating better because it's not just about making sure that your planning lines up with what our best information is. I think more fundamental to that is around transparency and trust and making sure that we don't lose sight of that.

So we look forward to further engagements with you.

That concludes this particular agenda item, and we will take a break. And can we resume at 10:15.

Okay. So it's going to be a long break, and we'll resume at 10:45 a.m.

Again, thank you all for the participation this morning.

**MR. GREGG:** Thank you very much.

**MR. KULA:** Thank you.

--- Upon recessing at 9:59 a.m. /

Suspension à 9 h 59

--- Upon resuming at 10:45 a.m. /

Reprise à 10 h 45

**THE PRESIDENT:** Good morning, everyone.

The next item on the agenda is a suite of waste and decommissioning Regulatory Documents presented to the Commission for approval.

I understand that there will be a single presentation covering the five proposed REGDOCs and that the Commission's question period will address each proposed REGDOC sequentially, one at a time.

I wish to note for the benefit of the record that the Commission received several requests from industry and from civil society organizations to participate in this meeting item and to make oral or written submissions to the Commission on these draft

Regulatory Documents.

These requests to participate were not granted. In accordance with well-established processes for Regulatory Documents development, the CNSC Staff indicate that they have reached the stage to propose these drafts after undertaking all of the rigorous steps in the consultative process, including seeking public input, considering that input in the drafting, and dispositioning all feedback.

The Commission will consider the draft Regulatory Documents, an important of which includes consideration of the public consultation that has been undertaken and how that public input has factored into the resulting drafts.

For the Commission, the draft Regulatory Documents are not a *fait accompli*. The Commission will decide whether and the extent to which there has been adequate public input and adequate consideration of the public input in the draft Regulatory Documents. We will also have to satisfy ourselves of the content of all the draft documents.

Should the Commission not be satisfied with any of the draft Regulatory Documents, we will

determine what further steps may be necessary for Staff to undertake.

As it is already close to 11:00 a.m., we will hear the presentation from the CNSC Staff, probably start the questions on the proposed REGDOCs, take a lunch break and resume after lunch with the questions from Commission Members on the remaining proposed REGDOCs.

I also wish to note that representatives from the Saskatchewan Ministry of Energy and Resources and also from Natural Resources Canada are joining us remotely. They will be available for questions later.

Ms Tadros, the floor is yours.

**CMD 20-M13.A**

**Oral Presentation by CNSC staff**

**MS TADROS:** Merci, et bonjour, Présidente Velshi et membres de la commission.

For the record, my name is Haidy Tadros. I am the Director General of the Directorate of Nuclear Cycle and Facilities Regulation.

With me today to deliver this presentation are my colleagues, Lynn Forest, Director of Regulatory



Framework Division, Karine Glenn, Director of Wastes and Decommissioning Division, and Nancy Greencorn, subject matter expert in waste management and decommissioning at the CNSC.

In addition, we are joined by several CNSC Staff available to support and answer any questions you may have on this subject.

The CNSC is committed to maintaining a regulatory framework that is modern and aligned with national and international standards and best practices while taking into account the Canadian context. To that end, CNSC Staff are here today to present Commission Member Document 20-M13 and requests the Commission approve five Regulatory Documents, or REGDOCs, related to nuclear waste and decommissioning.

These REGDOCs codify existing requirements as well as enhance and improve the existing framework.

Information in support of this request is provided within this presentation and the written CMD, which was provided to the Commission and interested members of the public.

Please note that a formatting error was identified in the tables found in the original version of

CMD 20-M13 which made some of the text unreadable. In order to remedy this situation, a revision of the CMD, 20-M13.A, was issued.

The formatting of the tables is the only change in the revised CMD.

This slide provides an overview of what we will be presenting today.

First, we will cover an overview of Canada's radioactive waste management and decommissioning framework.

Following that, we will outline CNSC's Regulatory Document framework and we will situate the five waste management and decommissioning REGDOCs presented today within this framework. Then we will outline the REGDOC development process, including the benchmarking of safety standards undertaken for these REGDOCs.

We will also provide an overview of each REGDOC and summarize what we heard from public consultation and engagement activities.

We will end with CNSC Staff's conclusions and recommendations.

This slide provides the context around Canada's radioactive waste framework.

Natural Resources Canada is responsible for setting Canada's nuclear policies, including those concerning radioactive wastes. NRCan's Policy Framework for Radioactive Waste establishes the roles and responsibilities of the Government of Canada and waste producers. The Policy Framework sets the stage for institutional and financial arrangements to manage radioactive waste in a safe, comprehensive, environmentally sound, integrated and cost-effective manner.

The *Nuclear Safety and Control Act* grants regulatory authority over the use of nuclear materials to the CNSC. The responsibilities of the CNSC include making regulations, issuing licences and ensuring compliance. The CNSC ensures that waste management, nuclear waste, has and continues to be safely regulated in Canada.

CNSC Staff actively participate in international committees on waste management and decommissioning, including the International Atomic Energy Agency's Waste Safety Standards Committee and the Nuclear Energy Agency's Radioactive Waste Management Committee and the Committee on Decommissioning of Nuclear Installations and Legacy Management.

Canada has also ratified the Joint

Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, an international agreement governing all aspects of spent fuel and radioactive waste management.

The Joint Convention calls for a review meeting to be held at least once every three years. The Contracting Parties participating in the Joint Convention are required to submit a national report at each review meeting, demonstrating the measures they have taken to implement their obligations under the agreement. Canada continues to meet its obligations under the Joint Convention.

As outlined yesterday during the Integrated Regulatory Review Service, or IRRS, item, in 2019 the CNSC underwent an IRRS mission. The objectives of the mission were to ensure continuous improvement of nuclear safety and demonstrate that the regulatory framework, including the approach to regulating waste management and decommissioning, is robust and consistent with international standards and best practices. The IRRS mission included a focus on waste management and decommissioning.

And upon review of CNSC's work on

modernizing our regulatory framework, the international IRRS team noted that the finalized versions of the waste management and decommissioning REGDOCs should be in line with the IAEA safety standards when the draft versions are finalized.

I will now pass the presentation to Lynn Forrest.

**MS FORREST:** Thank you.

I am Lynn Forrest, for the record. I am the Director of the Regulatory Framework Division.

This slide is a quick view of our Regulatory Framework at the CNSC.

It starts at the top with our enabling legislation, the *Nuclear Safety and Control Act*.

In the second tier, the CNSC has 13 regulations, which set out the high level, legal requirements that licensees or applicants must meet in order to obtain or retain a licence.

Next we have licences and certificates. The CNSC issues licences and certificates with facility and/or activity-specific requirements that therefore permit licensees to operate. Licences are also legally binding.

The largest segment in red represents the

CNSC's Regulatory Documents, or REGDOCs, as well as accredited standards such as those published by the CSA Group or ISO.

REGDOCs provide greater detail than regulations to clarify the CNSC's regulatory requirements and provide guidance as to how the requirements may be met. They are approved by the Commission. The Commission may choose to reference Regulatory Documents in the licensing basis. Only then do Regulatory Documents become legally bindings.

As for standards, they also provide detailed measures to achieve nuclear safety. For example, the CSA Group maintains a comprehensive range of nuclear standards developed and supported by committees of expert volunteer members from industry, general interest and government stakeholders, including the CNSC.

The Commission often references standards in REGDOCs and in licence conditions, where greater clarity of requirements is warranted. This is usually done after public consultation on the Regulatory Document or pursuant to a public hearing on a licence application.

The CNSC is committed to continuous improvement of its regulatory framework. Comments are

welcome at any time, and REGDOCs are considered to be evergreen.

Right now, the CNSC's waste management framework provides adequate oversight; however, there are areas to more clearly articulate the CNSC's regulatory requirements in the evolving nuclear waste and decommissioning context. That is why we are here today with a broad suite of documents about waste and decommissioning.

Clarity of requirements for all stakeholders improves the efficiency and effectiveness of the regulatory regime.

To enhance accessibility of our regulatory expectations, the CNSC structures its Regulatory Documents according to the framework shown here.

There are three categories of REGDOCs. The first one, "Regulated facilities and activities", which articulate the basic requirements for applying for a licence for each of the facility types or nuclear activities. These REGDOCs point to all of the other REGDOCs that contain requirements or guidance that applies to the particular facility or activity. For example, a Class I waste management facility would be required to meet

requirement in many other REGDOCs, including perhaps 2.2, 2.7, 2.9, 3.1, 3.2, et cetera, in addition to 2.11.

The second category represents the Safety and Control Areas which apply, on a graded approach basis, across most facilities and activities.

And the third one, "Other", which include reporting requirements, public and indigenous engagement and matters of Commission proceedings.

This slide shows where the documents presented today, in red, fit within this document framework. For example, series 2.11 includes 2.11.1, Volume I: Management of Radioactive Waste, REGDOC-2.11.1, Volume III: Safety Case for the Disposal of Radioactive Waste, Version 2, and REGDOC-2.11.2, Decommissioning.

Of course, this series also includes 2.11, which is the Framework for Radioactive Waste Management and Decommissioning in Canada, 2.11.1, Management of Uranium Mine Waste Rock and Mill Tailings, and 2.11.1, Volume III, Assessing the Long-Term Safety -- sorry. That one's already covered.

The next slide shows the older documents that would be superseded if the Commission approves the suite of documents before it today.



The documents being presented today would bring previously-published material that is still applicable into the CNSC's current structure so that it is easily found, and will modernize requirements and guidance.

Specific information on the draft Regulatory Documents will be provided later in this presentation.

The document development process used in creating the five REGDOCs presented today is shown on this slide.

The CNSC has a well-established process that ensures the creation of robust regulatory documents through extensive analysis and public engagement.

All documents are evergreen, as I said before, and comments are welcome and considered at any time.

The boxes that are outlined in black represent the opportunities where stakeholders in this case were explicitly asked to comment on the documents. The process for development of the documents commenced several years ago with analysis, on the left. The first formal opportunity for public consultation was in 2016 when a discussion paper was published to obtain public feedback on

the CNSC's early thinking about modernizing the waste and decommissioning regulatory framework.

Discussion papers play an important role in the selection and development of the CNSC's requirements or guidance. They are used to solicit early public feedback on CNSC policies or approaches. The use of discussion papers early in the regulatory process underlines the CNSC's commitment to a transparent consultation process. The CNSC analyzes and considers this early feedback when determining the type and nature of requirements and guidance to issue.

Taking into account the feedback that we received from the discussion paper and integrating previously existing documents into the new framework as well as determining the best possible structure for the broad subject matter of a waste and decommissioning framework involves experts from across the CNSC. All this was undertaken while the new projects for waste and decommissioning were coming -- while new projects for waste and decommissioning were coming forward worldwide. The result is the five draft documents presented today.

As is CNSC's practice, shown in Step 5, all draft documents were subject to explicit public

consultation periods in 2018 or 2019-20 for periods of 60 to 120 days, depending on the document. Any requests for extension to the consultation periods were considered and granted.

As a result of the public consultation in this case industry and civil society organization requested additional workshops with the CNSC to discuss their comments prior to finalizing the documents.

Therefore, the CNSC responded by adding an additional step, which is displayed in red, in the process for the further consultations to specifically consult on how the CNSC had addressed comments it received. This is represented by Step 5a.

Workshops were held with all commenters and feedback was accepted and addressed by staff in a transparent manner as presented in the CMD material.

Since the workshops we have continued to respond to all comments and are here to present the resulting draft documents.

CNSC regulatory documents are now reviewed on an ongoing basis and amended as required. Should the government amend its policy on nuclear waste these documents would be reviewed, amended accordingly, and

presented to the Commission for approval.

I will now pass the presentation to Ms. Karine Glenn.

**MS GLENN:** Sorry about the slides. For the record, I am Karine Glenn, and I am the Director of the Wastes and Decommissioning Division.

As Ms. Forrest pointed out, in 2016 Discussion Paper DIS-16-03, *Radioactive Waste Management and Decommissioning* was issued for 120-day public consultation. The use of discussion papers early in the regulatory process underlines the CNSC's commitment to a transparent consultation process.

Comments were received from 18 individuals and organizations. The comments fell into themes including waste classification; waste minimization; waste management program requirements. And those comments were posted on the CNSC's website for feedback, followed by a What We Heard Report that was published in 2017.

Staff considered the feedback received from the discussion paper in the development of the REGDOCs presented today.

The IAEA safety standards are consensus standards that provide the fundamental principles,

requirements, and recommendations to ensure nuclear safety. They serve as a global reference for protecting people and the environment and contribute to a harmonized high level of safety worldwide. The IAEA documents are not binding to the Member States, but rather serve as guidance.

As part of the development of these REGDOCs CNSC staff reviewed and took into account international regulatory best practices and modern codes and standards including the IAEA safety standards. Through this work staff ensured that the CNSC Regulatory Framework is aligned with international guidance and best practices while taking into account the Canadian context.

Comments from the IRRS mission regarding the regulatory framework on waste management and decommissioning were also considered in the drafts that are before you today.

In addition to the discussion paper CNSC staff conducted consultation throughout the development of these REGDOCs.

Each REGDOC was issued individually and separately for public consultation.

This slide outlines the public consultation period and the number of comments received for

each draft document. As per the standard CNSC process, the consultation included an initial period for comments followed by an opportunity to provide feedback on the comments that were submitted.

For each REGDOC all comments received were considered and responded to, and changes were made to the documents as appropriate.

In addition to the consultation outlined in this slide, REGDOCs 1.2.1 and 2.11.2 underwent an additional targeted consultation.

With respect to REGDOC 1.2.1 the Independent Geoscience Advisory Group or IAG had not made any submissions during the consultation period. The IAG requested to review the document after the close of public consultation. This request was granted and the IAG review occurred between June 14th and August 5th, 2019. Comments received were considered in the Draft REGDOC presented today and are dispositioned in the Tables that accompany the CMD.

After the initial public consultation was performed for REGDOC 2.11.2 the scope was expanded to include Class II facilities. A working group representing Class II licensees in the commercial, medical and

industrial sectors from across Canada was directly consulted for comments between January 27th and March 2nd, 2020. No comments were received from this targeted consultation.

During public consultation -- members of the public, civil society organizations and industry expressed an interest for the CNSC to hold workshops in order to review how comments were dispositioned and to engage on a common understanding of the documented information. In response CNSC staff hosted a workshop for industry on February 5th, 2020, and a webinar with members of the public and CSOs, on February 26th. The latter session was not very successful due to technical difficulties and a platform which did not allow for adequate engagement. Therefore, a second session with members of the public and CSOs was held on April 23rd, this time using a different platform.

The number of comments received in advance of the workshops are provided on this slide. Due to time constraints not every comment received by CNSC staff was answered during the workshop. However, CNSC staff dispositioned all of the comments and made them available through the detailed comments table available in the CMD

package.

The following key themes were raised during the public consultation for this suite of Draft REGDOCs. Overall, the commenters felt that there was a lack of clarity in the scope and applicability of the REGDOCs. As such, CNSC staff revised each REGDOC to clarify its scope and its applicability to various licensees.

Many commenters identified that the terminology and definitions lacked clarity and in some instances were inconsistent. As a result, CNSC staff revised the language used in the documents for clarity and precision.

CNSC staff also reviewed the REGDOCs to ensure that key terms are found in either REGDOC 3.6, *Glossary of CSNS Terminology*, or in the CSA standards that complement the REGDOCs.

There were also several comments questioning the alignment of the REGDOCs with IAEA safety standards. Consequently, CNSC staff conducted another review of the REGDOCs for alignment in a Canadian context with the IAEA safety glossary, as well as alignment with the existing policy.



The applicability of the graded approach was raised as a concern by both industry and the public, and as a result a section on the use of the graded approach was added to the appropriate REGDOCs.

Finally, several comments were received regarding the use of CSA standards as part of the regulatory framework. CNSC have provided that the CNSC maintains an efficient and streamlined regulatory framework by making appropriate use of international and national standards.

Each and every comment received was considered and responded to and changes were made to the documents as appropriate.

I will now pass the presentation over to Ms Nancy Greencorn.

**MS GREENCORN:** For the record, I am Nancy Greencorn. I am a subject matter expert in Waste Management and Decommissioning at the CNSC.

The first REGDOC presented today is REGDOC 1.2.1, *Guidance on Deep Geological Repository Site Characterization*. This document supersedes R-72, *Geological Considerations in Siting a Repository for Underground Disposal of High-Level Radioactive Waste* which

was our primary document published in 1987. The proposed REGDOC will become a guidance document but all requirements that remain in R-72 can now be found in other Regulatory Documents such as REGDOC 2.11.1, Volume I, and Volume III, which will be presented in the upcoming slides.

REGDOC 1.2.1 provides guidance on site characterization activities for deep geological repositories (DGRs).

Site characterization activities begin before the applicant submits a license application to the CNSC and will continue through the life-cycle of a DGR facility.

Site characterization is an essential component in selecting a site for DGR. The host rock and geosphere will be unique to the site chosen.

While site selection itself is not a licensed activity under the NSCA, site characterization information collected to support site selection will inform impact assessments and will be used to support an initial license application.

Should a DGR facility be issued a license site characterization activities will continue during subsequent life cycle phases. Examples of site

characterization activities that would be conducted under a CNSC license include verification of information gathered in earlier phases; establishment of adequate baseline information for future monitoring; and, information used in updates to the DGR's facility safety case.

The following slide outlines the feedback themes from the public consultation of REGDOC 1.2.1. As a result of public consultation the following revisions were made to the REGDOC: The purpose and scope were revised for clarity with a clear statement of the role of this document as guidance only.

The background information now includes clarity on early involvement of the regulator and public participation.

A section and figure were added to clarify the role of site characterization in the CNSC regulatory process. It explains how site characterization activities that begin during site selection may be used to support future license applications and impact assessments, and also how characterization will continue as a licensed activity over the lifetime of a potential DGR facility.

Finally, site characterization criteria changed to add microbiology as a factor that could affect

geochemical environment, add "potential to withstand glacial events" under geomechanical characteristics, and clarify that natural resource potential should be evaluated to assess the likelihood of inadvertent future human intrusion.

CNSC staff would also like to note that in preparing the CMD some comments on this REGDOC were erroneously omitted from the Comment Disposition Table. These comments, as well as CNSC staff's associated disposition are included in an annex to this presentation.

The next document before you today is REGDOC 2.11.1, Volume I, *Management of Radioactive Waste*. This is a new document which provides requirements and guidance for all licensees managing radioactive waste. It includes requirements for all steps in the management of waste including generation, handling, processing, transport, storage and disposal.

It also contains requirements and guidance specific to radioactive waste storage facilities and disposal facilities.

In addition, this document specifies waste management program requirements.

This document closely aligns with CSA

standard N292.0, the *General principles for the management of radioactive waste and irradiated fuel*.

This slide outlines the feedback received from the public consultation of REGDOC 2.11.1, Volume I.

Feedback from CSOs, members of the public, and industry provided that clarity was needed on NRCan's role in setting policy and the responsibility of waste owners. As a result, CNSC staff have included a direct reference to REGDOC 2.11, *Framework For Radioactive Waste Management and Decommissioning in Canada* which describes the national framework for waste management in Canada. REGDOC 2.11 also provides the philosophy underlying the CNSC's approach to regulating the management of radioactive waste.

Commenters also had questions on the applicability of requirements at the different lifecycle phases of a facility. As a result, the waste management facility sections were adjusted to distinguish the lifecycle stages.

Several commenters were -- comments were also received on the need for greater clarity on the definitions of radioactive waste classes. CNSC staff have amended the REGDOC for a more precise alignment with CSA

Standard N292.0 and IAEA Safety Standard GSG-1  
*Classification of Radioactive Waste.*

Commenters also raised issues on the applicability, timing, and the level of detail of characterization as well as expectations for maintaining waste inventory records. As a result, the document was revised to include further expectations on the characteristics that should be included as part of waste characterization, including the identification of principal radionuclides relevant to safety. As well, the REGDOC stipulates that licensees' waste management programs shall require records of the waste inventory under their control and maintenance of those records.

The commenters also requested that criteria for the transport of radioactive waste be included. A reference was included to the transport regulations as a result.

Finally, there were comments on the use and application of active and passive institutional controls. As such, clarification was provided on active controls including the expectation that active controls are followed by passive controls which ensure that knowledge of the disposal site is maintained and that the future uses of

the sites are controlled.

Next, is REGDOC 2.11.1, Volume III, *Safety Case for the Disposal of Radioactive Waste, Version 2*.

This document is a revision to Version I which in 2018 replaced document G-320, *Assessing the Long-term Safety of Radioactive Waste Management*, which have been in place since 2006.

REGDOC 2.11.1, Volume III provides updated requirements and guidance to licensees and applicants for developing a safety case pertaining to the disposal of all classes of radioactive waste.

Specifically, it addresses the development of a safety case, a supporting safety assessment for the post-closure phase of disposal facilities, locations, or sites.

This document also applies to long-term radioactive waste management facilities, locations, or sites where there is no intention to retrieve the waste.

The safety case is the main tool used to document and demonstrate that a facility will adequately protect people and the environment during its entire lifecycle and in the post-closure period.

For the post-closure safety assessment the emphasis is on the performance of a disposal facility and

the assessment of its impact after closure.

For REGDOC 2.11.1, Volume III, feedback received during the consultation period included the following themes:

Commenters identified a lack of clarity on the scope, specifically on the distinction between facility types and the timing of the different requirements at various stages of a facility lifecycle.

CNSC staff then revised the scope to clarify its application for disposal facilities, locations, or sites of all classes of radioactive waste for the post-closure phase.

Questions were also received on the relevance of the operational aspects to the post-closure safety case.

CNSC staff has clarified that while operational safety aspects are outside the scope of this document, the licensee shall ensure the impacts of pre-closure activities, including operation, on the post-closure safety assessment are assessed and minimized.

Also, several comments concerned the application of long-term waste management facilities and waste disposal facilities. As a result, CNSC staff have



clarified the scope of this regulatory document addresses disposal facilities. The CNSC defines a disposal as a placement of radioactive waste without the intention of retrieval. This document also applies to long-term radioactive waste management facilities where there is no intention to retrieve the waste.

Clarity was requested on the determination of time frames for the post-closure safety assessment. As such, text was added to the REGDOC to give more guidance on time frames.

Commenters also requested additional clarity on safety requirements and acceptance criteria. As a result, a definition of safety requirements has been added to the REGDOC. It clarifies now in the REGDOC that acceptance criteria are a component of the safety requirements that must be developed in consultation with the CNSC.

Furthermore, a section on acceptance criteria has been expanded based on the feedback received.

Comments were raised on the reliance on computer modelling for the development of a safety assessment. CNSC staff had clarified that computer modelling is one of only many means to provide confidence

in the post-closure safety assessment. All arguments and lines of evidence, part of the multiple lines of reasoning approach, including computer modelling, must be documented in the safety case.

The fourth document presented to you today is REGDOC-2.11.2, Decommissioning, which updates its predecessor, G-219, *Decommissioning Planning for Licensed Activities*. G-219 has been in effect since 2000. The original document provided guidance on the planning phase of decommissioning.

The CNSC defines decommissioning as the administrative and technical actions taken to allow the removal of some or all of the regulatory controls from a facility or location where nuclear substances are managed, used, possessed or stored. Decommissioning actions are the procedures, processes and work activities (e.g., decontamination, dismantling or cleanup) that are taken to retire a facility from service with due regard for the health and safety of people and the environment.

Draft REGDOC-2.11.2 provides requirements and guidance regarding the planning, preparation, execution and completion of decommissioning. This document applies to Class I and Class II nuclear facilities, uranium mines

and mills, and nuclear substances and radiation device licensees who are required to have a decommissioning plan or strategy as a result of a regulatory requirement or a condition of their licence.

REGDOC-2.11.2 is closely aligned with CSA Standard N294, *Decommissioning of facilities containing nuclear substances*.

For REGDOC-2.11.2, feedback received from the consultation period included the following themes.

Commenters raised concerns over the use of in situ decommissioning as a decommissioning strategy. The revised draft REGDOC addresses the IRRS's final report, suggesting that the CNSC revise its decommissioning requirements to better align with the IAEA guidance concerning entombment. Draft REGDOC-2.11.2 now clarifies that in situ decommissioning is not considered a reasonable approach to existing nuclear power plants or for future nuclear facilities and situations where removal is possible and practicable, with the exception of uranium mines and mills.

Clarity was sought on the timing of decommissioning submissions. As a result, additional requirements and guidance was added on the timing of key

decommissioning plans and activities such as when pertinent documentation needs to be submitted to the CNSC.

CNSC received comments regarding engagement with respect to decommissioning. Clarification was provided on the CNSC's expectations on public and Indigenous engagement as part of decommissioning strategies and decommissioning plans.

Clarity was requested on the safety assessment requirements for decommissioning, particularly with respect to the stage of storage with surveillance. CNSC staff have made clear that the decommissioning safety assessment should support the activities listed in the decommissioning plan. Staff have outlined that storage with surveillance plan should be developed on the basis of the outcomes of the safety assessment.

Additionally, clarity was sought as to whether decommissioning activities include storage with surveillance. As a result, the definition of decommissioning in the REGDOC has been revised to expressly include storage with surveillance.

Finally, there were questions raised around the alignment with CSA N294. During the public consultation phase of this draft regulatory document, CSA

N294-19, which also underwent public consultation, was published. CNSC staff have revised the draft REGDOC to ensure alignment with CSA N294-19.

The final document in the suite presented to you today is REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities*. This document is an update to the existing G-206 which was published in 2000. The original document was a guidance document and the changes proposed in this REGDOC reflect the regulatory experience acquired since the publication of G-206 as well as international best practices.

The changes from guidance to requirements for the mentioned sections will not have an impact on licensees since the financial guarantees that have been approved by the Commission or a person authorized by the Commission already meet those requirements.

REGDOC-3.3.1 provides updated requirements and guidance to applicants and licensees regarding the establishment and maintenance of funding for decommissioning of facilities in Part I and a new section pertaining to financial guarantees for the termination of activities licensed by the CNSC in Part II.

Part I of this document pertains to financial guarantees for decommissioning of nuclear facilities or activities for Class I A and B licences issued in accordance with the *Class I Nuclear Facilities Regulations*, uranium mines and mills licences, and waste nuclear substances licences.

Part II of this document pertains to financial guarantees for the termination of licensed activities such as for nuclear substances and radiation devices, prescribed equipment, and Class II facilities.

REGDOC-3.3.1 provides acceptance criteria for financial guarantees, examples of acceptable financial instruments, guidance on methodology and considerations for cost estimation, administration, review and reporting on financial guarantees.

The following comments were received from public consultation on REGDOC-3.3.1:

- there was a lack of clarity on the expectations for financial guarantees (funding) for long-term monitoring of facilities transferred to institutional control;

- questions were raised on the acceptability of expressed commitments by governments as

financial guarantees; and

- there were concerns with changing guidance statements from G-206 into mandatory requirements.

CNSC staff have provided clarification to commenters to these concerns.

Finally, a section of the REGDOC was revised to provide clarity on reporting requirements and to align with those found in REGDOCs such as REGDOCs-3.1.2 and -3.1.3, Reporting Requirements.

I will now pass the presentation back to Ms Lynn Forrest.

**MS FORREST:** Thank you, Nancy.

Lynn Forrest, for the record.

To conclude, the suite of waste management and decommissioning documents, if approved, will improve clarity and strengthen the CNSC's regulatory framework related to waste management and decommissioning. They modernize the framework, clarify terminology, incorporate operational experience and align with international safety standards within the Canadian context.

This suite of science-based regulatory documents was developed through iterative consultations with stakeholders from 2016 to 2020 and is supported by

several decades of experience and technical documentation.

Next.

Based on our conclusions, therefore CNSC staff recommends that the Commission approve this suite of regulatory documents.

Thank you for your attention and we remain available to answer any questions you may have.

**THE PRESIDENT:** Thank you very much for that very comprehensive presentation.

I will open the floor for questions from Commission Members and the first round will be on general questions that apply to the full suite of regulatory documents.

I will start with Dr. Lacroix.

**MEMBER LACROIX:** Thank you very much for this presentation. Quite interesting and I appreciate the fact that it must have taken thousands of hours preparing these five documents and also commenting on the interventions made by the industry as well as by the social society organizations. I especially enjoyed reading the comments from the intervenors and the reply from the CNSC staff.

I have also noticed that staff have



provided us with a number of definitions in these five documents. Especially at the beginning of each document you provide us with a clear definition of "should", "must", "can" and so on. So I really appreciate these definitions because it clarified many of the sentences in the text.

On the other hand, there were instances where I was a bit disconcerted by some of the wording and this comment came regularly from the intervenors, from the industry as well as from the social intervenors. One of the words that recurs in the five documents is the word "to optimize" and this word has -- I'm looking for the definition that I -- general comments. It's over here. Yes, right.

I will provide you the definition of the word "to optimize" from the Webster dictionary. Now, this is in the common language. It's to make as perfect, as effective or as functional as possible. So when I read it in the REGDOC document I'm ill at ease with the use of "optimize" because there is no limit in the sense that where does the buck stop, where do you put the line?

On the other hand, if I look at this word from a scientific point of view, to me to optimize means to maximize or to minimize a function with respect to

variables and parameters. So I would have loved to see a clear definition of "to optimize".

I will give you some examples that I have seen in the text. You come up with sentences like we will optimize the system. What does it mean? To optimize safety, what does it mean? Does it mean to minimize or maximize safety with respect to -- to what?

So this is a general comment and I would like to hear it from the staff.

**MME TADROS** : Merci, Dr. Lacroix.

This is Haidy Tadros, for the record.

Absolutely, words are very important and I think it also speaks to the importance of the various consultations that we have had as well to ensure that the meaning and the interpretation of the words that we use is clearly understood throughout this process.

With regards to your specific question on optimization, I would like to pass that question on to Ms Nancy Greencorn, who has worked extensively with these REGDOCs but also on the national and international stage of recognizing what this word means.

**MS GREENCORN**: Nancy Greencorn, for the record.

"Optimization" was one of the words that we did hear through consultation that could have used some clarity. The definition appears in the IAEA glossary and appears in the safety fundamentals.

As per the IAEA glossary, optimization is "the process of determining what level of protection and safety will result from the magnitude of an individual dose, the number of individuals, workers and members of the public subject to an exposure and the likelihood of exposure being as low as reasonably achievable, economic and social factors taken into account.

This is a definition that covers optimization broadly, not just specific to waste management and decommissioning.

The rationale for not including it in this document is that it is broader than waste and decommissioning and it is a term that CNSC feels that we should add to our glossary.

So moving forward we will look to add that in our next revision of the glossary, but I suspect it would be to align with the IAEA glossary definition.

**THE PRESIDENT:** Are you okay with that, Dr. Lacroix?

**MEMBER LACROIX:** Yes. Thank you.

**THE PRESIDENT:** Dr. Demeter...?

**MEMBER DEMETER:** Thank you very much. It was a large volume of information to review. I will first give a suggestion as a comment and then I will ask a question.

As a reviewer of the document, the 800+ pages, it would have been very helpful to have the page numbers in sequence instead of this block by block by block, because if you are referring to page 58 there might be five page 58s.

Also for the tables, it might be really helpful to have at the header which table you are in, because those pages go on for -- tables go on for pages and pages and it says refer to comment X in table Y. Well, you have to figure out, well, which table am I in?

And if it's possible to repeat the comment rather than us having to keep continually go back and forth between tables. I know it would make it longer, but it would make the review shorter.

So those are sort of mechanical things I had.

In line with Dr. Lacroix seeking

clarification on definitions, the one word that is used that I think is subject to perhaps subjectivity is "practicable". You know, we shall do this unless it's -- as long as it's considered to be practicable or practical. Maybe you can give some guidance on how you define "practicable" in the sense of the licensee requirements.

**MS TADROS:** Thank you, Dr. Demeter.

This is Haidy Tadros, for the record.

Absolutely regarding your first comment.

Thank you for the feedback. Yes, we will ensure the breadth of information that is presented to the Commission is presented as such that we take your perspective as you review them. So thank you for that comment.

With regards to your question around practicable, I would like Karine to take that question.

**MS GLENN:** Karine Glenn, for the record.

I am the Director of the Wastes and Decommissioning Division at the CNSC.

When it comes to practicable, it ultimately will -- a number of factors will need to be considered into the proposal that a licensee would be putting forward, including doses to workers for instance or potential impact to the environment. Is there a greater

dose to workers being done if removal of the material is done if we're using the case of in situ versus where the word "practicable" is used versus leaving it in place. What would be the potential environmental impacts of removing material from the site versus leaving it there?

All of that becomes part and parcel of the safety case that the licensee has to put together and the justification -- we talked about justification yesterday as part of the IRRS item -- the justification that the proponent would have to include as part of its application to the Commission and ultimately it would be the Commission, when looking at the entirety of the project and all of the justification assessments and mitigation measures put in place, who would determine whether that was an acceptable solution.

**MS TADROS:** Haidy Tadros, for the record.

Perhaps to give a more concrete example of how that word could be used in what we are looking at, I would call on Dr. Elias Dagher to provide that example.

**DR. DAGHER:** Thank you, Ms Tadros.

Dr. Elias Dagher, for the record. I am a Geoscience Assessment Officer with the Environmental Risk Assessment Division of the Canadian Nuclear Safety

Commission.

So I will give a very specific example of what "practicable" could mean and I will use it in the context of monitoring for instance.

So when monitoring programs would be developed, say, for a deep geological disposal facility, they have to be designed and implemented so as not to reduce the overall level of safety of the facility after closure. So for instance you don't want to put any kind of intrusive monitoring in there. So that is a concrete example of what we would mean by practicable in one aspect of the safety case.

Thank you.

**MEMBER DEMETER:** Can I follow up?

**THE PRESIDENT:** Yes.

**MEMBER DEMETER:** So what I'm hearing is when you say practical or practicable you are really looking at a risk-benefit analysis. That's what you're considering practical, which is I guess more concrete risk-benefit versus -- a lot of things might be practical, but they may have nothing to do with risk-benefit. So I think I understand now where you are going.

**THE PRESIDENT:** I would like to just

follow up on that because that is a highly controversial point, especially when we talk about in situ decommissioning where we have this qualifier of possible and practicable. Is that consistent with the IAEA guidance? Do they qualify that as well?

**MS TADROS:** Haidy Tadros, for the record.

The IAEA definitions do not go into that level of detail with regards to in situ definitions or providing guidance on what extraordinary or extraordinary circumstances in situ may be used and hence the CNSC staff have taken a look and are aligned with what the IAEA is putting forward.

Perhaps Ms Karine Glenn can speak to not only the IAEA but also the discussions of the CSA table, where this language has been discussed extensively.

**THE PRESIDENT:** Maybe we will hold the discussion until we get to that particular REGDOC if it is around that and we will give you an opportunity to elaborate on that.

Dr. Berube...?

**MEMBER BERUBE:** Yes.

Well, thank you for this very detailed piece of work. I would like to add right up front, in case



I forget at some point later on to say so, is that in general I am satisfied with the staff's positions and also the nature of the consultations done on this document overall. It's very thorough and I think the staff has done a wonderful job on this and I appreciate this level of effort to try and pull the expertise out of the general public as well as out of the applicable experts in each subject field, so thank you for that.

One of the things I found reviewing this particular document was its length was exorbitant. Very difficult to actually navigate down to a certain position at any point, as well as the other Commissioners said. Would it help if you broke each one of these particular REGDOCs into its own PDF? In future I might recommend doing that, maybe A, B, C, D type thing. It's just easier to deal with, easier to work with on that basis.

There is something that has come up and I think it's something that is very important and I saw this generally through the dispositions, was there's a general lack of understanding what the REGDOC framework is, and that is that in my opinion it's a living document and I would like you to discuss, you know, what that really means so that the average reader can understand this.

**MS TADROS:** Thank you, Dr. Berube.

And again, I would like to acknowledge your comments and feedback with regards to our documentation. We will definitely look at it from that perspective moving forward.

With regards to your question specifically, I would like to ask Mr. Brian Torrie, our Director General in the Regulatory Framework Directorate, to give you an appreciation for the framework as a whole, how is it seen by CNSC staff and how is it dispositioned.

**MR. TORRIE:** Hello. It's Brian Torrie, for the record. I'm the Director General of the Regulatory Policy Division -- or Directorate.

The Reg framework formally consists of the documents defined in the presentation. So these are all our REGDOCs that you see there. It also includes the use of other instruments such as standards. And then, as you saw in the presentation, at the top end of that you have the Act and legislation.

The REGDOCs themselves are provided to give clarity to licensees and stakeholders about what the requirements and guidance are. The REGDOCs themselves aren't legislation or regulations and that is why they are

evergreen.

This has been a common point brought up in the review of these documents, that, you know, it appears that there isn't flexibility when there actually is flexibility to adjust them, more flexibility, say, than if we had to review a regulation. That takes way more time, involves the government.

At the same time, there are different ways that the Reg framework works in terms of how a REGDOC is developed versus, say, a standard.

So, for example, a standard -- I am on the steering committee for the review of the standards, the governance process for that, and we approve the standards through that process, but they don't come to the Commission like a REGDOC does. A REGDOC would go to the Commission in a meeting like this for review and approval. A standard wouldn't. But at the same time, I think as we mentioned earlier, in terms of regulatory tools they can both be used and decided upon the Commission in terms of their use.

So in that way what we are deciding today is a REGDOC that provides requirements and guidance for the Commission to use, but until it appears in the licensing basis it doesn't have force yet and could be adjusted by

the Commission at any time.

**THE PRESIDENT:** Thanks very much for that.  
Dr. McKinnon...?

**MEMBER MCKINNON:** Yes, thank you.

I enjoyed reading all of the documents and it certainly represents a massive body of work and consultation.

My comments are mainly about the document content as opposed to the process, but if I were to look at the five REGDOCs together, you know, one could do that from a number of different perspectives and so the one I will take for my general question is that of a designer if I were reviewing these with that hat on.

There are a lot of activities involved in design, starting from site characterization, construction management, long-term monitoring and so on, and there are many different criteria involved. The individual tasks are well described in the documents, although I do note that the design criteria are generally vague or absent, and that may be the intention for a guideline.

However, I think there needs to be a clear overall objective stated, especially if terms like "optimization" are used, since some of the criteria are in

competition. And I think, like Dr. Lacroix, I had a lot of difficulty with the use of that word in the documents because it created a lot of conflicts and perhaps later in the afternoon I would like to come back to that particular point.

However, returning to the general comment, in the REGDOCs I got really no sense of a clear, unifying general principle for design, although I believe it's generally understood that this should be the prevention of radiological exposure within certain limits, but I only came across that in the safety case REGDOC.

So there was a lot of extensive reference to other documents, but the high-level design objectives, it seems to me that they are so important should they not be stated clearly in each of the documents for consistency and clarity?

**MS TADROS:** Haidy Tadros, for the record.

So if I understand your question correctly, Dr. McKinnon, it is more with regards to CNSC staff's articulation of the objectives for each of these documents?

**MEMBER MCKINNON:** Yes. It's really the unifying theme tying them all together at the high level.

The reason for that is that each document looks at individual problems like the siting or long-term issues and each have different criteria, but when decisions have to be made, because they will be in competition at some time, there has to be a guiding overarching principle that will rule all of them and that, perhaps in the language of Dr. Lacroix, is what you might be trying to optimize.

**MS TADROS:** Thank you --

**MEMBER McKINNON:** So really, you know, there needs to be a statement about that.

**MS TADROS:** Thank you, Dr. McKinnon, for the clarification.

So maybe I will start and I will have Karine and Nancy to prepare for a more detailed answer.

I believe the language that you are looking for is in the overarching framework document 2.11, which really sets out, as you would say, the design objectives for how radioactive waste management, the framework under which radioactive waste activities are conducted, the governing legislation and the roles and responsibilities for the activities within that framework. So that document, as you have rightly pointed out, is not included in this suite of documents. It has been

referenced as the overarching document that tries to explain as a lifecycle regulator from cradle to grave, as we say, how waste, radioactive waste is managed, how it is mitigated, how it is reduced.

So perhaps Ms Karine Glenn can add details specific to that line of perspective.

**MS GLENN:** Karine Glenn, for the record.

What Ms Tadros said is absolutely correct. Previously, the principles or the objectives that you are looking for in those high objectives were contained in a document called P-290. That has been replaced and incorporated in document 2.11 and they are the six principles for waste management and are found there.

They are guiding, overall high-level objectives, which are:

- radioactive waste generation has to be minimized;
- the management of the waste has to be commensurate with the risk and the hazard that it poses;
- the assessment of future impacts has to incorporate the time span in which the maximum impacts will occur;
- the impacts in the future cannot exceed

those that are allowable today;

- the measures to prevent unreasonable risk have to be implemented as soon as possible and fully funded to prevent any burden on future generations; and

- lastly, that the transborder effects cannot exceed those found in Canada.

So those are the six basic objectives that apply to all radioactive waste management regardless of what type of waste it is, what kind of facility it is or what stage or activity related to waste management you are performing.

You did point out that the requirements with respect to design are not prescriptive. That is because we do not prescribe the type of facility that a proponent puts forward for a disposal facility or for a storage facility. The proponent would select what that option is and then justify it through the use of the safety case. There are a number of objectives and limits that occur with respect to radiation dose to the public, allowable releases or limits for releases to the environment, and those would be the design criteria that the licensee must meet. How they meet that, that is up to the proponent and must be demonstrated through the safety



case and any ensuing impact assessment.

**THE PRESIDENT:** Any follow-up questions, Dr. McKinnon, on that one?

**MEMBER MCKINNON:** No. That was very helpful, thank you.

**THE PRESIDENT:** Thank you.

I have a few quick general questions and then we will see if the Commission Members have another round.

About the consultation process, I just want to confirm -- so the workshops that were held for this suite of REGDOCs doesn't always happen with REGDOCs. Staff decided to have these because of the level of feedback from the different stakeholders and them wanting further consultation, confirmation of that?

And the second part to the question is, the final draft that got submitted to the Commission, was that ever shared with the stakeholders or did they see that for the first time when the Commission saw it?

**MS TADROS:** Haidy Tadros, for the record.

On your first question, President Velshi, the answer is yes, these workshops were added because of the desire and the request that public and different civil

society groups had approached us and needing -- and we as well felt the need to better articulate how those comments were dispositioned.

For your second part of the question with regards to the actual documentation, I believe Ms Lynn Forrest can add to that.

**MS FORREST:** Thank you.

Lynn Forrest, for the record.

Yes. To reiterate what Haidy said, we do not as a rule hold workshops, but we are open to them at any time and it was definitely an unprecedented level of participation overall in the preparation of these documents.

For your second point, the workshops were held on April 23rd, the final workshops. Then we revised the documents accordingly and you can imagine that that was a mammoth task, it took a lot of time, and the documents were sent to the -- were published with the CMD around the 1st of June. We did not specifically send them out to the people who intervened. Although normally we would send them directly ahead of going to the Commission, timelines were a bit tight at this point.

**THE PRESIDENT:** Thank you.

And then for the workshop, would they have seen kind of the penultimate draft or is it just, "Here are the comments we have received and here is how we have dispositioned them?"

**MS TADROS:** Haidy Tadros, for the record.

The participants at the workshop had seen both the drafts as well as the tables of disposition outlining how their comments were specifically dispositioned and that was the essence of generating the discussion so that we land on a common understanding for that disposition.

Perhaps I may add with regards to our consultation -- and Mr. Torrie may want to supplement this -- the process you see before you on slide 8 obviously is a process we needed to fit on the slide, but also one that needs to be recognized as no other federal regulatory body goes through this process of consultation with regard to the information that they have when they are putting forward different information that regulate different industries.

So I don't know if Mr. Torrie would like to add anything there.

**MR. TORRIE:** Brian Torrie, for the record,

again.

Yes. I think Haidy covered it there in terms of the breadth of consultation we have done here. You look at hundreds of comments. The way we disposition comments, the fact that we take this to a public meeting and discuss it, that is not the normal procedure across other federal regulators, partly because they don't have a tribunal like we have, but I think it speaks to the depth and amount of consultation we do in these documents. They are well thought out. It's a very robust process from the time we start with the discussion paper to the time we bring a draft to the Commission.

**THE PRESIDENT:** Thank you very much for that.

And did I hear -- and I can't remember whether it was Ms Forrest or somebody else who said that. Did those draft documents get shared with the IRRS review team in whatever state they existed at the time?

**MS TADROS:** Haidy Tadros, for the record.

That is correct, yes. When the IRRS team was here, when we presented our regulatory framework and obvious area of interest, and because the focus of the IRRS was on waste management and decommissioning, we took the

opportunity to share the draft documents at the time in the versions that they were and show the IRRS review team and the expertise that they have where we are at and what our plans are with regard to this area.

**THE PRESIDENT:** Thank you.

And their feedback to you, at least what you stated up front, was based on what they saw, they had felt that this would bring the CNSC's regulatory framework in alignment with the IAEA's guidance?

**MS TADROS:** Haidy Tadros, for the record.

That is correct. Clearly they understood the national context that all the different contracting parties are in, but they did articulate that given the breadth of work that we had done and the text that we shared with them that we would be landing on for all areas in waste management and decommissioning, including in situ, they felt that, yes, with the final versions that are presented before the Commission, Canada would be in alignment with the IAEA safety standards.

**THE PRESIDENT:** Thank you very much for that.

And another very quick question. Given the cross-referencing amongst this suite of five documents,

do they all have to get approved as a suite of documents? I know in our submissions you have said not necessarily, but I just wanted to make sure. If for whatever reason the Commission says, you know, these three are good to go now, are there amendments required because of the cross-referencing and some are draft and some may not get approved?

**MS TADROS:** Haidy Tadros, for the record.

So we would definitely need to look at which documents if some do not get approved so that, as you say, the cross-referencing is done appropriately and there is no confusion, because the next step in our REGDOC process is implementation and we need to be clear with the industry what exactly we are looking at from an approved published document.

Having said that and perhaps to give a little bit more confidence to the Commission as to why we have presented all five together, perhaps Ms Karine Glenn can speak to that point.

One point of note that I would like to make is we did present -- I believe it was on our slide number 7 -- the current suite of REGDOCs that you see before you and if they were to supersede any other

document. So, as you see, the information that is contained within the suite of documents you see, while updated, includes a clarity of further context and clarity of definitions.

The radioactive waste management and decommissioning framework in Canada is already being overseen in a safe manner. The only document that is not in place from a purely technical document perspective is REGDOC-2.11.1 Volume 1, and the reason for that is that the information that is currently found in that document has been pulled from different documents that already exist and already have approval by the Commission and that is what we use to regulate the industry.

So with that, I would like to ask Ms Karine Glenn to articulate a little bit more on the staff's I guess plan to present all five of them, as heavy as they are.

**MS GLENN:** Karine Glenn, for the record.

We did receive comments. When we went for initial public consultation, we did not send all five documents at once. So we had sent out the documents individually. For instance, REGDOC-1.2.1 was the first one out and then the subsequent documents were written

concurrently, but we purposely staggered the consultation period so not to overwhelm the reviewers.

However, they do -- they are, as you pointed out, very much interconnected. The financial guarantee document relies on the cost estimate, which relies on the decommissioning plan. So those work together in concert. When we are talking about the decommissioning, it points back to the long-term safety assessment document for disposal facilities.

There would be ways -- if for some reason the Commission decided or elected to not approve all of the documents at once, we would need to remove those references to the new suite and reference to the previous versions of the documents where they exist may not be appropriate. So we would need to take a look at that if that was the case, but it could be done.

**THE PRESIDENT:** Thank you very much.

And Mr. Jammal, I'm sorry, I failed to see your raised hand when we were having our discussion on practicable. I know this is a more general response you want to make as opposed to on a specific REGDOC, so over to you, Mr. Jammal.

**MR. JAMMAL:** Thank you, Madam President.



You asked a question with respect to, in general terms, practicable. Dr. Demeter addressed the fact that it is a risk-benefit, but for the -- there are no buts -- and to provide clarity.

This is the language that is being used at the IAEA and in specific at the conventions, for example post-Fukushima. In the Vienna Declaration, the principle of the United declaration for offsite impact with respect to a design, innovative design, will be offsite impact from the design to be as low as practicable. So that is a risk-benefit, or even the cleanup post event, the lessons learned from the Fukushima. I am just giving what it means as practicable. You can clean up to the point you start to disrupt the livelihood of the individual. It's no longer practicable to continue with that activity. So the risk-benefit is always being evaluated and that is the principle of performance-based.

Thank you, Madam Chair.

**THE PRESIDENT:** Thank you.

Dr. Berube...?

**MEMBER BERUBE:** Yes. One of the general observations as I was going through the dispositions and the comments of people that you consulted with was this

idea that they are struggling with the idea of what is directive, what is prescriptive, what is guidance. Why are you -- what logic are you using to determine which of these things is applicable? In particular, I have seen some people ask why isn't this more directive, it tells us what we need to do versus, you know, being a guidance framework which they're supposed to come to terms with. From their standpoint of course it's harder and in some cases, especially with ALARA, it becomes a moving target. So I can understand why they are doing that.

If you could just run me through the logic. What is the difference and the reasoning for directed versus prescriptive versus guidance frameworks on this?

**MS TADROS:** Haidy Tadros, for the record.

Thank you for that question, Dr. Berube. I will start and I am sure my colleagues, both Mr. Jammal and Ms Glenn, will want to provide some specific examples there.

As you know, the CNSC is a performance-based regulator and what that really means is that we use objectives to outline what is required and the licensees need to meet those objectives. There are -- in

several areas of our regulation, as you know, the regulatory dose limits are prescriptive: Thou shalt not exceed these limits. The security regulations, very prescriptive. It goes into not only how you will do things but what needs to be done, and vice versa. So there are areas of our regulatory regime that are highly prescriptive.

Overall, we have been moving as per the directive of regulation-making, moving into a more performance-based regime whereby the projects are presented and they are looked at individually on their own merit, and the overriding theme that all of these projects have is safety. Is the safety in place to ensure protection of the environment and people? We do not promote a solution, nor do we discount a potential proposal. We look at the merit of the proposal or the solution based on safety.

You are obviously very familiar with our safety and control areas, the safety analysis that is done, and all of this together comes into a combination of being performance-based, prescriptive when it comes to ensuring safety with regards to limits and also guidance and clear expectations on how to meet those safety standards.

So perhaps I would turn to Ms Glenn first

and, if we miss anything, I have no doubt Mr. Jammal would be able to supplement our response.

**MS GLENN:** Karine Glenn, for the record.

Ms Tadros has done a really good job of capturing the essence of it and perhaps I could provide some examples in specific areas where I know in the comments we have seen some comments regarding requests for more prescriptive requirements, one of which being waste classification. I know we are going to probably get into that this afternoon.

One of the examples I use to try to explain waste classification is think of it in terms of your recycling bins. You have a blue bin -- in Ottawa we have a blue bin and then a black bin. Our black bin is for paper and then the blue bin is for your plastics and your cans and your glass. Just because something is plastic doesn't mean you can put it in your blue bin. Only certain plastics are allowed.

I use the same kind of analogy when we talk about waste classifications and why we are not using prescriptive requirements when we are defining those classifications.

Ultimately what will dictate what can go

into a disposal facility will be the safety case of that facility. And that will dictate what the waste acceptance criteria for that facility is. So if we said all fuel goes into a deep geological repository, must go into a deep geological repository, for instance, just because a proponent is putting forward a deep geological repository proposal doesn't mean that that proposal is suitable for the type of waste they want to put in. They still have to go through that safety case.

So by working on performance-based and making sure that all of the parts work together rather than being prescriptive is actually providing a greater level of safety as a result. And so that's an example. We can provide other examples of why we prefer to use or we recommend using non-prescriptive approaches, and I will pass it on to Mr. Jammal if he wants to add anything.

**MR. JAMMAL:** It's Ramzi Jammal, for the record.

I would like to wrap up what my colleagues have said, because I'm fully in agreement, Dr. Berube, the fact that it's a balance between prescriptive and performance-based. As we are fully aware with the Canadian environment and the CNSC itself, performance-based is

you're always achieving and applying the new standards as they become available. The same thing applies for the new technology. So as you are looking at enhancement for safety, you always take into consideration the new available information, hence the performance base.

When it's prescriptive, you have to go back and amend the regulation, or it even binds the operator in a box that prevents improvements, or it will be -- I won't say prevents as such, but it always can require information via directive or an order. But the prescriptive element will be impediment for available new technology to be applied or a development of new methodology in order to implement into the safety case.

The classic way is, for us, we can speak of the NPP that the Commission has an extensive experience with. We always look at improvement/enhancement in order to approach or meet new standard, and that is performance based. And that's the intent of the performance-based recommendations or reference in our documents and our regulatory framework. Thank you.

**THE PRESIDENT:** Thank you.

Dr. Lacroix?

**MEMBER LACROIX:** Again, this is a general

comment concerning the five REGDOCs. Sometimes when I read these REGDOCs I had a hard time making a difference between requirements and guidance. And I was wondering, have you checked the text for conflicts between requirements and guidance?

**MS TADROS:** Haidy Tadros, for the record. An excellent question, thank you, Dr. Lacroix.

We have, as best we can, been meticulous on making sure that the "shall" statements which stipulate the requirements are clearly laid out. But even more importantly is when we say "shall" in one document, we don't lose sight of what that "shall" means when you get to another part of the waste management stream, if you will.

So yes, we have gone through these documents quite extensively. Perhaps I'd ask with Ms. Nancy Greencorn, who has seen these documents perhaps much, much longer than I have, and she has gone through them all, to elaborate as to her review of the "shall" statements and the "should" statements.

**MS GREENCORN:** Nancy Greencorn, for the record.

When we were developing these REGDOCs, we

closely aligned them with the IAEA safety standards. So in the safety standards, they're set out as requirements documents and guidance documents. The requirements documents use the "shall" statements, where you see more "shoulds" in the lower-tier guidance documents.

So in our drafts, we prepared them based on those, where the requirements and expectations as "shall," based on the general requirements documents at the safety standards. We also looked at our CSA standards. So they had exceeded it from a "should" to a "shall." We were trying to be consistent with those as well. So we first in drafting the documents based it on the international and national practices.

We then went to a public consultation and members of the public and industry and CSOs provided us with concerns or not concerns for "shoulds" and "shalls." And in the comment dispositions you will see how we adjusted those accordingly.

We then looked at the documents as a whole to make sure, as Ms Tadros just said, it wasn't a "shall" in one document and a "should" in another document. But essentially, the decision whether we put in place a "shall" or a "should" was based on looking at international and



national documents.

**THE PRESIDENT:** Thank you.

Dr. Lacroix, if there were any specific ones that you struggled with, you may want to draw staff's attention to those just in case with so, you know, such a voluminous set of REGDOCs, any have been missed.

I do have a question for NRCan, and I believe Mr. Delaney's on the line. And it's a similar question I asked you yesterday, given that we may have a different audience today with this agenda item. And it's around the IRRS recommendation around Canada updating its radioactive waste management policy.

So if you can again brief us around the timing and the process, but more importantly for today's agenda item, there are certain concerns raised by certain civil society organizations that the REGDOCs not get approved and get deferred until after the policy's in place, and that if the REGDOCs were to get approved now, it may hamper or hinder the development of the NRCan policy. So I wanted you to comment on that. Clearly we've heard from staff that when the policy is in place, the REGDOCs will get amended as appropriate, but really do want to hear your perspective on that as well. So over to you, Mr.

Delaney.

**MR. DELANEY:** Perfect, thank you. It's Jim Delaney, for the record. I'm the director of the Uranium and Radioactive Waste Division at Natural Resources Canada.

As you noted, we did -- this did come up in the meeting yesterday when we were talking about the integrated regulatory review service mission that took place. In terms of the work that we are doing and just in terms of context, we did receive a recommendation as part of that review service mission that we look at enhancing our policy and developing an associated strategy for the management of radioactive waste.

In terms of the timing and what you noted, we are at the initial stages of this initiative and are designing an engagement strategy. And just in terms of the context with COVID-19, we're targeting the fall to launch that stakeholder engagement process. So we really want to work with stakeholders and Canadians, including Indigenous peoples, to get their views and perspectives as we work to enhance our radioactive waste policy.

In terms of the REGDOCs, I would say this is a separate process from what we're doing in terms of

updating our policy. The work that CNSC is doing to update the regulatory documents is a separate process. We recognize that the CNSC is committed to ongoing improvements and periodic review of its regulatory documents, and as was noted I think by Lynn as part of the presentation, the results from the review of Canada's radioactive waste policy framework can be applied to how the CNSC regulates, including the REGDOCs, when the policy is complete. So the CNSC will have the ability to respond to any policy direction that comes from that process.

Thank you.

**THE PRESIDENT:** Thank you. And, again, just to the one bit around do you see the issuance of the REGDOCs in any way constraining the development of the policy, like putting the cart before the horse?

**MR. DELANEY:** No, I don't. In terms of the -- sorry, Jim Delaney, for the record.

I don't see concerns with that at this time. They are separate processes, and the REGDOCS we look at through the lens of our existing policy at this time, so no.

**THE PRESIDENT:** Okay, thank you. Thanks for that confirmation.

We'll break for lunch now and resume the questions on the specific REGDOCs at 1:00. So we'll speak to you then. Thank you.

--- Upon recessing at 12:22 p.m. /

Suspension à 12 h 22

--- Upon resuming at 1:00 p.m. /

Reprise à 13 h 00

**THE PRESIDENT:** Good afternoon and welcome back to the continuation of our meeting.

We will now start with questions from Commission Members on the specific regulatory documents. And we'll start with REGDOC-1.2.1, *Guidance on Deep Geological Repository Site Characterization*.

And we'll start with Dr. McKinnon.

**MEMBER MCKINNON:** Thank you.

I particularly enjoyed reading this REGDOC.

I have a general question to begin with. The REGDOC currently reads as if site characterization and the DGR design will be done as a single task. But in most large and complex projects, these are typically done using

a multistage approach, such as conceptual pre-feasibility, feasibility, and so on, and each has their own level of site characterization detail and they each feed into each other. And this is somewhat similar to the concept of the graded approach that is mentioned in other REGDOCs.

So my question is will the DGR facility not be developed using such a staged approach? And because this has such a significant effect on the site investigation methodology, should that not be built into the descriptions of how site characterization progresses?

**MS TADROS:** Thank you for the question, Dr. McKinnon. This is Haidy Tadros, for the record.

Absolutely. I think to give you a flavour of the detail of the notion of design and site characterization through the life cycle of commissioning and construction, I'd ask Dr. Julie Brown to take this question.

**DR. BROWN:** Hi, good afternoon. I'm Dr. Julie Brown. I'm a geologist with the Environmental Risk Assessment Division.

And I think I understand your question, and I can definitely supply more information. This REGDOC was written at this point in time because of -- we're in a

pre-project stage where the Nuclear Waste Management Organization is carrying out their site selection process to fulfill their adaptive phased management project and to manage Canada's used nuclear fuel. And they have chosen to do that within a deep geological repository.

So under our regulatory framework, we don't have a regulatory hook with licensing to regulate site characterization in this pre-licensing period. So this particular document is specific to site characterization for geological disposal because it's a particularly important aspect during the siting process. And it just lays out the elements of a site characterization program with a focus on the subsurfaces that are relevant for a DGR.

And how it would be incorporated into a design requirement -- because that is very important for a disposal system for long-term radioactive management projects -- but that requirement for site characterization to be part of the system -- the waste system description and to inform the design, the only requirements we have for that are laid out in REGDOC -- on the long-term safety case, so 2.11.1, Volume III.

**MS TADROS:** Perhaps, Dr. McKinnon, I can

ask Dr. Elias Dagher to provide you with a little bit more information on the look at design and how the progress is used, just because we are on this topic and if need be we can come back to it in Volume III, as Dr. Brown mentioned.

So Dr. Dagher, over to you, please.

**DR. DAGHER:** Thank you.

Dr. Elias Dagher, for the record.

So yes, so the site characterization is a very important aspect of informing the design of the disposal facility. One of the reasons is the natural barrier the host rock does form part of that waste disposal description and is integral to having a safety function that's related to the sites. So that information is needed to support a safety case, for instance a safety assessment that's described in REGDOC-2.11.1, Volume III.

Regarding design, how the design may unfold and progress over time, so in the pre-licensing phases, for instance, it may not be a fully realized design. So that would -- that comes back into the discussion on optimization and practicability that we were discussing earlier. So when we are referring to optimization in the REGDOC, we're really referring to optimization of protection in that design to reduce not

only the radiological dose but also any non-radiological exposures to a level that is as low as reasonably achievable, or ALARA, economic and social factors under consideration. So hence, the optimization has to be practicable and achievable, and its practicability may change over time through the application of the principle of continuous improvement. And this falls into -- in line with CNSC's performance-based regulatory framework.

Now, one way that this also progresses is through the iteration of that safety case. So over time, through optimization of that design, as more details -- design details become manifested or in the design and as more information becomes available through site characterization and different monitoring activities, uncertainties are reduced and the safety assessment results would demonstrate this in reduction in the dose, which itself is a demonstration of optimization. So essentially you have a more complete design. It gets more complete over time as you move towards the closure of the disposal facility.

I hope that helps to provide some clarity.

**MEMBER MCKINNON:** Yes, thank you. I completely agree with what you've both said. But in



comparing the content of this particular REGDOC on the DGR with the Volume III that you mentioned, which we'll discuss later, I felt that that one did contain a lot more detail which -- you know, some of which would have been more appropriate in this particular REGDOC. Because it did read as if it, you know, is a one-shot task, and it didn't really capture some of this progressive elimination of uncertainty through continuous improvement of the different stages of site investigation.

So it really -- you know, taking all of the documents together, this one sort of stood out as being a bit of the odd one in that it didn't have the flavour that the others had with regard to how, you know, the site characterization was managed and how the uncertainties were reduced over time. That was really the basis of my question.

And since the staged approach to, you know, developing the site really is an integral component of why that sort of unfolding of the knowledge and the continuous improvement takes place, you know, not to mention it seemed to be, you know, an omission of a fairly significant part of how the facility would be developed over time, how the information would be collected and used,

and that really was not captured in, you know, that sort of single-stage approach which seemed to be, you know, the impression of how the site investigation would be done if I read that document by itself. And also, you know, the lack of consistency with the other documents.

**DR. DAGHER:** Dr. Elias Dagher here, for the record.

If I may add, so that REGDOC-1.2.1 really focuses on that -- getting that site characterization data. But it's really part of a much larger suite of regulatory documents and expectations. So we have REGDOC-2.9.1, for instance, which has requirements for monitoring and all of this other information that is required in the design. And that continues progressively throughout the design and development of the facility.

Part of it is also to align with what language is in the IAEA specific safety guide SSG-23. And there's also a CSA standard on DGR that is being developed as well. So there really is a large -- there is a framework out there that will be looking at this holistically. And that is just one component of it.

**MS TADROS:** So this is Haidy Tadros, for the record.

Dr. McKinnon, I think your comment is duly noted. I think this provides an example of how, one, staff have looked at the technical content and the applicability and the scope of which each of these documents will be used. But again, your point is that the information as it's presented in Volume III could have very easily been very informative and very relevant to the information presented in REGDOC-1.2.1 from the get-go.

The only other point maybe to bring forward to provide assurances is as staff are looking at either specific projects or working with specific entities going through a deep geological repository proposal, there is obvious links between both the upfront piece that REGDOC-1.2.1 presents and the information in Volume III. And we keep that in mind, and we bring that forward in our discussion, so the information is not lost.

I think it comes back to your point is how is it captured and how does it enhance the information that is already existing in REGDOC-1.2.1. So your point is duly noted, and I hope we've answered the question accordingly with regards to why staff have chosen to put the text the way that it is. But please feel free to ask any other questions if this is not clear.

**MEMBER MCKINNON:** No, no, thank you for your replies. I'm happy with it the way it stands for now, yes. Thank you.

**THE PRESIDENT:** Thank you.

Dr. Lacroix?

**MEMBER LACROIX:** Yes, thank you.

It is specifically mentioned at the beginning of the document that this document does not provide guidance on the finding and selecting a site. On the other hand, there is an organization called the Nuclear Waste Management Organization that is in the process of selecting a DGR. And for the record, and for the general public, could the staff connect or make the connection between the activities at the NWMO and this document?

**MS TADROS:** Haidy Tadros, for the record.

I would like to ask Ms Karine Glenn to take that question specifically, but before I hand it over, I think as a general statement it's worth noting that in writing these documents they are not project specific, so when Staff wrote these documents, our focus was very much on the safety and the expectations, requirements, guidance as we spoke of earlier as to what is required from a safety perspective.

So sort of with that general statement, perhaps Karine can provide and elaborate further specific to your question, Dr. Lacroix.

**MS GLENN:** Karine Glenn, for the record.

The Nuclear Waste Management Organization is an organization that has been tasked with implementing Canada's solution for used nuclear fuel through the adaptive phase management approach, which includes a deep geologic repository for the used fuel.

The activities that are regulated by the Commission begin after a site has been selected, so that site selection process does not fall under the regulatory oversight of the CNSC.

Because the activities of the NWMO is conducting right now that characterization and that -- the investigations that they're doing at this point in time will eventually be included into their application, it is important for us to provide guidance so that five years, 10 years down the road when an application is before the Commission that information has been done to the standards that are expected.

And I don't know if Dr. Brown would like to add any information related to that, but overall, that

is the reason why it is only guidance and -- at this point and why we do not put criteria related to site selection.

**DR. BROWN:** Julie Brown, for the record.

Not much to add. Only that because this information is so important for a deep geological disposal facility, we provide this guidance that applies to this time, but we won't review that information until it becomes in support of a licence application. But the quality of that information, what the information is and how it's collected are all things that are important, and that's why we have the guidance at this time.

**THE PRESIDENT:** Thank you.

And I totally appreciate why it would be guidance at the site characterization phase.

I do recall seeing a comment from one of our stakeholders that the document that it's superseding, R72, actually has requirements in it as well. Can you comment on that?

Are they requirements that are now being eliminated?

**MS TADROS:** Haidy Tadros, for the record.

No, there are no requirements that are being eliminated. Dr. Brown can elaborate on where those

requirements have shifted with regards to the framework that is presented for you today.

**DR. BROWN:** Hi. Julie Brown, for the record.

No requirements have been eliminated from our regulatory framework. All of the requirements for site characterization for disposal are in REGDOC 2.11.1, Volume III, and so how site characterization should inform the design and be part of the system description and support the inputs into long-term models and also to do with the requirement that the licensee verify the quality of the information that's being used.

But specifically with REGDOC R72, Section 2 of that document lays out sort of general description of the terms and the fundamental objectives and requirements to do with site characterization, and those higher-level requirements for any disposal project are found in 2.11.1, Volume I.

So no requirements have been lost.

**THE PRESIDENT:** Thank you very much for that.

Dr. Demeter.

**MEMBER DEMETER:** Thank you.

I'm going to preface this with reading a couple sentences from 1.2.1 section of this REGDOC:

"Site characterization involves detailed technical investigations to increase the state of knowledge about a particular site, and these processes involve a number of scientific disciplines, hydrology, rock mechanics, geochemistry, etc. that are integrated and interpreted together." (as read)

And then we heard, I think, the best short definition of REGDOCs are to clarify requirements earlier in the discussion and that the information collected from the site characterization is going to meet the standard required down the road.

It sounds to me that -- I'm still having a real difficulty having this only as a guidance document when the information that's collected at this stage will drive a process at a later stage, and if it's not done right at this stage, they've done all this work but perhaps we should be a little bit more definitive about the processes they use to validate the information collected



which will drive the safety case down the road.

So I'm still really puzzled why this is only a Regulatory Document because it will -- it will inform decisions on safety.

So all these REGDOCs clarify requirements and the requirements are to collect data on site characterizations such that it will inform those decisions down the road, so I'm still really puzzled why this is not like all the other REGDOCs.

**MS TADROS:** Haidy Tadros, for the record.

I'd like to ask Dr. Julie Brown to start and perhaps Karine can also prepare herself to give an overall view of how sort of we go from licence application guide to specific requirements that are then articulated in the second section of our regulatory framework.

So Dr. Brown, over to you, please.

**DR. BROWN:** Julie Brown, for the record.

Although we don't have a -- our regulatory framework hasn't kicked in, we do still -- we are still involved in building our knowledge in-house. And this early regulatory involvement really helps with ensuring that we have the requirements and clarifying with any future licence applicant how we expect them to meet those

requirements in the future when we do have that regulatory hook, and so that's why we have this as a guidance document because we don't yet have. And so these characterization activities that are ongoing right now for whatever site that they're going to pick, they are framed as -- they're elements of a characterization program, so they're -- it's difficult to say you need to meet them to the requirement.

The requirement is that they will have enough site characterization to demonstrate safety, which is in REGDOC 2.11.1, Volume III, and then we will verify all of the information that's collected now based on our expertise when it does come in, and so in those different areas that are alluded to.

And it's -- it's not possible to frame all of those things as shall statements because they must be characterized before we can evaluate them and it will depend on the site-specific characteristics of whatever site is chosen to develop a safety case for a DGR.

And I'll pass it to Karine for more.

**MS GLENN:** Karine Glenn, for the record.

Ultimately, it comes down to we could, technically, make those statements shall statements. Unfortunately, because it's not -- the proponent is neither

a licensee or it's not an area over which the CNSC has oversight at this point in time, there would be no way to enforce compliance against it until such a time as they do come before the Commission with an application, at which case we would do a verification.

There is also a requirement under the -- a regulatory requirement under the Class I nuclear facilities regulation that requires a licensee or proponent to characterize the site.

What we're providing is guidance as to what that characterization will be reviewed against when they do come, but at this point in time, as Dr. Brown mentioned, we -- they're not a licensee, they're not an applicant, and we don't oversee the site selection portion.

So as she mentioned, we do have a special project arrangement in which we work with in reviewing pre-licensing information with the NWMO, so if they were to provide some of their site investigation to us, at this point in time we would definitely review it against the requirements of 1.2.1 if it was published and we would provide feedback to the NWMO with respect to that review.

However, they are under no obligation at this time to implement.

**MS TADROS:** So maybe, Dr. Demeter, I -- again, I don't know if the confidence has been relayed to you or if we've answered your question fully.

Maybe I'll wrap up by saying there are requirements in the Class I regulations for site characterization. There is no doubt that that is a shall statement, and any licensee that anticipates getting a licence or having Staff review a licence has to present information in their licence application that indicates how they meet that requirement.

The structure of our regulatory framework, especially in Section 1 of the framework, is allotted to providing licence application guidance, so should a proponent want to execute a project, that section of our framework is usually the first place that a newcomer to the regulatory body usually looks to see what do I need to have in place to submit a licence application.

And that is why we call it a licence application guidance. This is -- this is our expectation of a proponent who is not yet a licensee to put together the information, and that information is usually captured from across all of our regulations, including the requirement to have done site characterization.

CNSC Staff look at that licence application and then impose -- once the licensee has received approval from the Commission for a licence, we impose through the Licence Condition Handbook specific requirements for that site-specific project or that site-specific area. So that way, the information that was in guidance is then provided for in Section 2 of our regulatory framework, which covers off the different safety and control areas, including physical design, which is where this one is captured in, and waste management.

And that is what the licensee will be -- we will do as Staff our compliance activities against.

So it's a -- to answer your question, it's a combination of how the regulatory framework is set up to include this information and then how that information is used to situate the application portion for a proponent and the requirements for a licensee.

So I'm hoping that didn't confuse the matter, but I'm hoping that clarified a little bit further.

**MEMBER DEMETER:** May I just follow up?

**THE PRESIDENT:** SO I know Mr. Jammal wants to add something and then maybe, Dr. Demeter, you can go next.

**MR. JAMMAL:** It's Ramzi Jammal, for the record.

Thank you, Madam President.

Just to put an envelope over it, it's -- all my colleagues said the right things to put the structure in place.

So Dr. Demeter, your question is, is we are applying the principles as we speak today for what we call vendor design review for small modular reactors and the design review with respect to potential DGR with NWMO.

As my colleagues mentioned, we engage with the applicant at the early stages in order to determine license-ability by the Commission or not, so that's why you would see the guidance being established so that the applicant before they become -- sorry, the proponent before they become applicant before the Commission, they know what our expectations are.

But it's up to them to meet those requirements that is being laid out at a high level in the Class I regulation.

And that's the process. We start with the engagement and then once the licence application comes into place, that becomes part of the licensing basis which will

bind the applicant and that we move over into the licensing process.

At every level from the design review to the environmental assessment to the licensing process, there is always public engagement. I just want to add this fact, consultation. And the end point would be in outcome for a licence.

But once the licence is issued, the application and the information that application becomes a licensing basis, but before then the guidance is provided to the licensee to make sure they are on the right track.

**THE PRESIDENT:** Dr. Demeter?

**MEMBER DEMETER:** Thank you.

That does clarify it a bit. I mean, in all practicality, this is a guidance document, but if a potential future proponent doesn't follow the guidance, doesn't do appropriate site characterization, their application's not going to go very far.

So the -- it's guidance, but thou shalt do site characterization and here are the categories that you should cover before you apply for a licence.

So I know it's guidance, but if they don't follow this guidance, I don't think the application would

go much further. So in practical terms, these are certain requirements for us to consider -- to favourably consider your application.

If you don't have site characterization, I don't think we'd be able to fully assess a licence applicant.

So it does provide guidance, but I think it's, in practical terms, strong guidance, if that's a good word, that these are the kind of things we want you to talk about when you -- when you provide your licence application.

So it's semantics at this point, but I'm -- I'm happy with that now.

**THE PRESIDENT:** Okay, thank you.

Dr. Berube.

**MEMBER BERUBE:** So as a general guidance document, I think it's okay. One of my concerns is in the -- I think the minimal treatment of the timelines on a DGR, you've looked at some of it in terms of geological stability over time and a little bit of climate change. The problem is this thing could be there for anywhere from hundreds of years to thousands of years.

And one of the issues that hasn't been



addressed properly, I think this management systems over that period of time, how is that possible that this has to be looked at and whether it's viable or not is part of the actual site characteristic because I know that some of that is, shall we say, highly subjective. And since we don't have crystal balls into the future how that's all going to go, one of my considerations is what happens in catastrophic failure and what happens to that site.

So time is a big factor in this with a DGR. Much, much more so than with an NPP or anything else, there's a finite life to it. This could be very, very long scale.

How are you addressing that or is there any intent -- intention to address that in the subsequent documents?

**MS TADROS:** Thank you for the question, Dr. Berube.

We have two technical experts who do exactly what you've described there in terms of looking at over the length of the time, so I'd like Dr. Son Nguyen to start first and prepare for a follow-up with Dr. Matt Herod in case there are any further details to add.

**DR. NGUYEN:** This is Son Nguyen here, for

the record.

With subject to timeframe, you're exactly correct. The timeframe is very long.

Most disposal systems which are intended for geologic disposal of spent fuel, we are looking at timeframe up to one million years, so this is very long. This is why we have this concept of the safety case. There shouldn't be -- the concept relies on passive means, so there shouldn't be any type of human intervention or people dealing with unexpected events in the future.

So all this information has to be provided in the safety case which is the subject of Volume III.

**MEMBER BERUBE:** So you're saying that's being handled instead of this document. I mean, it's not -- what I'm talking about is that actually time has not really been talked about in this document thoroughly, which is probably one of the biggest conditions of a DGR, I think, is looking at the timelines.

**DR. NGUYEN:** Yeah, the timeframe is discussed in detail in Volume III and how to select the timeframe, what kind of disruptive events, what kind of catastrophic event has to be considered in different type of scenarios which is in the safety assessment which

support the safety case for long-term storage of radioactive waste.

**MS TADROS:** Haidy Tadros, for the record.

Perhaps Dr. Matt Herod can speak specifically to Dr. Berube's question about REGDOC 1.2.1 and perhaps Dr. Julie Brown can also add her perspective on the nature of the geological analogues that are used and are explained in 1.2.1 as well from a time perspective.

Dr. Herod, over to you first, please.

**DR. HEROD:** Dr. Matthew Herod, for the record. I'm subject matter expert in radio isotope geochemistry and geology.

DGR timeframes or timeframes for any disposal facility have to be developed through the iterative process of the safety case that considers the dose over time, the risk over time and the peak hazard. And in doing so, that gives guidance -- that information on what will actually be the disposal option chosen gives perspective on the requirements of the site to maintain its stability over time as well.

So in the case of a DGR where the waste is quite hazardous, the timeline requirement for the site itself is quite extensive and, as Dr. Nguyen mentioned, is

up to a million years.

Because we have -- because we know this information that the timeline is therefore quite extensive, the site characterization has to consider that, so in doing so, the site characterization must be adequate to demonstrate that the site can maintain its isolation and containment capabilities over that time period.

And some of the ways in which we can do that or in which a proponent can do that and that the CNSC Staff can verify that is through the use of natural tracers in the environment, paleo hydrogeological tools such as groundwater age dating. Natural analogues can also provide information on this on how similar analogous sites have evolved over geologic time.

So we use multiple lines of evidence to ascertain how the site characterization timeline needs to meet the requirements for the timeframe which are developed through -- which are developed in REGDOC 2.11.1, Volume III.

So it's an iterative process that involves both Regulatory Documents that, really, the Volume III informs how you develop the timeline and Volume I then gives you guidance on what criteria you might need to look

for in the site characterization to understand that timeline.

**MS TADROS:** Haidy Tadros, for the record.

Dr. Berube, I hope we've answered your question. I do have Dr. Elias Dagher standing by if you'd like a further explanation on the difference between REGDOC 1.2.1 and Volume III because I think this is, again, the second topic after Dr. Demeter's point.

So we're on standby if you need further clarification.

**MEMBER BERUBE:** All right. That's fine.

I think I've got that -- dealt with this. Thanks.

**MS TADROS:** Thank you.

**THE PRESIDENT:** Okay. Thank you.

I think that takes care of REGDOC 1.2.1. I don't see any Commission Members with their hands up.

So why don't we move to the second one -- oh, sorry. Dr. Demeter, back to you.

**DR. DEMETER:** Thank you.

I just -- this is a quick question. Comment 137 on Table B, the second part talked about cumulative effects not being discussed in this particular guidance REGDOC, and the Staff's response are cumulative

effects are beyond the scope of this document.

I wanted to ensure that cumulative effects relative to proposed DGR are part of some other documents, so if it's not part of this document's scope, where would cumulative effects of DGR be captured?

**MS TADROS:** Haidy Tadros, for the record.

I would like to ask Dr. Julie Brown to take that, please.

**DR. BROWN:** Julie Brown, for the record.

I can assure you cumulative effects would be assessed as part of any disposal of radioactive waste project that is proposed in the CNSC, and it is laid out in REGDOC 2.9.1 on environmental protection. And that is referred to in the revised document on site characterization.

**THE PRESIDENT:** Okay, thank you.

Dr. McKinnon?

**MEMBER MCKINNON:** Thank you.

I have a question about site characterization and the potential for rejecting the site.

So we know that this document doesn't cover the actual site selection, but you really don't know that you've got a viable site until you've characterized it

and done all the studies and so on, and that might be at a fairly, you know, advantaged stage of investigation.

So I'm just curious, where is the boundary between characterizing the site and uncovering some potentially undesirable characteristics and saying, okay, the site is, therefore, no good and we have to pick another one or saying, okay, these are the characteristics of the site and handing that over to the design process and then the -- the issues of the site, whether it be the materials or the groundwater or whatever, are managed through the design process, so there's an issue of the boundary between characteristics of the site and what is handled by design. And I didn't get a flavour of, you know, where that boundary was in the document. If you could just discuss that, please?

**MS TADROS:** Haidy Tadros, for the record.  
Dr. Julie Brown can easily take that.  
Thank you.

**DR. BROWN:** Julie Brown, for the record.  
It is a concern in deep geological repository products because you can only characterize so much from the surface until you go underground, and that is an iterative process and it's between site characterization

and design.

So once the facility is sited and should it be licensed to prepare the site and construct, and more information was gathered about the site through verification activities whether through more borehole drilling or underground investigations, there would have to be an interaction with updating the safety case.

So if they went underground, and this has happened in other disposal projects -- probably, on Earth, the most advanced DGR -- national DGR project is in Finland, and they discovered a water conducting fracture zone, and they had to modify their design when they went underground, and then they had to demonstrate they would still be able to meet the safety case. And that is the process that would have to happen if a project were to go forward after encountering some unexpected or undetected feature once they developed.

And so that's one of the roles of this continual update to the safety case, and that would be covered by our regulatory framework.

**MEMBER MCKINNON:** So rejection would only take place if it could not be demonstrated that all of the requirements could be met?



**DR. BROWN:** Absolutely. If the safety case cannot be met then the project would not be permitted to advance.

**MEMBER MCKINNON:** Thank you.

**THE PRESIDENT:** Okay, I'll give the Commission Members 10 seconds to see if anyone's got more questions on this particular REGDOC.

Okay, not seeing any hands up, let's move over to REGDOC 2.11.1, *Waste Management, Volume I: Management of Radioactive Waste*. And, we'll start with Dr. Berube, please.

**MEMBER BERUBE:** So I notice, in general, this is much more proscriptive, which I think is appropriate for this particular document.

I have looked it over and I don't see any issues that I have to raise at this point.

**THE PRESIDENT:** Thank you. Dr. McKinnon.

**MEMBER MCKINNON:** Yes. I have a question. In terms of the operation there was a statement that the licensee shall establish and document operational limits and conditions derived from safety assessments. But my question was, Aren't the facilities already designed against very specific performance capacity criteria? And

should there, therefore, not be a comparison between the design objective and the as-built? And I do understand, you know, the -- the use of the safety assessment as part of the as-built.

**MS TADROS:** Haidy Tadros, for the record. Dr. Elias Dagher can take this question, please?

**DR. DAGHER:** Yes, thank you for your question.

Dr. Elias Dagher, here, for the record. So when we were looking at limits, controls, and conditions, so we're looking at a number of different things. One of those are the waste acceptance criteria themselves -- what can be accepted. But it also includes other limits and controls on conditions.

So, an example of that could be on those design specifications of the different engineered barriers.

An example of this would be for instance the dry density of the buffer or seal material, or on the dimensions of the waste containers to ensure the performance lies within what is described in the safety case. So these would be site specific and based on the nature of the waste disposal system and waste disposal

strategy.

So with that being said, those all get included within the safety case as different arguments that have to be met, so everything is inter-related in terms of that.

Now, you mentioned something, you know, comparing to the as-built state. That is a very important aspect of that because as you continue to increase your design, so you move towards from 10 percent design to 30 percent, eventually to your final design, which occurs close to closure of the facility, you continue to compare these different design requirements to what is occurring. So it is, again, an iterative process, it goes back to a design optimization and applicability of what's happening in the site. As you're getting more information of the site, you may be using continuous -- continuing to improve your design, as well, so that is an iterative process.

**MEMBER MCKINNON:** Thank you.

**THE PRESIDENT:** Dr. Lacroix.

**MEMBER LACROIX:** This is a short question, a quick question concerning the very short low-level waste. It says that the main criterion is the half-life of the predominant nuclides. How do you define the predominant

nuclides from a quantitative point of view?

**THE PRESIDENT:** Ms Tadros?

Well, it looks like Ms Greencorn is ready to go with a response. Go for it.

**MS GREENCORN:** Actually, Dr. Matt Herod will be taking this one, so I will pass it over to him.

**DR. HEROD:** Dr. Matt Herod, for the record.

So with respect to waste characterization of low-level radioactive waste there's a number of methods that can be used. Most preferred, I would say, is measurements of the actual isotopes within the waste itself, and there's a variety of different methods that can be used, spectrometric methods like gamma-spectrometry or liquid scintillation counting. And then there's -- which can be used for more easily -- easy to detect radionuclides.

For the more difficult to detect radionuclides which are often the ones which may have a longer half-life, in this case I'm thinking about radionuclides like Iodine-129 or Chlorine-36. These are very difficult to analyse using typical methods. However, there are means to measure them using mass spectrometry

techniques.

There is also a way to characterize waste using inferences such as scaling factors or modelling, as well. So those can also be applied if the history of the waste and the generation process of the waste is well-known. They are really only applicable if that additional information about the waste sources and provenance is well understood. However, as it is critical to apply those methods that the waste stream be relatively homogeneous. If it's quite variable additional sampling is required in order to characterize the waste.

And, so in classifying the waste as low-level, using the half-lives of the radionuclides it's important to provide relative -- to provide some limitation on the amount of the long-lived radioactivity in low-level waste, just given the extensive time period that it takes for those radionuclides to decay past -- to lower limits or to clearance levels.

**MS GLENN:** Karine Glenn, for the record.

If I could just add a precision that when we are talking about the short-lived waste, ultimately it's mostly medical applications, for the most part. And you still need to ensure that if you are clearing that waste

for conventional disposal, so waiting until the radioactive levels have decreased below to unconditional clearance levels, that you meet all of the requirements of the -- that are found in *Nuclear Substances and Radiation Devices Regulations* before you dispose of that waste in an appropriate fashion.

**THE PRESIDENT:** Okay, thank you.

Dr. Demeter.

**MEMBER DEMETER:** Thank you. I have two questions. I'll ask just the one right now, and then wait for the next round if it comes around.

The question is regarding the concept of waste versus storage, and it talked about waste having no further uses foreseen. And as I read the description that's usually defined by the licensee to just declare waste versus storage. But I want to get a sense, is there any particular advantage for the licensee relative to regulatory burden or cost to declare one versus the other, and can a system be gained such that by not declaring it waste it's under a different regulatory path, or framework?

How does CNSC get involved if there's a disagreement about what's waste versus storage? "Potential use" is a very broad term.

**MS TADROS:** Haidy Tadros, for the record.

So I know that Karine Glenn has been involved quite heavily with regards to international and national conversations around the definitions of waste, and I think she will definitely be able to take your question.

From an overall perspective, one, it's a question of whether the licensees foresee any future use for that material, I think is one thing that will be looked at. But, more importantly, irrespective of whether it's waste or -- or put for storage, the waste management principles as we were talking about them quite earlier on, there is a principle of minimization of waste, so that needs to be looked at as part of the overall program.

So, Karine, if you can take on the details of the definition of waste and perhaps an example?

**MS GLENN:** Karine Glenn, for the record.

First of all, radioactive waste or any types of isotopes are, first and foremost, nuclear substances and, therefore, they are regulated as such until such a time as they decay or meet the thresholds for either exemption or unconditional clearance. So whether you call it waste or not doesn't exclude you from the CNSC regulatory framework; I think that is the first point I'd

like to clarify.

Where that definition comes from is that in some countries -- and that's why if you ever look at the title of the Joint Convention, it's on the safe management of spent fuel and of radioactive waste. In Canada we classify used nuclear fuel as waste. Some countries do not because they reprocess that fuel. And so if a licensee had a reprocessing process in place, for instance, their fuel won't be waste as such.

We do require the licensees to report, in Canada, on their inventory of waste every three years. They report to Natural Resources Canada who maintains those inventories, and that's part of the obligations that we have under the Joint Convention, so we do look for differences.

We, also, because we regulate the facilities through their operation as well as for waste purposes, we know what's on the licensee's sites in terms of inventory of material. And so if we disagree with a qualification that a licensee may have put on a type of material, we will have conversations with them, NRCAN will have conversations with them. We will resolve that until such a time we -- as the CNSC, we feel confident that they



have appropriate plans in place for all of their material.

**MEMBER DEMETER:** Thank you.

**THE PRESIDENT:** Do you want to ask your next question too, Dr. Demeter?

**MEMBER DEMETER:** Sure. So the document states, as a thread through most of the documents, that they try to use the IAEA definitions as much as possible and be harmonized. And for example for low-level waste it requires isolation containment up to 300 years and is suitable for disposal in near-surface facilities. And that jives with IAEA.

But the IAEA also has similar phrases for intermediate-level waste and high-level waste. So an intermediate-level waste should be buried tens to hundreds of meters down, and for high-level waste the DGR is referable.

I wonder why those phrases were removed or are absent from the CNSC document, but are part of the IAEA document for intermediate-level waste and high-level waste?

**MS TADROS:** Haidy Tadros, for the record.

I'd like to pass this to Ms Nancy Greencorn who has been involved heavily with the definitions and how the alignment with the IAEA safety

standards come into play.

**MS GREENCORN:** Nancy Greencorn, for the record.

In adding the suitability for near surface disposal facilities for low-level waste, there is also wording, as well, along for the intermediate-level waste. And these are comparable with what is in the CSA standard at this time.

We tried as much as possible to continue to also align with the CSA standard N292.0, which has an annex that describes the waste classification system. And we were looking to not have too much contradicting information so that if a member of the public or a licensee looked at the classification system that existed in CSA N292.0, which we mentioned earlier went under a public consultation process as well, we wouldn't have contradicting language in the two documents.

So as a result, we included some of the language that was included in the IAEA safety standard and then included a direct reference to the IAEA safety standard GSG-1, the classification of radioactive waste. So if members of the public or industry were looking for additional guidance on how to classify waste, it would be

found in that document, as well. But, again, there is additional guidance and requirements set out in the CSA standard N292.0 that complements this document.

**MEMBER DEMETER:** Okay, so as I understand it, if the IAEA and the CSA standard agreed then that would be in here. If it was -- but you'd harmonize preferably to the CSA standard which is IAEA if there's a conflict in phraseology?

**MS GREENCORN:** In phraseology again we intended to rely on the International Safety Standard. If the intent was the same that was put out in the CSA standard and it wasn't maybe expressly the same words, we aligned where we could with the CSA. So, in the example of the intermediate-level waste we say that ILW generally requires a higher level of containment than can be provided in a near surface repository. So rather than stipulating exactly what depth that would be, and again because we are non-prescriptive it would be dependant on the safety case and the various wastes that you're putting into that, so in the end the intent was still this would not be typically suitable for a near surface, so the wording was as much as -- aligned between the CSA as well as the IAEA safety standard.

**MEMBER DEMETER:** Thank you.

**THE PRESIDENT:** Maybe I'll follow up with just more specificity on Dr. Demeter's question. So this maybe lack of clarity around definitions or a classification of waste had come up with both industry and with civil society organizations. With the changes made, do you believe that there is still ambiguity around classification?

**MS TADROS:** Haidy Tadros, for the record.

I hope you can hear me now. I know I had a bit of a shift earlier.

**THE PRESIDENT:** Yes, we can.

**MS TADROS:** Thank you.

So let me start by prefacing that from the work that CNSC staff do with regards to looking at information that comes in from the licensees and to capture the breadth of information around this topic of how to classify waste, there is not ambiguity.

We have focussed all of our efforts, whether they be documenting and aligning with international standards or national standards, on the focus of the safety case. So as Ms Karine Glenn said at the very beginning and perhaps she'd like to add to this answer, our focus has

been solely on ensuring that every facility will be different; every site will be different; every condition that is brought forward based on programs, based on site characteristics will be different. And to bring that together with an emphasis of what safety should be, I think the -- or, we believe that the documents before you capture the level of definitions and terminologies needed to ensure that that focus is on the safety case so that there is enough flexibility, but also there is enough understanding around what it takes to get through staff's recommendations and staff's assessments on all of these projects that are -- are potentially going to be brought forward.

So perhaps with that, I'll have Ms. Karine Glenn to -- to complement that answer.

**MS GLENN:** I think I touched on that -- Karine Glenn, for the record -- in one of my previous answers where the classification is -- waste classification gets a lot more emphasis than it really should.

It's a tool that helps licensees and CNSC get a good idea of volumes in terms of how much do you have that should more or less go in this type of facility. It helps develop a strategy.

But ultimately what really dictates, and

Ms. Tadros said it, what can go in a particular disposal facility is the safety case. So you could -- for instance, the project that NWMO is working on right now is designed for high-level waste, fuel, solid fuel. So, would it be suitable at this point in time, based on very early design, to put liquid high-level waste in that facility? Maybe not, but we're still talking about high-level waste, it's a DGR, so the safety case with the specific site characteristics and the specific design of that facility are really the key to what exact material can be placed in that facility.

So although we -- you know, there's a lot of conversation that goes around the waste classification, it is just a very high-level planning tool. It also gives a consistent way of reporting on international fora. But, ultimately, it is that safety case and that's where we've put all of that effort and time into developing the requirements for a safety case, and the expectations, is, because that is really what the key -- and that is consistent with what the IAEA has in their documentation.

**THE PRESIDENT:** Thank you. Thank you, that's very helpful.

Commission Members any further questions

on REGDOC 2.11.1, Volume I?

Okay, not seeing any hands up, let's move to the third one which is REGDOC 2.11.1, *Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste, Version 2*. And we will start with Dr. Demeter, please.

**MEMBER DEMETER:** Okay, thank you.

The comment 53, I think, of Table B brought up a question about CNSC should use an ecosystem approach to waste management. And the answer was that this has been put in the parking lot and we'll deal with it next time we review REGDOC 2.9.1. But I want to get a sense, is the ecosystem approach different than what we're doing now, or is it a trend that's happening internationally? Sort of how does this fit in with evolving standards for environmental assessment and how it might impact on management?

**MS TADROS:** Haidy Tadros, for the record.

So I'd call upon Mr. Andrew McAllister, our Director for Environmental Risk Assessment, to take that question.

**MR. McALLISTER:** Good afternoon. Can people hear me okay?

**THE PRESIDENT:** Yes, we can, thank you.

**MR. McALLISTER:** Thank you.

Thank you for that question, Dr. Demeter.

Certainly, the ecosystem approach is one that a particular intervener has been advocating and noted some general articles that have outlined that approach.

Like any other, I guess, scientific advances, CNSC staff should stay abreast of these and certainly we look to the international bodies that are providing the guidance around considerations of impacts to non-human biota, reference to things like the United Nations scientific community on the effect of atomic radiation, ICRP, IAEA, and we take direction from how that new science gets reflected into their initiatives and incorporated into our regulatory frameworks.

We typically look at impacts at a population level. So when we are looking at -- from radiological or non-radiological impacts we are looking at things from a population level. Species at risk certainly have a different connotation. We are driven by the *Species at Risk Act*, which looks at impacts at the individual level.

When we talk about ecosystem approach, its



interactions with populations, its ecosystem functions, aspects like that. We are not there yet from a regulatory framework perspective, but certainly our framework, as we have indicated before, is one that gets updated on a regular basis. So should that ecosystem approach science become more mature and makes it to where it gets due consideration from international bodies and gets reflected as such, we would look to how we can incorporate it into our regulatory framework, whether it be our regulatory documents, whether it be the updating of CSA standards.

**MEMBER DEMETER:** Thank you very much.

That's good.

**THE PRESIDENT:** Dr. Berube...?

**MEMBER BERUBE:** Yes, again in general.

This is a high-level document. It's pretty decent.

One of the questions I have looking at this is underneath the iteration design optimization for facilities. One of the things that you stipulate here is that you are going to use a well-designed iterative process, and of course coming from an engineering background, that can be many, many, many iterations. How do you decide at what level they have gone far enough with the iterative process to reassure you that these facilities

are okay, or the design is okay?

**MS TADROS:** Haidy Tadros, for the record.

That is an excellent question, Dr. Berube, and one that we ourselves discuss at length as CNSC staff when we are looking at information.

I would like to turn that question over to Dr. Elias Dagher.

**DR. DAGHER:** Dr. Elias Dagher, for the record. Thank you for the question.

There are periods of time within I guess the development or the lifecycle of a disposal facility when you would look at essentially going back into the safety case and doing a reiteration. So some of those periods are whenever there is a new licensing phase that is going to occur.

Other triggers for conducting a reiteration is if there is a significant change in the design that is identified either through continuous improvement or through new technologies that have been realized if there is something that has been identified as the proponent continues to undertake additional site characterization and verification of the geosphere. So there are a number of different stages which help to inform

what those decisions are. Mainly, it has to result in a large change or a significant difference to the safety case. So it has to be something that would significantly change how the iteration is going, so for instance, if you are looking at design, moving from a 30 percent design to a 70 percent design as well. So those are the different things I would look at.

From a regulatory perspective, though, we would expect the safety case to be updated ahead of every licensing phase within the disposal facility.

**MS TADROS:** Haidy Tadros, for the record.

Perhaps I can call upon Dr. Matt Herod to give a very specific example around the waste acceptance criteria, because I think that this is an area where, as Karine Glenn mentioned, the need to look at very specific changes, whether it be in what waste classification or waste is going in and the design becomes a very flexible and iterative process.

So, Dr. Herod, over to you, please.

**DR. HEROD:** Dr. Matt Herod, for the record.

So the waste acceptance criteria, or WAC, is the limit control and condition for a facility that

stipulates the types of waste, the inventory, the packaging, essentially all of the waste details that would go into the facility. This is developed through a multitiered process, an iterative process that comes from two directions essentially.

The first direction is what is the waste that we actually have to dispose of at our facility, so based on measurements and characterization. The second direction is the safety case itself and the safety assessment, where we model our facility and its performance over time and determine the impacts on the environment and people and what is the limiting amount of radioactivity and engineering that needs to go into it -- that can go into it in order to achieve the dose criteria and achieve regulatory requirements. So you develop the WAC from these two directions essentially, one coming from what you know you have and one coming from what you think your facility can measure up to.

And the WAC is then designed again and again throughout this process to optimize that facility to find the point at which dose is as low as reasonably achievable for the design of the facility. So that is the way the WAC is used.

So optimization is an ongoing process. The WAC doesn't continuously evolve throughout the lifetime of the facility, it's developed relatively early on, but that optimization of other aspects must continue in order to make sure that the facility is continuously improved.

**THE PRESIDENT:** Thank you.

Dr. McKinnon...?

**MEMBER MCKINNON:** Thank you.

I found this document was very clear in its added description compared to for example a DGR.

I have a question in connection with the management of uncertainties, section 7.5. So this is a very important topic and it is very nice to see its inclusion. My comment is also relevant to the DGR document, so really it refers to both.

Uncertainty should be distinguished from variability in this case because we are dealing with natural materials and this document really just refers to uncertainties. When you are dealing with natural materials, you have both. For example, uncertainty is a lack of information, for example the boreholes are too far apart and you can't be sure what is in between them, whereas variability is a natural property of the physical

components that you are measuring and you can quantify it. You can look at histograms and so on to make that distinction.

So they are treated differently and so I am wondering if it would be useful to make the distinction between the two, uncertainty and variability, in the document. So you are managing uncertainty, but how do you deal with variability? Because that is something that, for example, when you are demonstrating the adequacy of your data you can demonstrate that if you quantify the natural variability, whereas uncertainty is different.

**MS TADROS:** Haidy Tadros, for the record.

I would like to ask Dr. Son Nguyen to respond to that question.

**DR. NGUYEN:** Dr. Son Nguyen, for the record.

Thank you for that question, Dr. McKinnon. It's absolutely right, there is a difference between variability and uncertainty, although we tend to amalgamate them together in our terminology sometimes.

Yes, that variability is a common feature in any kind of things related to natural environments like rocks and soil in this sampling and there are ways to deal

with that. In modelling the evolution of the deep geological repository or disposal system, people take this kind of variability into account by using a different approach, like using statistical evaluation of the properties or doing bounding calculations to determine the most adverse effects. And at the same time, during construction and operation of a facility there is a monitoring program and there is a geoscience verification program at the same time in order to confirm that the bounding calculations which are assumed in the design are accurate and then really bounding the situation in the field.

With respect to uncertainties, the most difficult uncertainties to deal with are the uncertainties related to the processes and the events which are going to occur during the time period of concern. So we are talking about up to a one-million-year timeframe, what are the processes and what are the events which can occur during the time period. So those uncertainties are I think the most important ones and they can be overwhelming over the variability of the data that you can find in the field.

**THE PRESIDENT:** Are you okay with that, Dr. McKinnon?

**MEMBER MCKINNON:** Yes. I think the explanation was very good, I understood that, but I was wondering if there was a need in the document to actually make that distinction because they are quite different. They are treated differently; they have different consequences.

**THE PRESIDENT:** Okay.

**MEMBER MCKINNON:** Thank you.

**THE PRESIDNET:** Dr. Lacroix...?

**MEMBER LACROIX:** Thank you.

I read in the document and I quote: "The performance should take into consideration" -- I'm talking about disposal -- "the degradation of barriers during the timeframe associated with the disposal facility."

There are two key words in the sentence, "degradation" and the "timeframe". What do you mean by "degradation"? Why not use the word "aging"? And the second question is, what is the timeframe here?

**MS TADROS:** Haidy Tadros, for the record.

Again, excellent questions. I think the terminology we can definitely look at that because I think it is something that we would look to as a technological term in terms of a barrier that degrades as opposed to a



barrier that ages, if that is within the nomenclature.

But I would ask Dr. Matt Herod to explain sort of how we have positioned both those concepts and how we have captured that in the REGDOC.

**DR. HEROD:** Matt Herod, for the record.

So degradation and aging, essentially we treat them as very similar processes. Engineered barrier -- in the case of engineered barrier systems it is the perspective that degradation will almost inevitably occur and it is important that any sort of predictions about the performance of the facility look in great detail at the degradation mechanisms as a result of aging that could affect the integrity of the barrier system. So as a result, that is the reason for that language. And some of those processes -- we don't specify those processes because they are unique to each individual barrier.

With respect to the more -- the natural system for example, degradation and aging may or may not be a significant factor. However, it is nevertheless very important to consider those processes as they occur.

Where the timeframe comes into this is the timeframe provides that contextual information again about how important are these processes and how much time do we

need to model these processes for and extend them for, because some of these degradation processes can be exceedingly slow. However, when the multiplication factor of one million years is used, degradation can still be quite significant, even if the process is, you know, very, very, very slow.

So that is the perspective, the linkage between that degradation and the need to understand it in context with the timeframes of the facility. And timeframes, as I spoke about earlier, are developed independently considering multiple factors such as the dose at the facility, the waste, the hazard of the waste itself, the site characteristics.

So the degradation of the barrier system speaks to that and that is why it's a requirement that there be a multiple barrier system in place that can address those degradation mechanisms. So if one does fail, there are multiple barriers in place that can pick up the slack, so to speak.

**MS TADROS:** Haidy Tadros, for the record.

I think also we will obviously always take the opportunity to look at terminology.

With regard to the specific words that are

used in the current draft version that the Commission has before it, I think the word "degradation" also positions it as a worst-case scenario so that when you are looking at robustness of the barrier system, you are actually anticipating that there is nothing there and the degradation comes in where then models can be brought forward to either -- if there are other barriers that can then take on the load or if there is a potential for looking at a different way of designing the facility.

So the degradation in this particular case will have a significance with regards to the no -- there is nothing left to be called a barrier, let alone an aging factor, if you will.

**THE PRESIDENT:** Okay. Thank you.

Any more questions on this REGDOC, Commission Members?

Okay. I don't see any hands up, so let's move to the fourth one, which is REGDOC-2.11.2, *Decommissioning*.

We will start with Dr. Lacroix, please.

**MEMBER LACROIX:** Yes.

I have gone through all the comments made by the industry as well as by the various intervenors and

there is a definition concerning what you mean by "decommissioning". I understand the definition provided by the CNSC. It is clear from the regulatory point of view, it's crystal clear, but from a public perception, I mean it's really complicated to understand. I could not make a picture, a mental picture of this definition.

And when I saw the definition provided by Bruce Power -- and this is the ANS definition -- about what is meant by decommissioning, everything became crystal clear. And again, it was challenged, it was criticized, your definition, but you stick to it. That is a good thing. I understand the point of view of the regulator, I understand the point of view of the civil society organization, as well as the point of view of the industry, but again, from a public perception point of view, is it the right definition?

The reason why I'm asking this question is that you provide us with crystal clear definitions for decontamination, dismantling, cleanup activities and remediation. These are well-defined terms that I could understand, but decommissioning I am sceptical. So could you comment on this, please?

**MS TADROS:** Haidy Tadros, for the record.

I would like to pass this to Ms Nancy Greencorn, who has worked extensively with the IAEA safety standards and can give you a feel for how that definition has come together.

**MS GREENCORN:** Nancy Greencorn, for the record.

As I mentioned earlier today that the CSA standard 292 was updated, as well 294 was updated. It underwent a public consultation recently in 2019. At that time the decommissioning definition had minor modifications. However, there weren't many comments on the definitions at that time.

In establishing this document, we modified the definition slightly to align with the IAEA safety standards. In doing so, we put that definition out. Members of the public came back for clarification still on the definition, so we tried to improve upon the definition of "decommissioning".

I think one of the areas that we were hearing from industry and civil society organizations was storage with surveillance, is that a part of decommissioning? So we tried to expand the definition more to give a little bit more of the context of what

decommissioning includes. So essentially we started with the international safety standard, heard areas of where they wanted more precision or more guidance in the definition and we expanded the definition based on what we heard through public consultation.

I believe at this time now we have in our round of definitions that went out, or the documents that went out following the workshop -- or before the workshop, at that time we did not hear additional concerns regarding the change in definitions. So I suspect we got clearer on our definition. Although it seems long, it was so we could give that additional guidance of the dismantling, the decontamination and the storage with surveillance activities.

**MEMBER LACROIX:** That's great. Now, I understand the rationale behind it. Thank you very much.

**THE PRESIDENT:** Thank you.

Dr. Demeter...?

**MEMBER DEMETER:** Thank you very much.

I like this part of the document. I am going to refer to section 5.1, in situ decommissioning, and I will read the first sentence:

"In situ decommissioning shall not be

considered a reasonable decommissioning option for plan decommissioning of existing nuclear power plants or for future nuclear facilities in situations where removal is possible and practicable."

Now, we talked about practicable before.

The reason I bring this up is the tone of the in situ decommissioning, except for mines and mills, is that it's not preferred over removal based on the tone of the paragraphs as I go through. So it doesn't make a lot of sense that -- I would suspect that for future nuclear facilities you would build in a design that decommissioning by removal would be practical. So why are future facilities in this sentence when in fact we should be designing them so that in situ decommissioning is not the option, because it should be practical by design?

**MS TADROS:** Haidy Tadros, for the record.

Excellent question, Dr. Demeter. I would like Ms Karine Glenn to give you that perspective of how the language around future reactors fell. And for any further examples of sort of the definition of in situ again, I will ask Nancy Greencorn to prepare.

**MS GLENN:** Karine Glenn, for the record.

You are absolutely correct. In the guidance that we provide for the design of new reactors, decommissioning has to be taken into account as a consideration at the design stage in order to facilitate the decommissioning. We do, as Mr. Jammal mentioned earlier, do prelicensing reviews or vendor design reviews for small modular reactors and at that very early stage we look at decommissioning as a safety control area, what considerations they have made to facilitate the decommissioning, and at that point in time there should not be an intent to use in situ decommissioning. So you are very correct in that.

The "where possible and practicable", if I can give a little bit of context around that. What we heard in discussions -- and this text is also found in the CSA N294 standard on decommissioning -- is that this is fairly standard practice in industry when it comes to decommissioning, and I mean this means across the world, that demolition will often be done to buildings up till about 1 metre below grade and then they may leave some concrete behind.

Now, again, when we are talking about



that, we are not talking about leaving for future facilities reactor vessels or radioactive waste behind, but there was a realization that in some cases leaving some small parts of a structure behind may be something, especially if you are in a very, very remote area, may be something that could be considered.

Again, everything goes back to the safety case, right, and it is the expectation with any new facility design, with the exception of mines, that the removal will be complete. This has to come before the Commission. It is included in the impact assessment, their consideration for end state. At the ultimate end of the facility they come forward before a shovel puts in the ground for a new facility. So that would need to be brought forward and again would be subject to Commission approval, but most definitely the expectation is full removal of anything that would require CNSC oversight after the decommissioning is complete.

**MEMBER DEMETER:** That answers my question very well. Thank you.

**THE PRESIDENT:** Let me follow up on that, and maybe, if Mr. Delaney is here, he can talk about this.

I understand from a regulatory perspective

it will be the safety case that is of paramount importance, but from a policy perspective, is this something that would be within the scope of NRCan's policy on radioactive waste, whether in situ decommissioning would be allowed or not, whether it is practicable or not, that that qualifier is not necessary?

I ask this question because I understand there are many jurisdictions around the world where they have that as a policy decision that has been made by the nation.

**MR. DELANEY:** Yes. So Jim Delaney, for the record. Thanks for that question.

I would say that, consistent with Canada's policy framework as it stands right now, it is up to the waste owners to propose their proposed strategies for review by the CNSC.

I would also note that as part of the IRRS mission that took place they did note that decommissioning aspects should be included as part of the policy, so that is something that we will look at as part of the policy review.

**THE PRESIDENT:** Thank you.

So Canada's position could change with the

policy review when it comes to in situ decommissioning then?

**MR. DELANEY:** It's too early to say at this stage until we have done the full consultation and engagement process --

**THE PRESIDENT:** Right.

**MR. DELANEY:** -- but it will be something that will be a topic of discussion.

**THE PRESIDENT:** Thank you.

And while we are still on this section 5.1, this one talks about nuclear power plants. What about research reactors, would that fall in this as well?

**MS TADROS:** Haidy Tadros, for the record.  
Ms Karine Glenn can take this.

**MS GLENN:** Karine Glenn, for the record.

The text in the regulatory document, which mirrors the text that is also in the CSA standard, currently I'm going to say restricts or limits the use of in situ decommissioning to legacy facilities as well as uranium mines, as we discussed earlier.

So if a research reactor was a legacy facility, it could be a potential use of in situ decommissioning. And I say potential use, it's just

because it is listed as an option, it does not automatically mean that it would be an acceptable solution. Again, this would be heavily dependent on the safety case that would accompany the facility and the proposal.

So for a research reactor that was not a legacy facility, no, this would not be an acceptable solution.

If I may, I would like to share with you some text that is found at the beginning of every IAEA standard and this text reads, and I will quote:

"...many of the IAEA safety standards, in particular those addressing aspects of safety in planning or design, are intended to apply primarily to new facilities and activities. The requirements established in the IAEA safety standards might not be fully met at some existing facilities that were built to earlier standards. The way in which IAEA safety standards are to be applied to such facilities is a decision for individual States."

That is why for new facilities where decommissioning must be taken into account at the design stage, in situ should not be an option. However, for legacy facilities it could be potentially an option, but again would have to be fully justified by a safety case and subject to Commission approval.

**THE PRESIDENT:** Thank you.

So help me understand or clarify for me what is a legacy facility.

**MS GLENN:** I will ask Ms Greencorn to -- I'm sure she has the document right in front of her. We have defined it in the REGDOC which is also -- so it's basically facilities that were built at an age where it was in the early stages of nuclear development and where thoughts of eventual decommissioning was not considered. We built it and then we never thought of what would happen afterwards.

So perhaps Ms Greencorn can quote, if you would like, the exact text. It is in the same section of 2.11.2 as the text we were talking about previously.

**THE PRESIDENT:** Okay. Maybe what would be more helpful is given our existing licensed facilities, is there a list of legacy facilities within that?

**MS TADROS:** Haidy Tadros, for the record.

Yes. So CNSC staff have looked at the facilities that we currently license and, as Ms Glenn has indicated, research reactors would fall into that category and that is what we are looking at right now.

**THE PRESIDENT:** So, I mean, you know, we recently approved decommissioning for the Saskatchewan research reactor, the SRC one, and they I recall, I mean even though it was a minimal amount of contamination, they removed every speck of it or so, right? And one could question was that practicable, but it was a decision that was made. So I am just trying to reconcile what this section is saying and what the expectation is.

I understand the safety case piece. I am just wondering from a principle perspective what is it that we are driving with this?

**MS TADROS:** Haidy Tadros, for the record.

The principle that we are driving with this is again, as you have mentioned, President Velshi, is definitely the Canadian context allows for the proponents or the waste owners to provide for a solution. The REGDOCs that the Commission has before them, recognizing that that is the framework that currently exists within Canada and

working to ensure that the regulatory framework aligns with international standards but at the same time looking at the Canadian context for such standards to be implemented, what we are looking at here is exactly where we have landed with the words that are both aligned with the IAEA safety standards and are focused on a proposal that comes forward that is driven by the safety case.

The stipulation in section 5.1 goes further, because according to the recent IRRS review, when they looked at the text, and they, as you know from our item yesterday, had recommended not only a review of our national policy but had also made suggestions to Canada to look at its definition around in situ so that it aligns with the IAEA safety standards, and the text that you see before you in principle is where we landed to ensure both a balance between the IAEA context and the Canadian context that governs the regime around decommissioning.

Perhaps Ms Glenn would like to add anything further, because I think your question, President Velshi, is more focused and more strategic in terms of where the projects are coming potentially from and what we might be looking at as staff, going forward.

So, Ms Glenn, over to you, please.

**MS GLENN:** Karine Glenn, for the record.

When we talk about the legacy facilities, in most of the cases the facilities that qualify -- and I have the exact text now, so perhaps I will read it into the record:

"In Canada, legacy sites specifically refer to research and demonstration facilities, locations or sites dating back to the birth of nuclear technologies in Canada for which decommissioning was not planned as part of the design."

In those cases, in most of those types of facilities that qualify under that definition, those facilities, even post-decommissioning, those sites post-decommissioning would in most of the cases still need to remain under some type of institutional control due to contamination, the presence of disposal facilities onsite. So they couldn't be released from licensing, for the most part, entirely without restrictions on the use of the site. And therefore, in those cases the use of in situ in a Canadian context could potentially be considered. I keep saying "could potentially be considered" because it is not



a -- it's a legacy facility, therefore in situ is okay.  
It's not a one-for-one correspondence.

And I think that that is the context.  
When you referred to the University of Saskatchewan's  
SLOWPOKE, that facility, they are able to remove all the  
reactor and clean up the facility and reuse it for other  
purposes.

**THE PRESIDENT:** Have we lost Ms Glenn? I  
think we may have, but I think we have the answer.

So why don't we move to Dr. Berube.

**MEMBER BERUBE:** So this particular area is  
what I would call (indiscernible) in this particular  
meeting.

I want to back up a bit on this because  
the logic of this is really, really important. This is a  
shift basically in policy...

--- Technical difficulties /

Difficultés techniques

**THE PRESIDENT:** I think we may have lost  
Dr. Berube as well.

Dr. Berube, if you can hear me, maybe if  
you can shut your video, maybe you just don't have enough  
bandwidth.

Well, while we are waiting for Dr. Berube, maybe we will turn to Dr. McKinnon.

**MEMBER MCKINNON:** Yes. I have a question on safety assessment for decommissioning.

In section 7.2 there is a long list of requirements to demonstrate to make the safety assessment, many of which are quite open-ended and complex. For example, considering the interdependencies or combined and additive effects of hazards. Some of these are probably going to be very difficult to assess, so I'm wondering, will further guidance on how to carry out that demonstration be solely the responsibility of the licensee or is guidance provided by CNSC and how is the point of adequate demonstration determined?

**MS TADROS:** Haidy Tadros, for the record.

So what I would like to do is turn it to Ms Nancy Greencorn. We have Dr. Matt Herod who can supplement the answer. He is currently having just a bit of difficulty with his connection, but I believe Ms Nancy Greencorn can take the first part.

Nancy, over to you, please.

**MS GREENCORN:** Nancy Greencorn, for the record.

The rationale for having more high-level requirements for the safety assessment for decommissioning is it would depend on what your decommissioning activities are. It's difficult to be specific on the expectations for decommissioning when the decommissioning activity may be storage with surveillance or the decommissioning activity could be for a nuclear power plant or it could be a smaller Class II nuclear facility.

So as a result, the requirements were provided that looked at the range of licensees that may be undertaking decommissioning and it was looked at with what type of activities. Is it decontamination? Is it storage with surveillance? Is it actual demolition? As such, we included it in the document, the reference to a safety standard that goes in to give more detailed guidance on safety assessment expectation for decommissioning.

I would also, at this point, point out this is a safety assessment for decommissioning. If in the end you are choosing to select and demonstrate safety for an in situ decommissioning project, you are creating a waste repository. Therefore, the safety assessment criteria for decommissioning will be for the decommissioning component. You would also need to meet all

the expectations that are set out in 2.11.1 Volume III, the safety case for a disposal facility, because, as such, in creating that in situ you created a repository and your safety case would come through the waste disposal facility.

So this is specific to the actual decontamination and dismantling component.

**MS TADROS:** Haidy Tadros, for the record.

Dr. McKinnon, if you have the answer you were looking for, that's fine. I believe Dr. Herod is back on.

**MEMBER MCKINNON:** It's fine. It was a very general question. That's fine, thank you.

**THE PRESIDENT:** Okay.

Dr. Berube, I see you are back online, so if you can please proceed with your question again.

**MEMBER BERUBE:** Well, we are obviously not totally glitch-free with this, but it's pretty reliable, so I'm happy I'm back.

Going back to that particular section on in situ, I want to just back up a bit and look at the IAEA recommendation. The reason why we are shifting policy here of course is outlined by a provision; is that correct?

**MS TADROS:** Haidy Tadros, for the record.

So I would just clarify that in essence you are correct, we are shifting to align better with the IAEA. However, there is no shift in policy at this point. I think the policy does allow for exactly what we have captured in section 5.2.

**MEMBER BERUBE:** So let me just expand on that question then.

Could you talk me through the logic of why the IAEA basically recommends this particular strategy?

**MS TADROS:** Haidy Tadros, for the record.

I believe Ms Glenn will have the most succinct answer possible for that question because it is quite an involved question.

**MS GLENN:** Karine Glenn, for the record.

I will try to be succinct because I can talk for hours on this topic.

When it comes to in situ decommissioning, historically there have been some very poor uses of that decommissioning strategy. Particularly I will state an example of former Soviet Republics where basically -- I refer to it as dump and run. So basically a bunch of concrete was poured into the reactor, they left town. No oversight, no engineering, no analysis, no safety case.

There is a perception that in situ decommissioning is a cheap, fast and easy solution to decommissioning. Let me assure you that under the framework that the CNSC in Canada has laid out that is not the case. A full engineering assessment has to go behind that. There is a thorough analysis of the materials used, grout, of the degradation of the barriers, of the environmental impact over time of the releases. There are no fast tracks in the acceptance criteria. So whatever environmental release criteria are applicable to a DGR for instance, which is considered by some to be the summum of the disposal, those environmental releases are the same that would apply for an in situ decommissioning facility.

Some countries, especially when we are talking Europe, have very small footprints and a geology that may not be suitable to host disposal in a lot of locations. Canada has the luxury of having good stable geology, broad tracts of land where sometimes transportation across the country may not be the most optimized solution to waste disposal. It may make more sense to leave it on site if a safety case can be made to that.

So there is a shift in thinking as to what

sometimes people think in situ decommissioning is or entombment versus what the framework here could potentially allow.

I'm not sure if that answers your question.

**MEMBER BERUBE:** I think in a nutshell that kind of gets me to where I want to go with it. I am just understanding that because of historical shall we say abuse issues and because of land use requirements and future land use requirements this is probably a better way to go for a lot of nations, whereas we have the luxury of looking at other options because of our large country.

**MS GLENN:** And if I could just complement one more thing.

Some countries have developed a national strategy for all of their waste disposal, regardless of the classification of the waste. So all of the waste in their country must go to a single site and that would automatically preclude you from creating a disposal facility through in situ decommissioning.

**THE PRESIDENT:** Okay. Thank you. Thank you for that.

Are there any other questions on this

particular REGDOC, Commission Members?

Okay. I don't see any hands up for that, so we will take a break and resume at 3 o'clock for our last REGDOC.

Thank you.

--- Upon recessing at 2:46 p.m. /

Suspension à 14 h 46

--- Upon resuming at 3:00 p.m. /

Reprise à 15 h 00

**THE PRESIDENT:** Welcome back everyone.

We're ready to move to the last REGDOC, 3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities*. And we will start with Dr. McKinnon.

**MEMBER MCKINNON:** Yeah, thank you. My question is in connection with cost categories, and there's a few places in the document that some specific definitions are used, for example, labour, investment, expenses, contingencies in one place. But most projects tend to use either capital or operating costs. And the reasons are usually related to, you know, how expenses or capital items



are reported and taxed.

So is there a reason why these more standard categories have not been used?

**MS TADROS:** Haidy Tadros, for the record.

I would ask Ms. Milena Kostova to take that question, please.

**DR. KOSTOVA:** Good day. Dr. Milena Kostova, for the record. I'm a senior project officer with the Wastes and Decommissioning Division and a subject matter expert on decommissioning planning and financial guarantees for decommissioning.

The cost categories, the four cost categories which are listed into the guidance for development of cost estimation for decommissioning come from the international structure for decommissioning costing. This is the most comprehensive framework developed for -- internationally for decommissioning costing. Those cost categories are applied to the principal activities and the groupings of decommissioning activities, which should be listed based on the preliminary decommissioning plan.

Basically, we looked at when a cost for a decommissioning activity is estimated, all these four cost

categories to be looked at, like labour cost, we'll look for application and usage of local labour, labour aids. Investment cost is equipment or material that could need to be procured for the purpose of decommissioning. Expenses, those are consumables, taxes, insurances that the licensees are paying, and they have to be included into the cost estimate. And contingency, which is a provision for unforeseen elements of costs that might occur.

**MS TADROS:** Haidy Tadros, for the record.

Perhaps Dr. McKinnon, we can give you a financial perspective as well with regards to why those categories were chosen to answer your question. So with that, I'd ask Ms Patricia Fraser, our director in the Financial Reporting, Accounting, Policy and Systems Division to take that part of the answer.

**THE PRESIDENT:** Is Ms Fraser online?

**MS FRASER:** Hi, Pat Fraser, for the record. Sorry to keep you waiting.

The operating and capital categorization of expenditures is more for financial reporting and on an accrual basis of accounting, whereas for the decommissioning and large project costs, it's on a cash basis. So the REGDOC looks at the different categories of

cash flows that are projected for the project. And that's the main reason for the difference in the categorization.

**THE PRESIDENT:** Okay, thank you.

Dr. Lacroix?

**MEMBER LACROIX:** Still on the cost categories, the last item is contingencies, and I was wondering, does this category include pandemics?

**MS TADROS:** Haidy Tadros, for the record.

I would ask Dr. Kostova to take that, please.

**MS KOSTOVA:** This is really a very up-to-date question. Actually, contingencies are uncertainties which are within the scope of the decommissioning project. They must include it into the cost estimation, but not outside of the scope that is set into the decommissioning plan. While -- and when we do cost estimation for decommissioning, the uncertainty we call risk -- the uncertainties that are outside of the decommissioning project's costs. So the contingency that is mentioned in the document does not include pandemic situation. This would be considered risk.

**THE PRESIDENT:** Okay. Then moving on to Dr. Demeter.

**MEMBER DEMETER:** Thank you very much.

One of the things I've noticed is that the licence period for some facilities is expanding in length, and the economic certainties are increasing in variability. So I suspect that this type of document would take into account people coming to have a re-estimation of their financial guarantee between licence periods. Is that correct, that this would apply?

**MS TADROS:** Haidy Tadros, for the record.

Yes, that is correct. Both the operational parameters as well as the financial parameters, if there should be an update, they come before the Commission on Class I facilities, and the Commission would then review the acceptability of the financial guarantee.

We do have a regular cycle of review of the financial guarantees, as you know, Dr. Demeter. So outside of that regular review, the parameters that would be looked at dictate an update would be any operational changes, whether it be to the facility or the decommissioning plans, and/or the economic situation of the licensee.

There are requirements that the licensees need to provide the CNSC with notification should their

economic situation change such that we can adjust and bring the information to the Commission as appropriate.

**MEMBER DEMETER:** Okay, thank you very much.

**THE PRESIDENT:** Dr. Berube?

**MEMBER BERUBE:** Well, thanks for this document. There's a couple thing that I want to discuss. One of them is recommendations for a five-year revisit of the financial instruments and why you think that's appropriate.

**MS TADROS:** Haidy Tadros, for the record.

Perhaps I'd ask Dr. Kostova to take the first, and perhaps Ms Glenn can provide any further details as needed.

**DR. KOSTOVA:** Milena Kostova, for the record.

The cost estimate for decommissioning is based on the preliminary decommissioning plan. We require the licensees to revise their preliminary decommissioning plans every five years and as well as the cost estimation and to update the financial instruments that they put in place to secure money for decommissioning.

We consider that this is a reasonable

period because it gives enough period of time for the licensees to actually to look at their operations for some changes to inventories or other changes that might occur to be reflected into the decommissioning plans and the cost estimations.

**MS GLENN:** Karine Glenn, for the record.

Five-year is the minimum period, so the longest they can wait before they come back to re-evaluate their financial guarantee.

We also have other provisions in place, such as annual reporting on the value and the validity of the financial guarantee. We do report that annually to the Commission through the RORs for all the facilities. We have provisions, as Ms Tadros pointed out, that if we feel that there is a more frequent need for us to get a valuation, we can. Mr. Jammal pointed that out yesterday.

We have this year in light of the COVID-19 situation issued a 12-2 request to the reactor licensees, because their funds are invested, and we needed to ensure that they still maintained sufficient financial guarantees. So they are actually reporting to CNSC staff every three months on the value of their financial guarantee right now. And I can confirm that they are still in a surplus

position, so their financial guarantees exceeds their liabilities.

When they provide us with the amount of their financial guarantee for a five-year period, they forecast each year how much they need, and then they provide the highest amount for that five-year period. At any given time, the Commission or CNSC staff can request a licensee to modify that, their financial guarantee, or re-evaluate the value and the suitability of it.

And the last item I wanted to point out is that -- and I've lost it.

--- Laughter / Rires

**MS GLENN:** So if it comes back to me, I'll think about it and maybe add it in later. But ultimately, I think that Ms Kostova -- it came back to me.

Some of these licensees, and I'll use the reactor facilities, it's not a small task to redo their cost estimates. It is time-consuming. It takes CNSC staff a considerable amount of time to review the information as well. And so a five-year basis -- which is not necessarily in sync with any of the licensing, it's independent of that -- is at this point deemed suitable, but we always have recourse to go more frequently.

**THE PRESIDENT:** Okay, thank you very much for that.

Commission Members, any further questions on this REGDOC?

**MEMBER BERUBE:** I've got one more.

**THE PRESIDENT:** Okay, go ahead, Dr. Berube.

**MEMBER BERUBE:** This has to do actually with the NPP calculations and their present value. Of course anybody that knows things about finance and financial instruments know it's fundamental to get two things right on this, which is return on the investment type and also looking at modelling inflation to look at a real rate of return.

So the problem here is, knowing what I know about the financial markets and the state that they're in right now, how do you account for things like, oh, pandemics, hyperinflation, these kind of things?

**MS TADROS:** Haidy Tadros, for the record.

So I think one part of the answer to that is, as Ms Glenn was indicating, we stay on top of it. We predict that this is something that the licensees may be going through, especially those that may have instruments



or monies that are tied up in different markets that are seeing such high fluctuations. There are other instruments that are a lot more secure and will not be as volatile from a financial perspective.

Part of our review is both an operational review. So our licensing and compliance staff, as Dr. Kostova is, will look at it more from the lens of the operations itself -- if there are any anticipated changes in operations, given where the NPPs are, whether more money is needed for refurbishment, less money is needed for -- so I think that that magnitude of perspective is always taken into consideration.

The other part of our assessment is a financial assessment. And again, as you heard from Ms Fraser, our director in the Finance and Administrative Directorate, she has and her staff would look at it from a financial perspective. And I would ask maybe that she gives you more of a perspective of when they come to look at it, how do they keep in mind the volatility angle and that aspect of your question.

So Pat, over to you, please.

**MS FRASER:** Pat Fraser.

The discount rate definitely would be

impacted currently with the decrease in yields on government bonds. But the offset being -- factor would be the increased uncertainty and risks. But this is something that each of the licensees would have to take into account with their own individual risk situation in coming back with their discount rates, and we would review those assumptions.

**THE PRESIDENT:** Okay. Thank you. Anyone else with any further questions on this REGDOC? So I'm not seeing any hands up on this.

Last opportunity for a final round of questions on any other REGDOC based on the information we have heard or just any general questions around this suite of REGDOCs?

Dr. Demeter?

**MEMBER DEMETER:** Thank you. I just wanted to make a comment on two themes that I've noticed in these documents that I think are worth mentioning, and that this -- positively.

One is a number of times it looked at the safety case not necessarily just for the proposal in front of you but relative to alternates. So it's not is this safe, it's is it the safest way to go. And I think from a

policy point of view, if we only have one option and we say it's safe, but it may not be the safest way to go. So I liked the policy philosophy that it's not just what's before you, but what's before you relative to other options. I think that's a very powerful policy statement.

The other statement I want to make that I think was positive, there was a lot of times where industry wanted to secure what was the expectations for the future based on existing legislation, that it wouldn't change so they'd have some predictability. And staff routinely sort of said, Well, it'll be based on the evolving best-available technology practice, so forth. So there was never sort of an acquiescence to, well, yeah, if you want to do something in the future and that's the goal right now, that's what you'll be held to, because that safety case may change through time.

So I think that's another fairly positive and powerful policy theme that it's an evergreen or it's continually evolving. And that is one of the benefits of this not being phenomenally prescriptive but performance-based, is that things that are good to happen in the future will depend on the future state for safety.

So I just wanted to mention that those two

themes are very positive in these documents.

**THE PRESIDENT:** Thank you very much for sharing those, Dr. Demeter.

Anyone else?

Okay. So staff and all the others who supported them, thank you. Thank you for your presentation.

And with respect to the five proposed waste-related REGDOCs, the Commission will confer on the information it has received and determine whether staff needs to undertake further steps or whether the Commission is satisfied with the information received and proceed with a decision.

I also want to extend on behalf of all of us Commission Members a special thank you to staff who have done such meticulous planning in preparation for our first virtual Commission meeting that has gone pretty much without a glitch. And it kind of looks easy, but it -- all the behind-the-scenes work has really paid off. So a special, special thank you to all of you for making this happen.

This concludes the public meeting of the Commission. Again, I thank you all for your participation. Stay safe; stay well. Bonne fin de journée.

--- Whereupon the meeting concluded at 3:18 p.m. /

La réunion se termine à 15 h 18