

Canadian Nuclear
Safety Commission

Commission canadienne de
sûreté nucléaire

Public hearing

Audience publique

February 22nd, 2022

Le 22 février 2022

Public Hearing Room
14th floor
280 Slater Street
Ottawa, Ontario

Salle des audiences publiques
14^e étage
280, rue Slater
Ottawa (Ontario)

via videoconference

par vidéoconférence

Commission Members present

Commissaires présents

Ms. Rumina Velshi
Dr. Marcel Lacroix
Ms. Indra Maharaj

M^{me} Rumina Velshi
M. Marcel Lacroix
M^{me} Indra Maharaj

Registrar:

Greffier:

Mr. Denis Saumure

M^e Denis Saumure

Senior General Counsel:

Avocate-générale principale :

Ms. Lisa Thiele

M^e Lisa Thiele

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via videoconference / par vidéoconférence

--- Upon commencing on Tuesday, February 22, 2022

at 10:45 a.m. / L'audience débute le

mardi 22 février 2022 à 10 h 45

Opening Remarks

THE PRESIDENT: Good morning, and welcome to the public hearing of the Canadian Nuclear Safety Commission on the application by the Canadian Nuclear Laboratories to amend the Chalk River Laboratories (CRL) current operating licence to construct a low-level radioactive waste facility, herein referred to as the proposed Near Surface Disposal Facility (NSDF).

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

I would like to begin by recognizing that participants in this hearing are located in many different parts of the country. I am speaking to you from Toronto in the traditional territory of many nations, including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples, and now home to many diverse First Nations, Inuit and Métis peoples.

I would like to acknowledge that the proposed NSDF Project located on the CRL site in Deep River

is within the traditional unceded territory of the Algonquin Anishinabeg peoples as well as the traditional and/or treaty territories of the Williams Treaty First Nations and the Métis Nation of Ontario.

I will pause for a few seconds in silence so that each of us can acknowledge the Treaty and/or traditional territory for our respective locations. Please take this time to provide your gratitude and acknowledgment for the land.

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

Under my authority to do so in section 22 of the *Nuclear Safety and Control Act*, I have established a three Member Panel of the Commission to conduct this licence amendment hearing.

I will preside over the hearing, and I have with me on the Panel Dr. Marcel Lacroix and Ms. Indra Maharaj, who are, like me, remotely present for this virtual hearing.

Ms. Lisa Thiele, Senior General Counsel to the Commission, and Denis Saumure, Commission Registrar, are also joining us.

Here in Ontario, the forecast appears to be making way for an approaching spring, so I'm going to start with our safety moment on melting ice and snow.

It's to be expected, then, that there is a renewed urge to get out and enjoy some time in nature. But before we venture into the wilderness, remember to be mindful of the coming thaw. As the weather warms, conditions can change rapidly.

Whether skiing, snowshoeing or hiking, stay on marked trails, respect posted signage, and remain flexible.

If you venture to a scenic frozen lake or river, be aware of the ice thickness, avoid any areas near open water, and if you aren't sure of the quality of the ice, then stay on the shore.

Tell someone where you're going and when you plan to be back.

With the melting ice and snow comes higher flowing rivers, creeks and ditches. Flowing water can be unpredictable and the shore unstable or slippery, so do not venture too close and remember to be extra mindful of children or pets.

And finally, remember to take care when walking or driving, as puddles can quickly become a slippery sheet of ice once again.

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

Denis, over to you.

M^e SAUMURE: Merci, Madame la présidente.

Bonjour, Mesdames et Messieurs. Bienvenue à l'audience publique de la Commission canadienne de sûreté nucléaire.

During today's business, we have simultaneous interpretation. Please keep the pace of your speech relatively slow so that the interpreters have a chance to keep up.

L'audience est enregistrée et transcrite textuellement; les transcriptions se font dans l'une ou l'autre des langues officielles compte tenu de la langue utilisée par le participant à l'audience publique. Les transcriptions seront disponibles sur le site web de la Commission dans environ une semaine.

To make the transcripts as meaningful as possible, we would ask everyone to identify themselves before speaking.

I'd also like to note that this proceeding is being video webcasted live and that the proceeding is also archived on our website for a three-month period after the closure of the hearing.

As a courtesy to others, please mute yourself if you are not presenting or answering a question.

As usual, the President will be coordinating the questions to avoid having two people

talking at the same time. During the question period, if you wish to provide an answer or add a comment, please use the Raise Hand function.

Madam Velshi.

CMD 22-H3.A

Adoption of Agenda

THE PRESIDENT: Thank you.

With this information, I would now like to call for the adoption of the agenda by the Commission Members, as outlined in Commission Member Document 22-H3.A.

Do I have concurrence? For the record, the agenda is adopted.

Denis, over to you for some further introductory remarks.

MR. SAUMURE: This is Part 1 of the public hearing. The Notice of Public Hearing 2022-H-07 was published on October 28, 2021. A revised notice was posted on February 16th, 2022 to provide additional procedural guidance to assist intervenors in their preparation and participation in the hearing process.

It is important to note that for Part 2, the Commission, taking into account suggestions on procedural directions submitted by intervenors, has

modified certain processes to facilitate public participation while ensuring that the Panel Members receive the best evidence that they require to discharge their mandate and obligations.

Part 2 of the public hearing is scheduled to begin on May 31st, 2022, and will be held in Pembroke, Ontario.

The public is invited to participate either by oral presentation or written submission at the Part 2 hearing. Intervenors have until April 11th, 2022 to submit their interventions.

During Part 2 hearing, the Commission will consider updated submissions from CNL and CNSC Staff as well as written and oral submissions from intervenors.

The President will lead a question-and-answer period for the written submissions and each oral submission.

Part 2 will be organized by topic and is likely to be scheduled over a number of days. Time permitting, intervenors may be invited to present during more than one issue-based session.

Interventions on the following topics will be grouped together in an effort to hear the issues in an effective and efficient manner: environmental assessment and environmental protection; Indigenous consultation and

engagement; long-term safety case, and the requested licence amendment.

Intervenors are encouraged to ensure that their submissions are within the scope of the hearing. Submissions that do not easily fall within these topics will be grouped together.

More information on the conduct of Part 2 of the hearing is available on the CNSC website in the revised notice posted on February 16th, 2022.

The CNSC made funding available through its Participant Funding Program in two phases, one in May 2016, and the second one in March 2019. A funding review committee independent of the CNSC reviewed the allocation of funds. Based on recommendations from the FRC, the CNSC awarded funding to nine applicants for the first phase and to 11 applicants for the second phase. More information on the Participant Funding Program can be found in the notice of public hearing issued on October 28th, 2021.

All the documents presented today are available on the CNSC website or upon request to the Commission Registry.

I want to note that representatives from other provincial and federal governmental departments are joining us remotely and will be available for questions later this afternoon.

President Velshi.

THE PRESIDENT: Thank you.

On January 31st, 2022, the Commission received a request from Kebaowek First Nation to adjourn the hearing on CNL's NSDF application.

The Commission considered the request under section 14 of the Canadian Nuclear Safety Commission Rules of Procedure which gives the Commission the authority to adjourn a proceeding on such terms and conditions as the Commission considers necessary in the interests of a fair, informal and expeditious consideration of the matter.

The request noted different alleged deficiencies of the consultation process with regard to the proposed project. The Commission is aware of its obligations in fulfilling constitutional obligations and upholding the honour of the Crown and has determined that it would be premature to adjourn the proceeding without the opportunity to review and assess all of the evidence with regard to consultation.

As a result, the Commission determined to not adjourn the NSDF hearing at this time. A copy of the decision is available on the CNSC website.

Let's begin with the presentation from the Canadian Nuclear Laboratories, as outlined in CMDs 22-H7.1 and 22-H7.1A.

Comme mentionné tantôt, les présentations sont disponibles en français sur le site web de la Commission.

I will turn the floor to Mr. Doyle for this presentation.

Mr. Doyle -- Mr. Boyle, please proceed.

CMD 22-H7.1/22-H7.1A

**Oral Presentation by the
Canadian Nuclear Laboratories**

MR. BOYLE: Good morning, President Velshi and Members of the Commission. For the record, my name is Phil Boyle, and I am the Chief Nuclear Officer and Licence Holder at Canadian Nuclear Laboratories.

Before we proceed, I also would like to take a moment to acknowledge that our operations in Chalk River are situated on the unceded traditional territories of the Algonquin People. At CNL, we recognize the important role that Indigenous People perform in Canada, and appreciate the responsibility they have as stewards of the environment.

On behalf of CNL, I would like to thank you for the opportunity to discuss our proposal to construct a Near Surface Disposal Facility, or

NSDF, for the safe disposal of low-level radioactive waste at Chalk River Laboratories.

The proposed location of the NSDF at the Chalk River Laboratories site is shown here in the rendering on this slide.

CNL operates with an unwavering commitment to safety and environmental Protection under strong oversight by the Canadian Nuclear Safety Commission and other regulators. As is the case with all of our activities, these principles were the most fundamental considerations for us as we developed the planning and design for the NSDF.

As Chief Nuclear Officer, I am responsible for ensuring that nuclear safety is an overriding priority at the Chalk River Site and that we meet the conditions and requirements of our CNSC license in all our activities. I am confident that we can construct the NSDF safely and in accordance with all applicable requirements.

Joining me today is Mr. Joe McBrearty, Chief Executive Officer of CNL, and Ms. Meggan Vickerd, General Manager of Waste Services. Both Mr. McBrearty and Ms. Vickerd will be speaking as part of our presentation today.

We are also supported by a whole CNL team to answer any questions you may have on the proposal,

including Mr. George Dolinar, our Director of Corporate Environmental Services, and Mr. Pat Quinn, Director of Corporate Communications.

Although you will only be hearing from a few of us today, I would like to acknowledge that this proposal was developed by a strong team involving many people with expertise in various disciplines and with extensive experience. This includes CNL's consultants who have been directly involved with the development of the proposed NSDF.

AECOM brings experience from designing similar facilities in Canada and the United States. Golder brings experience in performing federal environmental assessments within Canada. And Arcadis brings international experience in performing long-term safety assessments for nuclear repositories.

We are also joined by representatives of Atomic Energy of Canada. AECL is the federal Crown corporation that owns the site that CNL operates and manages.

We are here before the Commission today at this Part 1 Hearing to present our proposal in support of our application to amend the current Chalk River Laboratories site licence, which would allow CNL to proceed with construction of the Near Surface Disposal Facility.

Under the *Nuclear Safety and Control Act*, this amendment is required to add a new Class 1B nuclear facility to the site licence for the disposal of solid low-level radioactive waste.

The NSDF Project is also a designated project under the *Canadian Environmental Assessment Act* and requires an environmental assessment decision from the Commission.

These two decisions trigger the Crown's duty to consult and, where appropriate, to accommodate input from Indigenous communities and organizations.

In addition, the NSDF Project is also regulated by other legislation such as the *Species at Risk Act* under which other responsible authorities such as Environment and Climate Change Canada may issue permits.

Today, we will summarize our safety case that low-level waste is suitable for disposal in an engineered near surface facility and that it will provide robust isolation and containment in alignment with standards and guidance from the CNSC and other international authorities.

As Chief Nuclear Officer responsible for the facility, I am confident that we have done the work to support our conclusion that the NSDF will protect the public and the environment during every stage of the

facility's life.

I will now invite Mr. McBrearty to provide his remarks.

Mr. McBrearty. **MR. MCBREARTY:** Thank you, Mr. Boyle, and good morning, President Velshi and Members of the Commission. For the record, my name is Joe McBrearty, and I am the President and CEO of Canadian Nuclear Laboratories.

I appeared before the Commission just a few short weeks ago to discuss the future of the Chalk River Laboratories campus. While I will briefly speak about the future of the site once again, my focus is on the matter before the Commission, the Near Surface Disposal Facility and CNL's waste solutions and ongoing work to enhance our protection of the environment.

Turning to our agenda today, I would like to begin by discussing who we are at CNL and our priority missions. Then I will provide a brief history of waste management practices at the Chalk River Laboratory site, bringing us to where we are today while emphasizing the importance of the proposed NSDF as an enabling facility to advance our missions to restore and protect the environment and to reduce overall risk.

Afterwards, I will invite Ms. Meggan Vickerd to discuss the disposal facility in more detail,

including the proposed waste inventory, how the engineered containment mound is designed, how water will be responsibly managed, and why the proposed site is the appropriate location to construct and to operate the facility.

Ms. Vickerd will also provide a summary of our Indigenous and public engagement activities.

And finally, Mr. Boyle, our Chief Nuclear Officer, will conclude our prepared remarks by discussing CNL's management systems, including the many controls and practices in place at Canadian Nuclear Laboratories for the protection of people and the environment.

Before proceeding, like Mr. Boyle, I too want to acknowledge the Indigenous Peoples of Canada and voice our strong commitment to being an active participant in Canada's journey on the road towards healing and the road towards reconciliation. I want to acknowledge that our operations here in Chalk River occur on the unceded and traditional lands of the Algonquin people.

On a personal note, I recognize that close cooperation with Indigenous communities is vital to that journey. I also recognize that understanding and cooperation goes beyond CNL's business and the government. Everyone must learn and understand the true history. To make progress, we must be open to showing respect, learning

and acknowledging the past.

In my position as President and CEO, I have had the honour to participate in several engagements and ceremonies. As I have said to the Commission before, for a highly technical engineering guy like myself, I found these experiences to be moving and very warm. There is meaning in these connections, and I believe we must embrace these opportunities to engage and understand one another because it creates the necessary conditions to make change. We will only succeed in this by working together.

As part of our ongoing commitment to have meaningful input into our activities from Indigenous communities and organizations, CNL has made extensive efforts and provided capacity funding to support Indigenous communities with their participation in the NSDF Project.

Along the way, CNL and AECL have signed memorandums of understanding with the Métis Nation of Ontario, the Algonquins of Ontario and the Algonquins of Pikwakanagan First Nation to guide dialogue on matters of mutual interest and work towards establishing longer-term relationship agreements.

Additionally, to support participation in the NSDF Project Environmental Assessment process, CNL has committed to provide funding through contribution agreements which has been used for Indigenous communities

to conduct their own reviews of the Environmental Impact Statement and participate in dialogue with CNL about their areas of interest. And we continue to work with Indigenous communities to move forward on the commitments identified during the environmental assessment process.

I would like to stress that these growing and evolving relationships are important as we talk not only about this proposal, but also the future of the Chalk River site and CNL more broadly.

We are committed to continuing engagement with Indigenous communities and organizations in a manner that is agreeable to the specific communities throughout this entire hearing process and throughout the entire lifecycle of this project.

As Canada's national nuclear laboratory, CNL is a world leader in nuclear science and technology, with unique capabilities and solutions across a wide range of industries, including nuclear waste management and decommissioning.

To support AECL's mandate from government for the management of the Government of Canada's radioactive waste and decommissioning liability, in addition to the advancement of science and technology, CNL has aligned its activities into three mission areas, and these mission areas focus on national priorities. These

guide us in our work to advance nuclear science and technology for a clean and a secure world.

First, we contribute to the health of Canadians by advancing research in the health sciences. At CNL, we are pursuing a new generation of medical isotopes and radiopharmaceuticals that could bring hope to people all around the world who suffer from cancer and other diseases.

Second, CNL is developing clean energy technologies for today and for tomorrow to combat climate change and achieve the net zero emission goal by the year 2050.

And finally, we are conducting the largest and most complex nuclear remediation project in Canada across four provinces and territories, addressing Canada's legacy waste liabilities to restore and protect the environment for future generations.

Underpinning these three missions is the renewal of the Chalk River campus, which is being funded through a \$1.2 billion investment from AECL on behalf of the Government of Canada.

Over the past 70 years, work at the Chalk River Laboratories has had a profound impact on the lives of Canadians, from the way we power our homes, to the way we fight cancer.

The scientific breakthroughs and technologies that have been achieved at Chalk River have brought immense benefits to Canada. However, like other nuclear research facilities around the world, these historical operations and past practices have generated different forms of nuclear waste which, as shown on these slides, were managed according to the best practices at the time.

And unlike a nuclear power plant, which creates fairly consistent forms of waste, our activities have been research based and have changed from year to year. This means that our legacy waste facilities are unique, and our waste streams are varied.

Today, this liability includes existing waste management areas, radioactive plumes and contaminated buildings and facilities. While this waste is being safely managed and monitored for the short term, permanent solutions are necessary in order to reduce the risks that this waste presents to our workforce, to the public and to the environment.

So looking at the future of the site, we intend to continue large-scale remediation of contaminated lands on the campus, and the NSDF is the key enabling facility for the permanent disposal of this low-level waste.

It is important to understand that the legacy waste management areas at the site were designed and built prior to the development of modern standards. For instance, the pictures on the far left show examples of old waste management practices. In this case, an unlined trench, with no engineered barriers, is being filled with waste material.

Over the years, our management of low-level waste has evolved as we apply more advanced engineering principles to the design of waste storage structures and more effectively reduce the risk by containing and isolating the waste from the environment.

Building on decades of experience combined with the science and technology of today, we are able to ensure a purpose-built disposal facility that will reflect the hazardous lifetime of the inventory. The NSDF has a design life of over 500 years, which is sufficient time to allow for the low-level radioactive waste to decay.

As waste disposal technology improves and the regulatory guidance and standards are modernized, the current practice of building additional temporary storage systems at the Chalk River site is no longer appropriate.

This means we can now employ full lifecycle management to this nuclear waste instead of leaving this burden to future generations. And just to be

clear, as shown on these slides, this waste already exists at the Chalk River site and has for nearly 70 years. The majority of our low-level waste remains uncontained and exposed to the elements.

At a foundational level, the NSDF will further enable a significant reduction in the risk to the environment and to future generations.

So why have we chosen Chalk River Laboratories as the proposed site of the NSDF?

To begin with, about 90 percent of the waste intended for disposal is already at the Chalk River site. Since the vast majority of waste is already here, it is most effective to consolidate the waste at this location.

About five percent of the waste intended for disposal is from other AECL-owned sites in Canada. This waste is from facilities decommissioning and environmental remediation activities.

CNL is currently restoring and protecting Canada's environment by reducing and managing AECL's nuclear liabilities at other sites such as Whiteshell. Our integrated waste strategy considers current and planned waste management across all AECL-owned sites. The other 5 percent of waste is from commercial sources, such as hospitals and universities. This non-AECL waste proposed

for disposal was produced for the benefit of Canadians.

If you have ever gone into the hospital for a diagnostic procedure or cancer treatment, some of the materials and items used during these procedures become contaminated and must be disposed of.

In addition, the Chalk River Laboratory site has been receiving and safely handling these materials for decades as a service we provide to Canadians, because we have the people, and we have the capability to do this.

And finally, the Chalk River site is federal property, has an enduring mission, and an existing site licence, where the priority is placed on safe operations, characteristics that should instill confidence in our ability to ensure long-term safety of a disposal facility.

I will now invite Ms. Meggan Vickerd, CNL's General Manager of Waste Services, to describe our proposal to construct and operate the NSDF.

Ms. Vickerd?

MS. VICKERD: Thank you Mr. McBrearty. And good morning, President Velshi and Members of the Commission. For the record, my name is Meggan Vickerd. I have led the team that developed the application in front of you today and I am the General Manager of Waste Services at CNL.

I have been an employee at CNL, and previously AECL, for over 15 years. Most of my career in the nuclear industry has been in decommissioning and waste management, addressing the Government of Canada's nuclear legacy liabilities. I have been involved in environmental remediation projects to intercept and treat groundwater plumes, which were the direct result of lack of containment of legacy waste. On occasion, when the risk warranted it, we have even performed select retrievals of legacy waste, when the structures were no longer providing isolation from the environment.

However, we have had to defer all major environmental remediation of our legacy waste management areas, because we have not had the capacity to manage the volumes of waste which would be generated from this critical clean-up mission.

The NSDF is required to facilitate these activities, and it has been designed and will be built to modern standards. The project also enables CNL to remain in alignment with regulations for management and disposal of radioactive waste in Canada.

Here is a rendering of the proposed facility. The NSDF includes an engineered containment mound that will hold up to 1 million cubic metres of solid low-level waste. The facility will feature 10 disposal

cells, built in two phases. The first six cells are in Phase 1, which is anticipated to operate for 20-25 years, and then the remaining four cells in Phase 2.

NSDF also includes a wastewater treatment plant and storage tanks to store and treat leachate, that is water that passes through the waste. Water that is diverted away from the waste is managed in the surface water management system.

The project also includes other support facilities and site infrastructure required to operate the proposed facility. For example, a vehicle decontamination facility, an operations support facility, and an administration office.

Should CNL be successful in this application, which is in front of the Commission for decision, the construction is anticipated to start later this year. This includes site preparation activities such as vegetation clearing and excavation. Construction includes any onsite roads, utilities, the perimeter berm, the base liner system for Phase 1, as well as a wastewater treatment plant and support facilities. Commissioning will be conducted toward the end of the construction phase.

Following construction, the operations will begin, it will last at least 50 years. During operations, the development of disposal cells will

continue. Low-level waste that meets the waste acceptance criteria, as demonstrated by modern waste characterization approaches, will be placed into the facility. The waste in each cell is covered as the cell is filled. The construction of the baseliner for Phase 2 will also occur during the operations phase.

The decommissioning phase is expected to last 30 years. During this phase the final cover system will be installed on the engineered containment mound. There will also be continued treatment of wastewater from within the mound and decommissioning of redundant site infrastructure and facilities.

Following decommissioning, CNL will seek approval from the Commission for the closure of the engineered containment mound. The post-closure phase includes institutional controls expected to be in place for at least 300 years; this phase will continue as long as necessary as determined by the regulatory agencies. It is important to note that the post-closure phase is not "abandonment".

As site owner, AECL is committed to controlling and restricting the land use of this facility's footprint for as long as necessary.

It is our ongoing commitment to develop strong relationships with First Nations, Métis, and

Indigenous organizations, by providing meaningful avenues for dialogue and participation. We recognize the rights of Indigenous Peoples and the commitment to support the Government of Canada's consultation regarding activities that may impact their rights.

Since 2015, CNL has been engaging with Indigenous Peoples about the proposed project in accordance with the *Canadian Environmental Assessment Act* and regulatory guidance. Throughout this process, we have continued to adapt our engagement activities according to the unique interests, concerns, and information needs of the specific communities.

In consultation with CNSC, CNL has identified Indigenous communities and organizations based on Indigenous or Treaty rights in proximity to the project. These include communities and organizations within the Anishinabek traditional territory, the Métis Nation of Ontario, the Chippewas and Mississaugas of Williams Treaties First Nations, and the Mohawks of Bay of Quinte.

Input from Indigenous Peoples have been captured in the Indigenous Engagement Report. This report is reflective of traditional knowledge and land uses that Indigenous communities and organizations have shared with us. And we have assessed the potential impacts of the project on their traditional activities and land uses.

During these engagements, some communities voiced concerns about the potential impacts from the project. As a result, we have established a proposed path forward with Indigenous Peoples by formulating commitments which address any outstanding interests and concerns about the NSDF project. CNL will continue to report on progress through our annual update on our environmental assessment commitments to the CNSC as well as in future revisions of the Indigenous Engagement Report.

At CNL, we believe that transparency is important to building public confidence in the safety of the NSDF design, and in CNL's ability to construct and operate the facility. In accordance with REGDOC-3.2.1, Public Information and Disclosure, CNL's Public Information Program forms the basis of our communication efforts with Indigenous Peoples, stakeholders, and the public.

A variety of communication products and outreach activities are used to ensure that the stakeholders, local communities, and members of the public have up-to-date information and relevant information about the proposal to construct and operate the NSDF. In March of 2020, the COVID-19 pandemic changed our in-person engagement plans and activities. CNL has adapted to the restrictions by providing continued online platforms for virtual meetings, workshops, webinars, project updates and

open houses.

Overall, the virtual engagements have been well attended. We even noted an increase in participation compared to some of our in-person engagements in previous years. Through our engagements, CNL has incorporated feedback from the public into our project plans, as reflected in the Environmental Impact Statement. Examples include changes to the waste inventory, clarification on how the NSDF protects the Ottawa River, and consideration of potential off-site impacts to members of the public downriver from the Chalk River site. I will touch on some of these later in the presentation.

CNL is committed to maintaining open channels of communication, and continuing engagement, and addressing NSDF project-specific inquiries, questions, and concerns from any member of the public.

The employees at the Chalk River site live in here the Ottawa Valley or across the river in Quebec. We recognize the importance of the Ottawa River. The river is an integral part of our lives, as many of us have lived here and worked beside the Ottawa River for years.

As previously mentioned, the existing low-level waste at the Chalk River site is causing a localized impact on the environment for which CNL has been taking actions to mitigate to ensure there is no offsite

impact. The NSDF though will provide modern engineering features to contain and isolate the waste, thus representing additional safeguards to protect the Ottawa River.

The NSDF project has been designed in accordance with regulatory and international design principles for waste disposal and is appropriate for the hazards associated with the low-level waste. Furthermore, waste disposal technology utilized in the mound's design is supported by the latest advancements in geomembrane sciences and landfill engineering.

The base liner system will include a primary and secondary liner to contain the waste and limit the potential release of contamination below its surface. The cover system will isolate the waste, providing radiation shielding, an intrusion barrier, and prevent precipitation from contacting the waste.

The natural and synthetic barriers of the NSDF are designed to work together to contain and isolate the waste from the environment for hundreds of years, until such time that the activity of the waste will have decayed to levels found naturally in the environment. In fact, long-term performance tests conducted by Queens University demonstrated that the synthetic, high-density, polyethylene geomembrane of the liner system will meet the 550-year

design life, complementing the clay layer and providing a hydraulic barrier for thousands of years.

A perimeter berm will also be constructed for structural stability. The berm has been designed to withstand severe natural events.

Again, one of the most critical aspects of this project is the management, containment, and treatment of water that comes into contact with the waste in the proposed facility. To help demonstrate how water will be managed at NSDF, we will now play a short video.

--- Video Presentation / Présentation vidéo

"CNL is often asked about how the Near Surface Disposal Facility will handle rain or snow that could get into the facility when a cell is open and being filled.

Good question, because we are putting a lot of research and design expertise into making sure that the environment and people will be protected, even from the smallest amount of water that could get into the facility.

To explain, let's follow one raindrop on its journey through the facility.

This is a raindrop's-eye view of the Near Surface Disposal Facility.

Before the facility starts operations, a water collection system and waste-water treatment plant will be installed.

The raindrop falls into the cell as it is being filled, and lands on the material inside. This could be building debris, soil, or packaged material such as protective clothing. As the raindrop, and others like it, go through the material, they could pick up contaminants.

The amount of water hitting the waste will be minimized by the use of temporary covers during off-hours.

As the raindrop falls to the bottom of the cell, it will migrate downward and will collect in the primary liner system. The liner system will prevent water from getting outside the cell. The multi-layer system includes a leachate collection system and leak detection system, the main

component is a high-density polyethylene geomembrane. The total thickness is over two metres. The water is then collected into the leachate collection pipes. You can see how we designed the cells with a slope to allow water to flow into the pipes. Once in the pipes, the water will be pumped up and out to the perimeter of the facility. Meanwhile, the raindrop, because it came into contact with the waste, will be pumped into one of the equalization tanks before heading to the waste-water treatment plant. When the raindrop enters the waste-water treatment plant, it will enter a process designed to attract and hold contaminants. At this point, the raindrop, and all the water that's gone through the waste-water treatment plant, will be tested. It won't be released to the Perch Lake watershed if it does not meet criteria for protection of the

environment and people. The raindrop will be purified so that the Ottawa River remains completely safe. Water that does not come into contact with the waste will be pumped to one of the storm water management ponds.

But what about after the Near Surface Disposal Facility is full, and has been sealed?

We've sealed it so well, that if our raindrop was falling at this time, no outside water will come into contact with the waste inside. The raindrop will not be able to penetrate the cover system and will flow down towards one of the storm water management ponds.

The cover system is a complex series of protective layers that includes topsoil; an intrusion barrier to keep animals out; and a geomembrane, the key element, tested to last well beyond the engineered containment mound's design life of 550 years. All together the cover system is over

*two and a half metres thick.
Once closed, the site will be
monitored and controlled for more
than 300 years when contents will be
reduced to near background levels.
The care and effort going into the
design of the NSDF reflect how CNL
puts the environment and people
first!"*

MS. VICKERD: Although the engineered features of the NSDF are designed to safely contain and isolate the waste, the safety of the facility is not solely reliant on the engineering, but complemented by the natural features of the selected site.

One of the concerns we have heard from the public and Indigenous Peoples was whether or not the site was appropriate to locate a disposal facility. It is.

CNL selected the proposed site following an evaluation of 15 potential sites at Chalk River. Based on an initial screening only two sites were identified for further evaluation, with the current one preferred due to a number of advantages.

The proposed site is located approximately one kilometer away from the Ottawa River. But overland distance to surface water is not critical to the safety

performance of the facility. This graphic illustrates the natural elevation of the area. As you can see the NSDF is being built on a bedrock ridge, that's a natural divide, it directs groundwater away from the Ottawa River.

Our modelling shows us that in the extremely unlikely event of contamination leaving the facility, it would take an estimated seven to 12 years to travel through the groundwater to a nearby creek and eventually reach the Ottawa River. This is more than enough time for our environmental monitoring to detect the issue and take appropriate measures to intervene. We also know this to be true because decades of groundwater monitoring that have already been conducted in this watershed.

Furthermore, the proposed site is well situated outside of the flood plain. The base of the proposed NSDF is located approximately 163 metres above sea level, this is at least 50 metres above the elevation of the Ottawa River. The mound will be sloped to minimize visibility from the Ottawa River.

During our engagement with Indigenous Peoples, and members of the public, we also heard concerns about the potential for natural events to impact the facility. Consistent with CNSC guidance and international standards, we have assessed natural events that may occur

for this region.

The NSDF has been designed to withstand events such as forest fires, earthquakes, major storms, and tornadoes. The facility is also designed to withstand a significant seismic event, the magnitude of which has not been observed in this region and is more characteristic of a major tectonic plate border.

The use of earthen materials, and specifications for waste material placement and compaction are all part of the design basis of the mound. It will provide the necessary structural stability.

Extreme rainfall events have even been considered in the design of the wastewater treatment system. The storage capacity and maximum flow rate of the wastewater treatment plant is designed to account for back-to-back, 100-year storm events.

The wastewater treatment plant and other infrastructure on site are also designed to withstand potential tornadoes and extreme high winds. The project has also considered the effects of climate change such as increased precipitation. Should any issues arise during any stage of the project, CNL is fully prepared to respond, and specific emergency response plans for the facility will be developed.

To demonstrate that the NSDF will not pose

a risk to human health during the entire life cycle of the facility, CNL conducted highly technical detailed calculations that included a number of different scenarios and their predicted effects on workers, Indigenous Peoples, and the public.

The safety assessments that support the application have demonstrated that NSDF design adheres to regulatory limits established for the protection of human health and the environment, as well as incorporates a margin of safety.

First, it is helpful to talk about radiation in everyday life. Examples of radiation exposure that most everyone experiences includes taking a flight, getting an x-ray at the dentist, or even eating everyday foods. Radiation occurs naturally from cosmic and terrestrial sources as well as from man-made materials. Within Canada, the average dose from natural background radiation is 1.8 millisieverts per year. The prescribed annual dose limit for a member of the public from regulated nuclear activities or facilities is one millisievert per year.

One of the points we want to make with this slide is that long-lived radionuclides exist within the environment. Radionuclides such as uranium, thorium, and potassium are present in soils and bedrock, such as the

outcrop shown on this slide. Understanding that levels of long-lived radionuclides can exist naturally without consequence to human health is important relative context for NSDF.

It is important to re-state that only low-level waste will be accepted for disposal in the NSDF. This waste consists of building demolition debris, contaminated soils, and discarded items such as rags, mops and protective clothing that have been contaminated. Low-level waste can be handled with no additional safety precautions. In terms of risk, low-level waste represents the lowest risk category from a radiological hazard perspective.

Low-level waste contains primarily short-lived radionuclides, and it restricts the amount of long-lived radionuclides. Long-lived radionuclides are intrinsically part of the low-level waste fingerprint at CNL. It is not practical, either technically or economically, to separate since it exists as contamination. By the time the engineered barriers degrade, no longer providing containment, so after the design life, over 99 percent of the disposed inventory will have decayed. Only a very small amount of radionuclides will remain.

The presence of long-lived radionuclides in small concentrations does not represent a risk.

CNL has demonstrated that the NSDF will be safe. We do this by examining the various ways future generations may interact with the disposal facility after the barriers start to degrade.

Despite the fact that the NSDF will remain under institutional control for as long as necessary, we examined what would happen if Indigenous Peoples or the public interacted directly with the disposal facility during the post-closure phase. The assessment includes different hypothetical land users with a wide range of dietary characteristics and habits. This helps us account for all potential exposures and doses.

Three types of land users were selected to examine the long-term safety of the facility.

First, as shown here, an onsite family lives and farms on top of the disposal facility, with fruits, vegetables, and potatoes assumed to be grown in the garden on top of the mound. They raise cattle, which graze in the area, and chickens, which are fed with feed grown in the garden.

A second group of land users represents a small number of adults and children that hunt on the land and make recreational use of the area surrounding the disposal facility, including the Ottawa River. This group spends time in the nearby creek, eats deer hunted from the

site, and fishes in the river.

A third group of land users is a self-sufficient group of Indigenous Peoples, including adults and children, using the area surrounding the disposal facility for traditional purposes such as hunting and gathering. This group is assumed to have increased consumption of local fish and wild game compared to the other land users. Consideration of eating berries and mushrooms were also made in this scenario.

For the wide range of scenarios and events examined, the exposure to the land users was calculated well below the regulatory public dose limit of 1 millisievert per year, meaning that there is no consequences to human health, even for future generations.

The reason for this is that the inventory is only low-level waste. It requires containment and isolation for only a few hundred years in order to sufficiently decay the short-lived radionuclides. The radionuclides, which take longer to decay, are restricted to very low concentrations which do not pose a risk to the human health.

In fact, once a facility is closed, the dose to someone living down river in Ottawa or Gatineau is one million times lower than the regulated public dose limit.

To increase confidence in the safety assessment for the project third-party reviews by individuals with relevant expertise were performed. The findings and recommendations of third-party reviewers were considered during the development of the design and safety assessments for the project.

These assessments supporting the NSDF's safety case will be updated throughout the life of the facility. Revisions of safety assessments will be submitted to CNSC Staff.

I will now turn the mic over to Mr. Boyle to discuss the CNL Management System.

MR. BOYLE: Thank you, Ms. Vickerd. Phil Boyle, for the record.

Now I would like to briefly discuss CNL's robust Management System, which is aligned to the required safety and control areas outlined in the Chalk River Laboratory's operating licence and our licence condition handbook.

The Management System is about the way we do our work, is the set of processes and procedures we use to ensure safe and efficient operations. This includes occupational safety, maintenance procedures, design requirements, configuration control, radiation protection, and environmental protection as examples.

The Management System is the result of many years of experience in dealing with nuclear science and materials.

CNL's Management System is comprised of an integrated set of documented standards and responsibilities to which CNL is governed and managed. The Management System demonstrates and documents the commitment to maintaining a high level of quality and excellence in all CNL activities in an environment that prioritizes safety and fosters continual improvement.

It provides a detailed framework for long-term safety through all phases of the nuclear facility lifecycle, including design, construction, commissioning, operations, and decommissioning. And this framework applies to the proposed NSDF.

These mature programs and processes are already in place and will continuously improve to ensure that all regulatory requirements are achieved now and in the future.

For clarity, we have functions or programs to ensure compliance with each of the safety control areas in our CNSC licence which govern all of our licence activities.

Chalk River's Management System has been rated as satisfactory in all safety and control areas based

on CNSC Staff assessment. The Management System is well-positioned to safely and securely deliver all phases of the NSDF project.

CNL is responsible for this project during every phase of its life, including during construction.

Through the implementation of CNL's construction process I'm confident that adequate controls are in place to ensure construction activities will be efficiently, effectively and safely delivered, and that all activities will be properly documented.

A construction quality assurance plan was developed for the project in alignment with the CNL construction program requirements and includes an extensive testing regimen, as detailed in the design specifications.

Although the construction contractor will be required to undertake its own quality control, CNL has decided to procure a construction quality assurance contractor with experience tailored to this kind of work; to conduct independent quality surveillance and testing.

Our management system was applicable to CNL's recent execution of the design, construction, operation and closure of the Port Granby long-term waste management facility in southeast Clarington.

During that project approximately 800,000 cubic metres of low-level waste had been safely contained

inside the engineered mound.

CNL constructed the new facility and supporting infrastructure shown here, which includes the engineered above-ground mound, dedicated wastewater treatment plant, stormwater collection ponds, internal haul roads, and various support structures, all similar design features to the NSDF.

The design of the NSDF project built on the operating experience from similar facilities, including the Port Granby experience. Benchmarking site visits were conducted as part of the design development.

CRL's experience in managing radioactive waste and in-depth knowledge gained on implementing long-term solutions demonstrates that CNL can safely construct, operate and eventually close the NSDF.

It is vitally important that programs are in place to monitor the environment surrounding the NSDF, verify the effectiveness of the facility and check that mitigation measures are working as intended.

At Chalk River Labs there is a well-established and extensive environmental monitoring program developed in alignment with the management system requirements.

CNL conducts and annually reports on the results of this program, which has been in place for over

60 years. Let me briefly describe it. Environmental monitoring occurs at over 400 sampling locations at Chalk River and various locations outside of the site boundary.

On average, CNL collects approximately 5,000 samples annually and conducts over 40,000 unique analyses of these samples. We monitor the air, surface groundwater and the soil to determine if any activities are having an impact on the surrounding environment.

This environmental monitoring program will be expanded to include specific monitoring related to the NSDF project and monitoring results will continue to be reported to the CNSC annually.

Once the engineered containment mound is closed CNL will remain responsible for long-term monitoring of the facility.

The environmental assessment concluded that the implementation of the NSDF project is not likely to result in significant residual effects on people or the environment with identified mitigation measures in place.

Our follow-up monitoring program will verify the accuracy of the environmental assessment predictions and the effectiveness of the mitigation measures.

CNL is committed to informing the public about our monitoring results and mitigation measures, and

we are also committed to including Indigenous communities and organizations in our environmental monitoring, planning and implementation.

For example, we are working with the identified and interested Indigenous communities on the co-development and participation of the environmental assessment follow-up monitoring program, ensuring that each community's unique and individual needs are addressed.

So, as we move forward along this journey, we are committed to applying modern standards and technologies to reduce risk of radioactive waste, continue to engage with Indigenous people and the public in addressing concerns as they arise, ensuring the protection of people and the environment, which includes the Ottawa River, during all phases of the project, and completing periodic reviews and updates of our safety case through all licensing stages.

I am confident in stating that CNL firmly believes the NSDF project will significantly improve current conditions at the Chalk River Laboratory site through safe waste disposal and enhanced environmental protection and stewardship.

Potential effects of the NSDF project on the environment are limited because the inventory is low-level waste and the NSDF project has been designed with

consideration of site-specific characteristics and is suitable for the proposed inventory.

CNL is fully equipped and ready to proceed with construction of the NSDF, meeting all the required standards of the licence's safety and control areas.

This concludes our presentation. I want to thank President Velshi and Members of the Commission for the opportunity to present to you today.

We are prepared to answer any questions that the Commission may have.

Thank you.

THE PRESIDENT: Thank you, Mr. Boyle, Mr. McBrearty, and Ms. Vickerd for that presentation.

I would now like to move to the presentation from CNSC Staff as outlined in CMDs 22-H7 and 22-H7.A.

And I'll turn the floor to Ms. Murthy. Over to you please.

CMD 22-H7/22-H7.A

Oral presentation by CNSC staff

MS. MURTHY: Thank you. Good morning, President Velshi and Members of the Commission. For the record, my name is Kavita Murthy, and I am the Director

General of the Directorate of Nuclear Cycle and Facilities Regulation.

Our presentation today will discuss CNL's application to amend the Chalk River Laboratories current operating licence to construct a low-level radioactive waste facility, the proposed near-surface disposal facility.

As the Commission has just been provided an overview of the proposed NSDF by CNL, CNSC Staff's presentation will not reintroduce the project.

With me today are a number of specialists to answer any questions that the Commission may have.

Before we begin, CNSC Staff would like to acknowledge that the proposed NSDF project located on the CRL site is within the traditional unceded territory of the Algonquin and Anishinaabe peoples as well as the traditional and/or treaty territories of the Williams Treaty First Nations and the Métis Nations of Ontario.

I would like to point out at this point to the Commission an error in CNSC Staff's written CMD in Section 3.5, page 32 of the CMD. If you prefer, it's on page 42 of the package.

In the subsection entitled Seismic Impacts on the NSDF, in the very last line of that paragraph it says, "an earthquake with a 50,000-year return period,"

this should be corrected. It should indicate "10,000 return period."

We will begin with the purpose of this public hearing. Today's proceedings are Part 1 of 2. The purpose of Part 1 of a two-part public hearing is for the applicant and CNSC Staff to present written and oral submissions to the Commission and respond to questions from the Commission.

CNSC Staff are here today to present our findings and recommendations to the Commission for the proposed project based on our technical reviews and consultation and engagement activities that have spanned over five years.

CNSC Staff's recommendations are based on the information available to date, and notwithstanding the opportunities for Indigenous nations and communities and the public to express their views to the Commission during the Part 2 public hearing.

The second part of this hearing will begin on March 31, 2022. During Part 2 registered intervenors will have an opportunity to make their views and concerns heard by the Commission.

CNL's licence application was submitted to the CNSC in March 2017 and updated in March 2021. In their submissions CNL requested that the Commission amend the

current operating licence for CRL to authorize CNL to construct the proposed NSDF facility at that site.

With respect to this licence application the Commission will need to make an environmental or EA decision under the *Canadian Environmental Assessment Act 2012* or *CEAA 2012*. Assuming a positive EA decision by the Commission, a subsequent licensing decision under the *Nuclear Safety and Control Act*, or the *NSCA*. And with respect to the CNSC's duty to consult obligations, a determination on whether the honour of the Crown has been met as per Section 35 of the *Constitution Act of 1982* and common law.

This slide provides a brief outline of the scope of the regulatory review carried out to inform each of CNSC Staff's conclusions and recommendations. This scope of the EA considers environmental effects of the project over its entire lifecycle.

The licensing review, on the other hand, is focused on the scope of the application for the construction of the NSDF and considers the relevant safety and control areas specific to construction activities.

CNSC Staff also took into consideration and reviewed all aspects of the facility lifecycle, including its operation, decommissioning of support facilities, closure and post-closure as recommended by

international guidance and best practice.

These future phases of the facility would be subject to separate decisions by the Commission should a licence to construct be approved.

As the EA and licensing decisions for the NSDF project have the potential to impact Indigenous and/or treaty rights, the duty to consult as per Section 35 of the *Constitution Act 1982* and common law is required.

To assist in fulfilling the duty, Indigenous consultation and engagement activities were integrated and carried out throughout the regulatory review process with Indigenous nations and communities to ensure their participation in the process and to make sure that their concerns were heard and addressed in a meaningful way.

The NSDF project was determined to be a designed project under *CEAA 2012* as per Section 37(b) of the Regulations designating physical activities. CNSC Staff conducted an EA for the NSDF project in accordance with *CEAA 2012*, as this was the applicable in place at the time of receipt of the submission in 2016.

The *Impact Assessment Act* came into force in August 2019. CNL's project description was received three years before that, in May 2016. As provided for in the transition provisions in the *IAA*, projects with

environmental assessments that were initiated under the former *CEAA 2012* continued under that process.

In accordance with *CEAA 2012*, you, the Commission, must render a positive EA decision before you consider a licensing decision under the *NSCA*.

The CRL site where the proposed NSDF will be constructed operates under the current nuclear research and test establishment operating licence. This licence was renewed in 2018 for a 10-year period. The construction of the proposed NSDF is considered a new Class 1B facility as per paragraph 90(a) of the General Nuclear Safety and Control Regulations.

CNSC Staff determined that the proposed NSDF is not authorized in the current CRL operating licence and the Commission must approve an amendment to the current operating licence to allow the construction of the proposed NSDF to take place.

To render an amendment decision, the Commission must determine whether the proposed NSDF project meets the requirements under the *NSCA*.

As an agent of the Crown, the Commission must ensure that all of its licensing and environmental decisions uphold the honour of the Crown and consider Indigenous peoples' potential or established Indigenous and/or treaty rights as per Section 35 of the *Constitution*

Act and common law.

Both the NSDF EA and licensing decisions require the Crown's duty to consult, and where appropriate, accommodate Indigenous nations and communities whose potential are established Indigenous and/or treaty rights have the potential to be impacted by the proposed NSDF project.

In order to fulfill the duty to consult and accommodate, CNSC Staff conducted extensive consultation activities with identified Indigenous nations and communities to ensure their full participation in the regulatory review process and to ensure their concerns were addressed to the extent possible.

The Commission must determine whether the honour of the Crown has been met in fulfilling the CNSC's duty to consult.

I will now present an overview of the regulatory review process that was undertaken for the proposed NSDF project.

Environmental assessment and licensing processes can be conducted sequentially or in parallel, depending on which approach a proponent requests. As shown on this slide, CNL requested that the NSDF environmental assessment and licensing be conducted through an integrated parallel process.

The technical review of this environmental and licensing review was iterative, transparent and carried out in parallel, and the project was assessed against applicable regulations, regulatory documents and international standards.

Here's what the iterative process looked like when CNSC Staff concluded that a submission was not complete or satisfactory. CNL was asked to submit additional information and/or revise the documents to address CNSC Staff's comments.

When resubmitted the document was reviewed again to ensure that all comments were satisfactorily addressed. This process continued, in some cases, for several rounds until all comments were addressed.

In July 2021 CNSC Staff were satisfied that all regulatory requirements had been met and determined that CNL's application could proceed to public Commission hearings. If the Commission approves a license amendment, CNSC Staff will implement the compliance verification program to span all aspects of the project.

Next, we provided overview of the EA process carried out for the proposed NSDF, including a summary of CNSC Staff's findings. And, for this, I'll pass the presentation to Dr. Nana Kwamena.

Nana, over to you.

DR. KWAMENA: Thank you, Ms. Murthy. For the record, my name is Dr. Nana Kwamena. I am the Director of the Environmental Assessment Division.

I will provide an overview of the EA process carried out for the proposed NSDF project, including a summary of CNSC Staff's assessment.

CNSC Staff, as the responsible authority for the designated project, conducted a comprehensive, robust and rigorous assessment of the potential environmental effects of the proposed project.

This assessment was conducted as part of the EA process in accordance with the requirement of federal environmental review legislation. To support CNSC Staff's assessment, Staff sought expert advice from the federal departments and agencies listed on the slide.

A provincial EA was not required, as the proposed project is located on federal lands. However, both the Provinces of Ontario and Quebec participated in the EA process as apart of the federal/provincial review team.

Many Indigenous nations and communities also collaborated with CNSC Staff in developing sections of the EA report on topics related to information or concerns with respect to potential project impacts on right, interests, culture, or traditional uses as well as

Indigenous knowledge.

The comments and topics raised by Indigenous nations and communities, as well as members of the public and other stakeholders, were considered as part of CNSC Staff's assessment and will be addressed later in the presentation.

The EA for the NSDF project focuses on the assessment of potential environmental effects for the entire lifecycle of the project on areas of federal jurisdiction.

CEAA 2012 requires responsible authorities to determine the scope of factors to be taken into consideration in the EA of a designated project.

In March 2017 the Commission issued a scoping decision on the information to be included in the EA. The decision took into account the comments received on the project description from Indigenous nations and communities and the public, as well as CNSC Staff's recommendations.

CNL's environmental impact statement, or EIS submission, was assessed against relevant legislation, CNSC's generic guidelines, and applicable regulatory documents as outlined on this slide.

All project-specific EA documentation and related records are posted online on the Canadian Impact

Assessment registry and/or the CNSC's website for the project.

CNSC Staff assessed predicted changes that could be caused by project activities to non-living subdivisions of the environment. These divisions are known as environmental compartments and include atmospheric environment, water resources and terrestrial environment, as well as the geological and hydrogeological environment.

Changes to the environment caused by project activities can lead to effects on valued components. Valued components refer to features such as living organisms that may be affected by a project and that have been identified to be of concern by the proponent, government agencies, Indigenous nations and communities, or the public. CNSC staff assessed the valued components listed on the slide.

For each valued component, CNSC staff assessed whether there is a potential for adverse residual effects due to project activities. A residual environmental effect is an environmental effect that remains or is predicted to remain after mitigation measures have been implemented. The degree of the residual effect was determined by taking into consideration the mitigation measures proposed by CNL. CNSC staff's assessment informed staff's determination of whether the project is likely to

cause significant adverse environmental effects taking into account mitigation measures.

In the EA report, CNSC staff provide a summary of staff's assessment of each environmental compartment or valued component as well as an identification of potential residual effects.

CNSC staff's technical assessment and findings were informed by CNL's assessment as presented in the EIS and related documentation, views and concerns expressed by Indigenous nations and communities as presented in the rights impact assessments and through consultation activities, expertise and information provided by the federal the provincial authorities, and views and concerns expressed by the public and other interested stakeholders.

As previously mentioned, the inputs listed on this slide informed CNSC staff's determination regarding whether the proposed project is likely to result in significant adverse effects, taking into account mitigation measures.

I will now pass the presentation to Mr. Mohamed Gacem, who will provide an overview of the licensing process carried out for the proposed project.

MR. GACEM: Thank you, Dr. Kwamena.

For the record, my name is Mohamed Cherif

Gacem, and I am a senior project officer and the licensing lead on the proposed near surface disposal facility project.

We will now provide an overview of the licensing process carried out for the proposed NSDF project and share key highlights from CNSC staff's review of CNL's licence application.

CNSC staff's licensing assessment considered CNL's licence application and supporting technical documentation; CNL's existing programs, processes, and procedures as applicable to the proposed NSDF; CNL's performance in all 14 safety and control areas (or SCAs) during the current licence period (2018-2020), which are listed on the right side of this slide; and public information, community outreach, and Indigenous engagement activities.

CNSC staff assessed CNL's submissions of technical documents and safety assessments against the regulatory requirements of the NSCA, its associated regulations as well as CNSC regulatory documents, guides, and standards for relevant SCAs to the scope of the application. Some of these can be seen on this slide.

For the proposed near surface disposal facility, the key requirements come directly from the *Class I Nuclear Facilities Regulations* and the *General Nuclear*

Safety and Control Regulations (GNSCR) as well as other applicable requirements from the NSCA.

CNSC staff used the applicable regulatory requirements for the licensing assessment review. At the time of CNL's application, the waste regulatory policy P-290, *Managing Radioactive Waste*, the CNSC guidance document G-320, *Assessing the Long-Term Safety of Radioactive Waste Management*, were in use and have since been superseded by REGDOC-2.11.1, *Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management*.

CNSC staff also considered all applicable International Atomic Energy Agency (IAEA) safety standards and guidance documents and integrated best practices from these documents to complement the Canadian regulatory framework used to assess the NSDF licence application.

Based on the CNSC staff's general assessment of relevant SCAs to the scope of CNL's licence application and consideration of past performance, CNSC staff conclude that CNL continues to implement and maintain effective programs at the CNL site. These programs ensure that licensed facilities and activities are managed and performed safely and in compliance with regulatory requirements.

CNSC staff also determined that CNSC's

NSDF-specific documents are adequate to properly carry out the proposed NSDF construction activities in accordance with regulatory requirements.

This slide illustrates the components of the NSDF safety case. The safety case presents scientific, technical, administrative, and managerial arguments and evidence in support of the safety of the facility throughout its lifetime. The safety case is supported by the safety assessment, which is initiated at the inception of the project and must be updated throughout the entire facility lifecycle.

The NSDF safety case contains two key components, the safety analysis report for the construction, operation, and closure phases -- listed as "pre-closure" on the diagram -- and the post-closure safety assessment (PCSA) that covers the institutional control and post-institutional control phases.

CNSC staff assessed CNL's NSDF safety case to ensure that it meets regulatory requirements through verification that the engineered design of the facility follows international best practice, uses present-day technology, and is compatible with the site characteristics; assessing and comparing the submission information with relevant standards and criteria; performing independent calculations to validate the safety

arguments presented.

The NSDF safety analysis report analyzes the impact of the NSDF during construction, operations, and closure phases on workers, people, the environment under normal and accident conditions.

CNL utilized a systematic hazard analysis methodology that included hazard identification and classification, hazard analysis, failure mode effects, and criticality analysis. CNSC staff reviewed CNL's assessment and concluded that the systematic hazard analysis methodology is adequate and meets regulatory requirements.

The post-closure safety assessment (PCSA) provides an evaluation of the potential impact of the disposal facility on people and the environment during the post-closure period. The PCSA analyzes the expected evolution and degradation of the facility and the impact of disruptive events (example, earthquakes, erosion, climate change, extreme precipitation, et cetera) on the ability of the facility to isolate and contain the waste.

CNL's post-closure safety assessment, through the use of mathematical modelling, analyzed a variety of scenarios: normal evolution, disruptive events (events such as earthquakes, fires, floods), human intrusion, and other worst-case what-if scenarios (such as mass excavation, flooding, et cetera).

CNSC staff verified and determined that the NSDF post-closure safety assessment meets Canadian regulatory requirements and guidance and aligns with international best practices. CNSC staff assessed both the methodology and the results, and found that the results provide assurance that long-term impacts from the NSDF will comply with regulatory acceptance criteria (one millisievert per year). The NSDF design will ensure containment and isolation of the waste in the near and long term.

This graphic shows the results of a selection of CNL's post-closure safety assessment scenarios relative to the dose criterion of 0.3 millisieverts per year, dose limit of one millisievert per year, and the Canadian average background dose of 1.8 millisievert per year.

To meet requirements and guidance, CNL was required to simulate the performance of the NSDF to demonstrate that it would meet an acceptance criteria of 0.3 millisievert per year and a limit of one millisievert per year, the public dose limit for a variety of scenarios.

The horizontal lines show the results of a selection of these scenarios as dose to a receptor per year.

The vertical blue line on the left of this

graphic shows the dose acceptance criteria, which is a protective constraint set lower than the public dose limit, to account for uncertainty in the results or multiple sources.

The vertical red line toward the middle of this graph identified the CNSC public dose limit of one millisievert per year.

And the vertical green line to the far right shows the average background radiation dose in Canada of 1.8 millisievert per year and provides context to the results of the post-closure safety assessment.

In addition to the scenarios shown, several scenarios with deliberately unrealistic assumptions, called what-if scenarios, were modelled to illustrate and determine the worst-case impacts.

As can be seen from the graphic, all scenarios resulted in doses below the one millisievert per year public dose limit. These results build confidence in the safety case and the long-term performance of the NSDF to assure the public, environment, and the Ottawa River are protected.

The graphic on this slide shows the radioactivity concentration of the waste after the NSDF is closed. It provides evidence to support the safety of a 300-year institutional control period and a 550-year design

life for the NSDF barriers.

The blue line depicted on this slide represents the radioactivity concentration of the waste in the NSDF drops off rapidly. This is because the shorter-lived radionuclides in the NSDF waste decay in the first decades post closure.

In addition, CNL compared the NSDF waste with the activity concentration of local uranium-enriched rocks (the grey bar) and local background (the green horizontal line) to show the activity of the NSDF waste is similar to background by approximately 100 years post closure. This also helps justify the time frame for the 300-year institutional control period and 550-year design life of the NSDF barriers.

CNSC staff find that the level of the hazard and time frames used justify the length of the institutional control period and barrier design life in accordance with regulatory requirements for disposal facilities. As a result, the multiple lines of evidence including the design, the waste, and the long-term safety assessment provide assurance the NSDF will protect people and the environment.

I will now pass the presentation to Ms. Nicole Frigault, who will present an overview of the Indigenous consultation carried out for the proposed

project.

MS. FRIGAULT: For the record, my name is Nicole Frigault, and I am an environmental assessment specialist and EA lead on the proposed NSDF project. I will provide an overview of CNSC staff's Indigenous consultation and engagement activities.

The NSDF project is located within and has the potential to impact the traditional and treaty territories and homelands of many Indigenous nations and communities. Therefore, as listed on the slide, CNSC staff identified the following Indigenous nations, communities, and organizations to be engaged and consulted throughout the regulatory review process.

Starting in 2016 with the commencement of the regulatory review process, CNSC staff provided many opportunities for dialogue and collaboration with Indigenous nations and communities about their concerns and areas of focus. CNSC staff provided regular updates to keep them informed of key developments and to solicit their feedback and perspectives.

In the written correspondences and meetings with Indigenous nations and communities, CNSC staff notified and encouraged them to participate in the regulatory review process, including the public Commission hearings.

CNSC staff also monitored CNL's engagement with Indigenous nations and communities to ensure that they met the requirements of REGDOC-3.2.2 and other related guidance.

In addition, CNSC staff provided the opportunity to Indigenous nations and communities to develop a mutually agreeable approach to consultation, such as terms of references, that suited their needs, capacity, and level of interest.

As part of the CNSC's duty to consult, CNSC staff considered and assessed the NSDF project's potential impacts on Indigenous and/or treaty rights, which culminated in rights impact assessments, or RIAs, for the Indigenous nations and communities listed on this slide.

CNSC staff offered to develop collaborative consultation approaches for the RIAs for each of these identified Indigenous nations and communities. The Algonquins of Ontario, the Algonquins of Pikwakanagan First Nation, and the Métis Nation of Ontario worked collaboratively with CNSC staff to draft the RIAs and provide input into the EA report. Views of these Indigenous nations and communities are seen throughout both reports, and CNSC staff have worked with each of them to ensure their concerns were appropriately characterized, responded to, and addressed to the greatest extent

possible.

CNSC staff would like to emphasize that each Indigenous nation and community's Indigenous and/or treaty rights, interests, and concerns are unique. While this presentation provides a summary of the findings of the RIA processes completed for the project, it is important to note that individual RIAs were conducted for each Indigenous nation and community, and it is important to review each one in detail to understand each nation and community's specific rights, history, culture, and concerns as it relates to the project.

In conducting all of the RIAs, CNSC staff in consultation with potentially impacted Indigenous nations and communities determined that the project has the potential to impact the following categories of Indigenous and/or treaty rights: harvesting rights, governance and stewardship rights, and cultural continuity rights.

Indigenous nations and communities raised concerns with respect to the NSDF project's potential to permanently remove access to part of their traditional territories for the practice of their rights, to lead to fear and avoidance behaviours of their community members and citizens in the area around the NSDF site due to perceived risk of contamination, and impacts on the sensory experience.

As part of the RIA process, CNSC staff also identified and assessed the potential effectiveness and meaningfulness of proposed mitigation measures and commitments from CNL, AECL, and CNSC staff to address the identified potential impacts as a result of the NSDF project. CNSC staff concluded that these proposed measures would be adequate to effectively address and mitigate the identified impacts.

I will now pass the presentation over to Ms. Kim Campbell, who will speak to other matters of regulatory interest.

MS. CAMPBELL: Thank you, Ms. Frigault.

For the record, my name is Kim Campbell, and I am the acting director of the Canadian Nuclear Laboratories Regulatory Program Division.

The next few slides will focus on other matters of regulatory interest.

Since the launch of the regulatory review process in 2016, CNSC staff's public engagement activities have focused on the objectives of introducing the project; providing information on the EA and licensing processes and the role of the CNSC in the review of the project; bringing awareness to participation opportunities; and encouraging the public, Indigenous nations and communities, and other stakeholders to participate in the process.

The CNSC provided over \$794,000 in participant funding to interested Indigenous nations and communities and organizations as well as the public and stakeholders. This included multiple funding opportunities since 2017, throughout the EA and regulatory review process, as well as the funding for Indigenous knowledge studies and consultation activities with Indigenous nations and communities.

During the early stages of the regulatory review process between 2017 and 2019, CNSC staff hosted or attended multiple in-person engagement activities, such as open houses, local community events, and Meet the Nuclear Regulator sessions. Since 2016, CNSC has also held or participated in multiple engagement sessions with various councils, committees, municipalities, and members of Parliament concerning the NSDF project.

Since 2020, despite the COVID-19 pandemic circumstances, CNSC staff enhanced its public engagement activities through the use of new and adaptive tools such as a consolidated project portal through the launch of an NSDF landing page on the CNSC external website; regular and consistent status updates through the distribution of quarterly project bulletins to a comprehensive distribution list of interested parties; topical discussions with interested participants through online webinars, one-on-one

sessions, and technical focused sessions; and lastly, mail drops to a large radius of both surrounding and directly affected communities related to NSDF of approximately 50,000 mailboxes.

CNSC staff have heard concerns from the public and Indigenous nations and communities through the outreach and engagement activities that were just presented on the last slide. This slide here summarizes the key concerns raised, which include long-term safety of the project, proximity to an important water body (the Ottawa River), possible groundwater contamination, waste management and inventory, alignment of the project with international standards, cumulative effects, and use of Indigenous knowledge.

The CNSC's regulatory review process is designed to consider and assess all of the aspects identified in these key items. To reasonably address concerns raised, CNSC staff used new and adaptive tools to explain and clearly provide information on the regulatory review process and discuss each of these specific concerns during engagement activities or in response to email inquiries. All participants have been strongly encouraged to participate in the upcoming part 2 public hearing to express their views directly to the Commission.

CNSC staff conducted over a dozen webinars

and technical focused sessions on the NSDF project. Each session focused on a key area of public and Indigenous concerns as listed on this slide. In particular, each webinar was hosted in both official languages and overall had an engaged audience of well over a hundred registered participants.

These webinars and technical sessions enabled participants to ask questions directly to CNSC staff working on the assessment of the NSDF. CNSC staff responded in real-time to questions and in writing to any questions where there was insufficient time to ensure timely and adequate answers were provided to all participants.

All of the webinars will be made available on the CNSC's YouTube channel. The CNSC is targeting to have these uploaded prior to the Part 2 hearing.

The most commonly heard concern expressed by the public to the CNSC was that the NSDF is located too close to the Ottawa River and could potentially contaminate drinking water supplies of communities downstream.

CNSC staff performed detailed assessments of the environmental protection measures in place to safeguard people and the environment during both the NSDF operation and post-closure periods to ensure the Ottawa River and other water resources are protected.

CNSC staff's assessment confirms the NSDF has a robust design that includes defence in depth and passive safety features that will ensure the waste is contained and isolated and that the location is suitable.

In addition, modelling that assumes the NSDF barriers fail shows that the levels of contamination reaching the river remain low and doses to receptors are well below the dose limits. During the operational period the wastewater treatment plant will operate and ensure that releases meet regulatory requirements.

In addition, CNL's onsite Monitoring Program and CNSC's Independent Environmental Monitoring Program will ensure levels of radionuclides in the Ottawa River remain below regulatory limits.

As a result, CNSC staff are confident the NSDF will not negatively impact the Ottawa River and have communicated this information to the public and Indigenous Nations and communities through a variety of engagement activities and tools.

To enhance transparency and to foster confidence and trust in the regulator, CNSC staff have made the following commitments to the public and Indigenous Nations and communities in the CMD and will report publicly on any updates and the progress made towards accomplishing these objectives.

These include:

- engage with members of the public, Indigenous Nations and communities and local authorities, and seek feedback early on future Independent Environmental Monitoring Program sampling campaigns related to the NSDF and/or CRL site;

- continue to build long-term relationships with each of the identified Indigenous Nations and communities, and involve them in the ongoing monitoring and oversight for the implementation of mitigation measures and follow-up program measures should the NSDF Project proceed;

- conduct engagement activities with Indigenous Nations and communities at a frequency mutually agreed upon with each of the Indigenous Nations and communities;

- conduct regular outreach activities related to the NSDF Project and/or the CRL site with local communities.

CNSC staff's commitments are separate and independent from the commitments made by CNL during the EA process with respect to proposed mitigation measures and follow-up program measures. CNSC staff's commitments are specific to achieving the regulator's objectives in maintaining long-term relationships with, and ongoing

dialogue on concerns expressed by, local and Indigenous Nations and communities.

I will now pass the presentation back to Ms. Murthy for CNSC staff's overall conclusions and recommendations.

MS. MURTHY: Thank you, Ms. Campbell.

For the record, my name is Kavita Murthy.

The environmental effects of the NSDF Project and their significance have been determined using assessment methods and analytical tools that reflect current accepted practices for environmental and socio-economic assessment, including consideration of potential accidents and malfunctions and the potential for cumulative effects.

Based on an evaluation of CNL's submissions, CNSC staff conclude that the NSDF Project is not likely to cause significant adverse environmental effects to human health or the environment, taking into account the CNL's proposed mitigation and follow-up program measures. These proposed mitigation and follow-up program measures have been committed to by CNL and CNSC staff will verify their implementation.

As a result, for the EA decision, CNSC staff recommend that the Commission determine that the NSDF Project is not likely to cause significant adverse

environmental effects referred to in section 5 of *CEAA 2012*.

Should the Commission issue positive decisions, CNL will be required to further design and implement an Environmental Assessment Follow-Up Monitoring Program to verify the accuracy of the EA predictions for the NSDF Project, determine the effectiveness of measures taken to mitigate the potential adverse environmental effects of the NSDF Project, and support the implementation of adaptive management measures to address unanticipated adverse environmental effects.

CNSC staff assessed CNL's licensing application for the proposed NSDF Project and determined that:

- the continued implementation of CNL's existing corporate programs and adherence to accepted NSDF-specific procedures are adequate to support the proposed construction of the NSDF;

- the NSDF safety analysis report and supporting hazard analysis and assessments meet regulatory requirements; and

- the NSDF post-closure safety case and supporting safety assessment provide confidence that the long-term impacts from the NSDF comply with regulatory requirements.

CNSC staff have determined that the NSDF has a facility design that provides for its safe operation, decommissioning and closure, providing adequate protection for workers, Indigenous peoples, the public and the environment over the near and long term.

Based on CNSC staff's assessment of CNL's submissions, we have concluded that the proposed NSDF Project is protective of people and the environment, taking into account the implementation of all identified EA regulatory commitments and licensing regulatory actions.

CNSC staff conclude that CNL's licence application to construct the NSDF at the CRL site complies with all applicable regulatory requirements.

If the Commission approves the construction of the NSDF, CNSC staff will amend the CRL licence and associated *Licence Condition Handbook* to include the NSDF in the licensing basis. The associated changes are reflected in the proposed licence and the proposed *Licence Condition Handbook* included in Part 2 of CNSC staff's CMD.

The only proposed changes to the current CRL operating licence are the addition of two facility-specific conditions related to CNL's implementation of licensing regulatory actions and EA regulatory commitments as shown on this slide.

As per condition G.7, licensing regulatory actions are a list of CNL-directed actions to be carried out during construction and pre-operation activities.

As per condition G.8, EA regulatory commitments are a list of CNL's identified mitigation measures, follow-up program measures and agreed-upon commitments with Indigenous Nations and communities made during the EA process.

Based on CNSC staff's licensing and EA regulatory review and technical assessments, CNSC staff propose that these actions and commitments become an enforceable condition in order that CNSC staff verify the adequate implementation of these conditions and ensure the NSDF is protective of people and the environment.

CNL will be required to update and report on the progress of the implementation of licensing regulatory actions and EA regulatory commitments to the CNSC on an annual basis or as required by the Commission. These will also be tracked and monitored by CNSC staff.

CNSC staff submit that the Commission accept CNSC staff conclusions and recommendations presented in CMD 22-H7 and exercise its authority under the *Nuclear Safety and Control Act* to amend the licence to authorize CNL to construct the NSDF.

CNSC staff also recommend that the

Commission approve the authority to staff, as set out in section 6.6 of CNSC staff's CMD.

We wish to note here that subsequent phases of the project would be subject to separate licensing decisions by the Commission.

Finally, CNSC staff request that the Commission affirm CNSC staff commitments made to the public and Indigenous Nations and communities, as summarized in slide 34 of this presentation and as set out in detail in section 7.2 of CNSC staff's CMD.

Taking into consideration the consultation activities conducted to date, the proposed mitigation measures, the follow-up program measures and the commitments from CNL, AECL and CNSC staff, CNSC staff have determined that the potential impacts to Indigenous and/or treaty rights as a result of the NSDF Project have been adequately identified, assessed and mitigated.

CNSC staff recommend that the Commission determine that the duty to consult and accommodate has been appropriately and adequately discharged for the proposed NSDF Project.

This recommendation is based on the information available to date and notwithstanding the opportunities for Indigenous Nations and communities to express their views to the Commission during the public

hearing process.

This concludes CNSC staff's presentation. We are available to answer any questions that the Commission may have. Thank you.

THE PRESIDENT: Thank you very much, CNSC staff, for your presentation.

We will now take a break for lunch before beginning the rounds of questions. Let's come back at 1:30 p.m. Eastern Standard Time. We will see you all then. Thank you.

--- Upon recessing at 12:36 p.m. /
 Suspension à 12 h 36
 --- Upon resuming at 1:30 p.m. /
 Reprise à 13 h 30

THE PRESIDENT: Welcome back.

We will now move to rounds of questions from Commission Members to both CNL staff and CNSC staff.

As mentioned earlier, there are representatives from other government departments available to answer any questions Commission Members may have.

We will start with Dr. Lacroix, please.

MEMBER LACROIX: Thank you, Madame la Présidente.

Thank you very much for this morning's presentations.

I will kick off with a fundamental question and it is with respect to the key public and Indigenous concerns.

This concern is about the long-term safety of the NSDF Project. In spite of the fact that this question is already addressed in the CNL submission as well as the CNSC submission, I would like to hear from CNL why the proposed NSDF Project is the best solution among various alternatives, including the "do nothing" alternative, for managing the legacy long-term low-level waste and for protecting the people and the environment.

THE PRESIDENT: Mr. McBrearty.

MR. MCBREARTY: Thank you, Commissioner Lacroix, for that question. My name is Joe McBrearty, for the record.

There are a couple of reasons that we believe that this is the proper method and that it is a safe method.

First of all, this method will contain and will isolate the low-level waste that is presently, for the most part, uncontained on our site. As I said earlier in my remarks, it is exposed to the environment.

We believe that the technology exists

today. It has been proven internationally that this technology works.

We believe that we have the right site here from a geological perspective and a hydrogeology perspective. We believe that our analysis addresses how we will keep the Ottawa River safe from a geological perspective but also from a standpoint of environmental monitoring and control of activity or material in the mound. The material is safe.

When we looked at the other options that were available, as you saw in our presentation and in the documents provided, we looked at "do nothing", we looked at a very, very low-waste level disposal, we looked at deep geological repositories, and then we also looked at the near surface disposal.

We did not believe that "do nothing" was the correct answer because the material is here. I believe that the material, even though it is in safe temporary storage, this is not the way that we should be handling this material for the long term. I believe that that's deleterious to the environment.

The portion of very low-level waste, we don't think is appropriate either and I won't go into all the details there. I may ask Ms. Vickerd to go into some more details in a few minutes.

But we did look at the possibility of a deep geological repository. In looking at the deep geological repository, we do not believe that is the appropriate solution for this type of waste. First off, deep geological repositories are more designed for very long-lived high activity, high-level waste, for instance, expended fuel. In addition, the amount of low-level waste that we have, 1 million cubic metres, is a vast amount when you go to look at the size of the repository that you would have to build.

When we down-selected further, we looked at different types of low-level waste facilities. One was the engineered mound that we have proposed. The second was above-ground concrete vault storage. While both provide a safe process going forward, the above-ground concrete vaults are a little less seismically reliable, and when we looked at it, it was about four to five times more in a lifecycle cost.

We believe that the engineered mound with its seismic safety components that exist and -- in addition to not only the bedrock construction but also listening to some of the feedback that we had received from agencies and the public, one of the questions that had come up was what about -- could some of the sand or some of the soil in the vicinity of the NSDF, could it liquefy in a major seismic

event. And actually that caused us to go back and relook at our seismic analysis and how we were going to construct the mound and we've actually decided that we will excavate that silty or sandy material just to increase the seismic capability and quality.

I would just add one other thing and if that satisfies your question, we can stop there or I might pass it to Ms. Vickerd, who is probably far more technically apt in some of these questions.

The bottom liners and the top liners, these are state-of-the-art liners. This is common. This is modern technology that we know works. We have experimented and determined that the 550-year design life is probably conservative, but that is the life that we have decided because we believe that when you look at the activity reduction over the first 100 to 300 years, it's about over -- greater than 99 percent reduction, that this -- that these liners in combination with the leachate collection systems and the leachate treatment systems are adequate to protect the river.

And I will -- I will stop there, sir. And subject to any further questions.

THE PRESIDENT: Dr. Lacroix, are you satisfied with that response?

MEMBER LACROIX: Yes, thank you very much.

THE PRESIDENT: Thank you.

Mr. McBrearty, maybe I can ask you a follow-up question to do with site selection. And I appreciate what you mentioned earlier today, that you picked the Chalk River site because that's where the bulk of the waste is and there is going to be continuous presence on the site.

Given the level of concerns about the proximity to water that -- having an NSDF on the Chalk River site, is there a reason why you did not explore other sites that, you know, are 10 kilometres away from any water body and at least go through the assessment process to see how that compared with the other options you were looking at?

MR. McBREARTY: Thank you, President Velshi, for that question. Mr. McBrearty, for the record.

I will start this question and then I will hand it off to my colleague, Ms. Vickerd, who will probably give a bit more detail.

We did look at other sites on the Chalk River site, as I think Ms. Vickerd pointed out, 15 other sites. There were -- there were numerous criteria that we looked at to ensure that we met those criteria.

Some were geologic criteria, some were size criteria, and some were exclusion criteria that we did

not want to impact. And I think Ms. Vickerd covered some of those earlier, but I will ask her to go back and cover those.

We looked at this from a possibility of -- this is AECL. You know, this is federal legacy waste. And we looked at this from AECL being the owner and the organization responsible for the long-term care and remediation of this waste.

So we did look at our Whiteshell site, which is in Manitoba. We look at the NPD site, which as you're familiar, is about 15 miles north in Rolphton. And we did not believe that they met our criteria for size of the site, width of the mound and -- and other concerns in those areas.

But I would like to pass the microphone over to Ms. Vickerd.

THE PRESIDENT: I'm sorry, Mr. McBrearty. I'm aware of the other sites that you've looked at. Mine was, did you go further afield to other sites altogether, not necessarily under the purview of CNL or AECL as potential sites that were nowhere close to a water body.

I see Ms. Vickerd's got her hand up.

MR. MCBREARTY: So let's turn it over to Ms. Vickerd.

MS. VICKERD: Meggan Vickerd, for the

record.

So what I'd like to comment on is the site is appropriate and we've demonstrated that with our site characteristics, site characterization, and our assessments for the site. Regardless of where the site -- the facility is proposed, it is engineered and designed to be protective of any groundwater, any water source, so it is -- you know, the reason that we've chosen here, the Chalk River site, is because most of the wastes exist here and then that way we don't need to transport it. Even though we can transport nuclear material safely, it avoids the transportation and it is consistent with other international practices of other complex sites like ours where they've led research and development missions for a number of decades.

CRL's been here for over 70 years where we've, you know, done things that have led to localized contamination and other sites that have very large clean-up missions so, in fact, create a disposal cell on their facility to enable the clean-up mission of the site. So it is consistent with international practices to create a disposal cell at your site when you're trying to undertake a very large decommissioning, environmental remediation program.

THE PRESIDENT: Thank you.

Again, I just want to confirm, you did not

look at any other sites that were not within the control of CNL.

MS. VICKERD: Meggan Vickerd, for the record.

No, we only looked at sites that were operated by CNL and owned by AECL.

THE PRESIDENT: AECL. Thank you.

Ms. Maharaj.

MEMBER MAHARAJ: Thank you, Madam Velshi.

Following up on the concept of site selection and facility design while we're in this space, I wanted to talk about the sizing of the facility and understand a little bit better the timeline as well as the scoping of the size of the facility.

So what I've read is that 90 percent of the low-level waste is already on this site, so it is available to be entombed, if I can use that word, at any point in time. So why are only six out of the 10 cells being opened in Phase 1 and the other cells, the other four cells, are being opened at a later date if the capacity, essentially, on site today would fill nine out of the 10 designed cells?

That's sort of the first part of the question.

THE PRESIDENT: Ms. Vickerd.

MS. VICKERD: Meggan Vickerd, for the record.

So it has to do with our -- the way that we plan for our waste. We do have -- we've mentioned before we have integrated waste strategy and the point of that plan is to identify activities that we're undertaking from our facilities decommissioning, environmental remediation program plus ongoing operations, not just for the Chalk River site, but all of the CNL operated sites.

So in that plan, that plan is closely linked to our comprehensive decommissioning plan for the whole site as well and we do have a very large clean-up mission under way now. We've decommissioned over 110 buildings already.

We want to clean up the legacy waste management areas, as we mentioned, and that is anticipated to take some time, though, over a number of decades.

It's -- so the waste, 90 percent, that we forecast means that it's waste currently in storage or waste to be generated. So it includes both, so we have about 300 cubic -- 300,000 cubic metres of low-level waste currently in storage which would be retrieved, characterized according to modern standards and compared against our waste acceptance criteria and then another 600,000 or so cubic metres to be generated from a clean-up

mission of waste to be generated.

So forecast, it looks at the waste we currently have plus waste forecasted as part of our clean-up mission.

MEMBER MAHARAJ: Okay, super. That does help me understand that quite a lot better.

With respect to the sizing of the facility, however, if you can see a straight line to the first 90 percent of capacity being utilized, what, if any, design capability or design aspects of this facility have been undertaken to make it expandable beyond the one million cubic metres of waste storage?

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

So what I want to comment on is we do have some constraints. We've -- you know, footprint-wise, we only have -- we've established some setbacks from the wetland that ensure protection of wildlife and species. We've identified constraints from not being visible from the Otter River, so we've put height constraints, so we have spatial constraints on ourselves.

And the current location is appropriate for one million cubic metres.

What we can do from an optimization is

reduce the amount of low-level waste through waste diversion practices.

So the waste forecast that we have of the one million cubic metres is conservative in that it doesn't necessarily account for waste diversion and, from a waste hierarchy, disposal's always the last resort. We do want to continue to explore ways that we can reduce, reuse, decontamination, so possibly the low-level waste could be cleared as clearable waste, so we would optimize that volume through appropriate application of the waste hierarchy.

MEMBER MAHARAJ: So if you can reduce the amount of waste by a variety of techniques that you've just identified, would you be applying those techniques to the 300,000 cubic metres of waste you have currently in storage prior to embedding it into the cells or -- yeah, okay. You're nodding your head, so I can just stop talking.

MS. VICKERD: Well, Meggan Vickerd.

I don't mind adding -- Meggan Vickerd, for the record.

We're already actually employing that. We're in the process of retrieving legacy waste, applying modern waste characterization and sort and segregation practices on our legacy waste, so we are seeing recovery rates of certainly, you know, waste that's been in storage

for decades, we do see decay and, you know, it can be reclassified because of just the natural decay that happens.

MEMBER MAHARAJ: Okay. Thank you.

I'll hand it back to Madam Velshi.

THE PRESIDENT: I think Mr. McBrearty wants to add something to that.

MR. McBREARTY: Yes, Commissioner. Thank you. Yes, President Velshi.

Mr. McBrearty, for the record.

And one item I would like to add to Ms. Vickerd's comment because her folks were the ones, actually, that have been leading -- spearheading this.

There is an example of -- we've started this sort and segregation process of our waste, of our legacy waste, and as an anecdotal point of a sample of about 500 cubic metres of waste, which was initially thought to be intermediate-level waste, we were able to find that 10 percent of that waste was actually clearable waste. It was not going to go to low-level or ILW. About 85 percent of that, maybe even more, was low-level waste, and the remainder was actually ILW, was intermediate-level waste.

And so this ability to actually size reduce and go through a component-by-component survey and

analysis of each component allows us to reduce the amount of material that will actually go into either intermediate-level waste into the future or into the NSDF mound.

Thank you.

THE PRESIDENT: And so maybe, Mr.

McBrearty, I can ask you some follow-up questions around this waste characterization and the inventory, and maybe staff can -- CNSC Staff can add to the response after you've given yours.

So is the expectation that before any waste is placed in this engineered mound that it goes through this thorough characterization and that there's details of the inventory available for CNSC Staff or maybe it's even publicly available on exactly what has been placed in the mound so that the example you gave, how important characterization is, and especially with the short-lived materials if this project doesn't happen, if it were to proceed, but not for another five years, then the waste would look quite different.

So help me understand what your plans are around characterization and also the kind of details on the inventory that is going to be kept.

MR. McBREARTY: Thank you, President Velshi, for that question.

It's Mr. McBrearty, for the record.

Before I turn the microphone over to Ms. Vickerd for some more details on the actual record-keeping for our waste, a few things that I would like to state.

First of all, of our legacy waste will go through this sorting and segregation prior to -- prior to emplacement into the mound. However, our -- the wastes that we are now processing from tearing down buildings, demolition, et cetera. That goes through a process of very detailed design, planning, characterization prior to -- prior to actual demolition so we know what we're taking out.

It actually -- for us, it allows us to minimize that waste prior to -- prior to even, you know, putting it in something that we would have to go look at further.

And what we have found here -- Ms. Vickerd mentioned we've taken down 110 buildings. You know, we found that a good majority of that demolition debris is actually clearable.

Some of it's hazardous asbestos. Some is low-level. Some very, very little ILW. But a good majority of it is actually clearable.

So through our characterization or design processes and then our survey processes at the end of the

day prior to stuff going into -- into a temporary storage to be put into the mound.

We have a very detailed, very detailed process, but I'd like to turn it over to Ms. Vickerd who can probably give you a little bit more details on some of the accounting of that material.

Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

So our waste characterization process is in alignment with CSA standards, the N292 series about waste characterization. It specifically references the types of data you need to collect from a characterization process and from a record-keeping process. So our waste management program is where that waste characterization process falls.

And in addition to the CSA standards, we've also confirmed that we are carrying out characterization that -- according to the best industry practices such as ensuring that we characterize waste before it's generated.

So we've talked about the legacy waste, but even for facilities decommissioning in our current operations, we characterize the waste stream before it's generated and then after it's produced, we also verify that

it's what we expected. And there will be a very rigorous process of how we screen that characterization data to ensure it meets the waste acceptance criteria for both legacy waste and new waste before it gets accepted into NSDF and then the record-keeping is, you know, consistent with our management system, our approach to N286 as far as due diligence of having retrievable and transparent records.

But perhaps CNSC Staff would like to ask more because they have done some inspection on it.

THE PRESIDENT: Okay. Thank you.

That's a great segue, CNSC Staff, on your expectations and what, exactly, is in the proposed licence or *Licence Condition Handbook* around those compliance verification requirements.

MS. MURTHY: Kavita Murthy, for the record.

So as CNL has stated, an extremely important foundational document of the licensing basis for the NSDF is going to be the waste acceptance criteria document, which is the document that has gone through an extensive review by the CNSC.

The waste -- before I pass on to Mr. Gacem to give you details about the WAC itself, I want to note that it is a critical document, not just during the waste

emplacement but also to ensure the long-term safety. And there are limits in it which restrict what can go in, what form it has to be, and for that I will pass the question to Mr. Gacem.

MR. GACEM: For the record, my name is Mohamed Cherif Gacem.

So yes, indeed, as mentioned by Ms. Vickerd, so CNSC Staff were proactive during the licensing review of the NSDF and have carried out waste characterization inspection in September 2017.

And one of the most, I would say, important or major finding or action which was directed to CNL was to characterize all the legacy waste in storage at CNL Chalk River Laboratories.

And we found out during that inspection that CNL has a robust waste characterization and has enabling facilities to carry out this waste characterization. One of these facilities is the waste characterization facility and the sort and segregate as mentioned by CNL staff and, in addition to that, they have the waste analysis facility, which is the end point where all waste that is being considered for leaving out the CNL is not, I would say, waste -- radioactive waste will be cleared out from the CNL.

So on the waste characterization, we found

out and we concluded that CNL has, as I said, a robust waste characterization program in addition to the waste management program and they are following the CSA standards N292 and all regulatory documentation.

In addition to that, the CSA standard will be issuing the N292.8 on waste characterization which will be used by CNL and CNSC Staff for upcoming inspections in the future.

THE PRESIDENT: Thank you very much.

MS. MURTHY: So if I can, Ms. Velshi, we will be structuring a compliance program around the NSDF should it be approved, and part of the compliance work that will be done during waste characterization and emplacement will be to inspect that the records are kept and that the criteria are met. And we will take advantage of the CRL site office in order to have boots on the ground on a fairly regular basis.

Thank you.

THE PRESIDENT: Thank you very much.

Dr. Lacroix.

MEMBER LACROIX: With regards to the waste characterization, I wonder, is the waste characterized according to its physical state, chemical state, radioactive state? How -- what do you mean exactly by characterizing the waste itself?

And furthermore, will the different cells contain the same mixture of waste or will there be a cell devoted to, let's say, demolition debris and another cell will be devoted or filled with, I don't know, contaminated soil and so on?

THE PRESIDENT: Ms. Vickerd.

MS. VICKERD: Meggan Vickerd, for the record.

So I'll first answer your first question around the waste characterization.

So the waste will be characterized to gather all the data and information required to compare it to our waste acceptance criteria, so if you look in the waste acceptance criteria document was actually available on our website as well in both official languages. It identifies that we need physical properties, chemical properties and radiological properties. Radiological properties, obviously, for the long-term safety assessment, chemical properties to ensure that there's no impact on the liner system or mobility of nuclides, but physical properties are important, as you heard in our presentation.

We talked about the waste becomes part of the structural stability of the containment mound, and that's what gives it that resistance to large seismic motions.

MEMBER LACROIX: Okay.

MS. VICKERD: So we -- you know, we're interested in the physical properties of the waste and, for that reason, we've identified it, different types of waste, as far as physical properties. We have Types 1 through 6 and it helps us classify the physical properties and then we can fill the cell according to our waste compaction -- our waste emplacement and compaction plan.

So then regard your question as to, you know, would one cell be dedicated, no, not necessarily.

The sequence of activities of happening on the site needs to be coordinate such that we receive the waste according to the way that we need to place it. For instance, you know, you want some larger packages on the bottom of the cell and then you can fill it in with demolition debris and soils around so that you compact it properly.

So it does matter how we layer the waste and, for that reason, we do have a -- it's part of our design basis and we have a compaction in operations -- compaction emplacement plan to make sure that we follow that design basis.

MEMBER LACROIX: Okay. And what about the possibility of having some waste that needs some packaging? Is this a possibility?

THE PRESIDENT: Ms. Vickerd.

MS. VICKERD: Meggan Vickerd, for the record.

So we do, in our waste acceptance criteria document, identify some streams of waste that may have higher activity, so we have a graded approach or a two-tiered approach for concentrations of waste.

We do identify waste that have a higher level of concentrations that do need to be in leachate controlled packages simply because we want to control it at the source prior to the cover in that cell being placed on top. And then that way we can keep the design basis of the wastewater treatment from being to remove the contaminants and the leachate appropriately.

MEMBER LACROIX: Okay. And one last question, a quick question.

From what I gather, it's essentially the waste is solid. There's no liquid.

MS. VICKERD: Meggan Vickerd, for the record.

Correct, yes.

MEMBER LACROIX: Okay.

MS. VICKERD: It's only solid level waste, no liquid.

MEMBER LACROIX: Okay. Thank you.

THE PRESIDENT: And Ms. Vickerd, on the waste acceptance criteria, and forgive me if it's already in your document, what are the limitations on the percentage of activity from long-lived radionuclides?

Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

So we do have thresholds identified in the waste acceptance criteria that are consistent with CSA standards and IAEA international guidance, so for instance, for alpha, or long-lived alpha, we identify a threshold of 400 Becquerels per gram, and for long-lived beta and gamma, we use 10,000 Becquerels per gram.

So if we were to look at an IAEA document, the GSG-1, which identifies how to characterize waste, those thresholds are consistent with the lower range of what's considered low-level waste.

THE PRESIDENT: And so you know that neat chart that you showed, that shows radiological decay over, you know, the hundreds of years. At the start how much of that activity is from long lived radionuclides? Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

So if you look at that chart, and that

chart is specifically developed to identify how quickly low-level waste can decay, because it's primarily short lived. So only a very small fraction remains, and that is the fraction that is long lived. So if you look at the bottom where it levels out, that is the fraction that is long lived.

THE PRESIDENT: And that would have been the same pretty much, at the beginning?

MS. VICKERD: At the beginning. Correct.

THE PRESIDENT: Okay. Thanks very much.
Ms. Maharaj?

MEMBER MAHARAJ: Thank you, Madam Velshi. I would like to ask a couple of questions, sort of segueing from the rate and duration of decay, to talk a little bit about some of these very long and difficult to really conceive of timeframes.

So you're talking about geomembranes that have a 550 year lifespan. You're talking about institutional control periods of 300 years. Everything -- there are a lot of very, very large timeframes in this particular concept, and I guess I'm wondering where those large 100-year blocks of time originated. How were they derived?

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the

record.

So I'll start off, I think you're trying to, I think, understand the basis for our design life of the engineered cover, as well as the institutional control timeframe; correct?

MEMBER MAHARAJ: Yes.

MS. VICKERD: Okay. So I'll refer you back to that chart, or that graph that was in the CNSC's presentation. I can't remember which page it was on.

MEMBER MAHARAJ: Which slide number?

MS. VICKERD: Slide 23, I think. So I'll start off with -- at a conceptual definition. Low-level waste is waste that is primarily short lived. It does restrict the amount of long lived. And low lived waste requires management and disposal, or management for at least a few hundred years in order to ensure that that short-lived activity decays and what's left is not -- does not pose a consequence to the environment or the public.

So this chart is meant to convey the inventory that we have, and that's the blue line, and the fact that it decays quite rapidly. So our choice of a 550 year design life demonstrates the engineered barriers that we'll have in place are appropriate for the hazardous lifetime of the inventory, which is the most activities in the short lived. And then the institutional control period

is the time period that, you know, CNL and AECL are committed to ensuring control of the site, to ensure that, you know, the public doesn't interact with the facility. So this graph is actually supposed -- meant to show how -- that we selected the institutional control period we selected and the design life we've selected are appropriate for the inventory that we've proposed, and so that's where those timeframes come from.

And the 300-year institutional control timeframe, I'll just note that is consistent with many other complex nuclear sites, as far as institutional control timeframe. It does represent 10 half lives of short-lived radionuclides, meaning short lived radionuclides are usually a half life of 30 years or less. So 300 years means that it has been through 10 half lives and decayed.

MS. MAHARAJ: Okay. If I can then back you up in the timeline a little bit to the Phase 1 and Phase 2 construction and operation period. I'm having some difficulty getting my head wrapped around why the operational period is 50 years long when the construction period of the facility is only three, during which time it will be 60 percent constructed. So can you help me understand what you mean when you talk about operations with respect to a static mound?

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

So the reason that we have such a long operations phase is because NSDF isn't just required for our cleanup mission, which we intend to execute over the next couple decades, but it is intended to be the disposal for even our operating low-level waste. We do intend to operate at a -- Chalk River has an enduring mission. We don't have a plan closure for the Chalk River site, so rather than continue to use storage for our low-level waste, once we generate low-level waste and it meets NSDF's waste acceptance criteria, it would go right into the disposal facility.

So the reason that we have Phase 1 is really to facilitate the cleanup of the Chalk River site over the next couple of decades. And the reason for Phase 2 is really to make sure that we continue to have a full lifecycle approach to managing our low-level waste at Chalk River.

MEMBER MAHARAJ: So if we follow that chain of thought, if 90 percent of the waste that's going to go into this facility is currently located onsite, whether it's standing up in a building that needs to be demolished, or it's already in a storage facility of some

kind, that would only leave you 10 percent of your capacity for the activities you've just described. Is that enough capacity?

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

So I think there's been some confusion. The 90 percent represents wastes that currently exist or will be generated. It's not just waste that's currently in our storage facilities, but will be generated from either the cleanup mission or continued operation of the Chalk River site.

MEMBER MAHARAJ: Ah, yeah, okay. All right, that helps. And then why a 30-year period of time for closure?

THE PRESIDENT: I see a few hands up. So let's go with Mr. McBrearty, and Ms. Murthy, I'll come to you at the end, okay? Mr. McBrearty?

MR. MCBREARTY: All right. Thank you, President Velshi. Mr. McBrearty, for the record.

Just a couple points of clarification, I think maybe it had gotten mixed up a little bit on the question on how long to construct the operations phase, etcetera. It will probably -- it will take us three years to construct the first phase, that's actually digging out,

getting the cells ready. But the actual emplacement of the waste will happen over several decades as we go.

And we -- as Ms. Vickerd pointed out, there's six cells in the first phase, and so as the first cell is filled it will be capped. It will receive a geomembrane cap and then a sacrificial cap, and then we'll continue to move to different cells as we go forward until the entire first phase is actually ready for final closure.

So I think maybe that's a little bit of the confusion on the three years to construct and then the long period of time for operation. Because it will take us just -- it will take us that long as we demolish, and sort, and put waste in. And then you know, if you remember a bit from our 27 January conversation on the future of the site, you know, many of the waste management areas that we are going to be cleaning up, and some of this material will go there, it will require a long period of time to actually execute those, so this site will actually absorb, or it will be the repository for some of those.

I'm going to take a quick stab at the part about decommissioning, but then I'm going to turn it back over to Ms. Vickerd, because I think she can probably give you a better description. The decommissioning will -- you know, once we are done, there's long periods of monitoring that have to be taken into account. We have to be able to

decommission the wastewater treatment plant. We want to make sure that the leachate is done and we don't -- won't have a need for the wastewater treatment plant. And so they will actually have long periods of time of monitoring to ensure that we are ready to make that decision.

But I would, to probably give a far more complete answer, I'd like Ms. Vickerd to just comment on that if she could.

MS. VICKERD: Meggan Vickerd, for the record.

So you know, just quite simply, the 30 years is required because once we install the final cover system, that's the length of time that we recognize the engineered containment mound needs to reach a stabilized period of hydration. Basically, you know, you can have precipitation coming in while it's operating, we put the cover system and then we need it to stabilize and any leachate that might be remaining to come out and be treated.

So it's the time period that we require the leachate to be dropped off, or out of the facility while we have the wastewater plant. But also, for any landfill gasses to stabilize within the facility as well. So it's an appropriate timeframe to allow the facility to stabilize so it can go into a post-closure phase.

THE PRESIDENT: Ms. Murthy?

MS. MURTHY: Kavita Murthy, for the record.

So there are a couple of key concepts that I think would be worth mentioning here. There is going to be decommissioning of certain infrastructures and facilities, but the waste disposal site itself does not get decommissioned, it gets closed. During the institutional control period, which as has been explained, is a period that covers a timeframe that is required assure us that the facility is performing as accepted, there is regulatory control.

So it isn't a period where there is no commission control of the site. So there is a requirement for the licensee to have -- to be maintaining the site. The environmental monitoring program as well continues during the institutional control period. So if the Commission would like to have a little bit more understanding of what the time -- what we would consider and how we would be doing compliance during this period, I can ask Dr. Mathew Herod to speak to that.

THE PRESIDENT: Ms. Murthy, maybe I can just ask some additional questions and Mr. Herod can include those. One is, I just want to make sure I understand the end stage of this facility would be

post-institutional control. So for those 500 years there would be no public access allowed on site, none during institutional control, or is there restricted access during that? And also, like, who looks after the institutional control phase? So maybe if you can address all of those, Mr. Herod.

MS. MURTHY: Kavita Murthy, for the record.

So the 300 year is nominally the institutional control period, and that is in the application that we have accepted. But I'll hand over to Dr. Herod for the remainder of the questions.

DR. HEROD: Dr. Matthew Herod, for the record. I'm a Senior Project Officer in the Canadian Nuclear Labs Regulatory Program Division.

So the institutional control period serves two very important purposes. The first is to control the access to the site, and so during that 300-year period of time CNL would remain the control on -- would have control of the site. And that it would then therefore restrict access and have land use restrictions in place during that time as well.

The second aspect is to also control human intrusion during that period as well, and so to prevent any human intrusion from occurring during that 300 year period

to allow ample time for short lived radionuclides to decay during that time as well. So that's another key aspect of the 300-year institutional control period.

Can you repeat -- I don't want to miss any of your question, could you please repeat?

THE PRESIDENT: No, I think you've answered my question, though you did raise another question. You know the human hazard assessments that we saw, you know, with the different folks using the land in the proximity of the NSDF, this is all post institutional controls, after the 300 years. But has a similar hazard assessment been done that if for whatever reason, what we now call the institutional control phase, there's actually human activity around there, and people living around and living off the land, what the health consequences of that could be?

Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

I think you're asking if we have done a sensitivity analysis. So yes, our normal evolution includes a 300-year institutional control timeframe, during which CNL, as a licensee, is responsible for. and you know the area and the liability is still an asset of the Government of Canada. We have done a sensitivity analysis of what if

institutional control is only 100 years rather than 300? And there is still no consequence to someone who interacts with the land sooner.

THE PRESIDENT: Perfect. Thanks very much. Thank you.

Okay, then back to Dr. Lacroix.

MEMBER LACROIX: What if in a number of years from now or a number of decades from now, all of a sudden, the effluent discharge target limits become exceeded? What action would be taken to correct the problem? Walk me through these steps that you would take in order to mitigate the consequences of the leaks and also to trace back the origin of the leaks.

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

So I'll start and then maybe I'll see if either Mr. Boyle or Mr. Dolinar want to add something from a management system perspective.

So I'll start with the design of the wastewater treatment plant. It is very flexible. It's a modular system. So we get effluent that -- influent that comes into our storage tanks. Before we process it, we sample that to see what the constituents are. So if we have a contaminant or a constituent that we did not expect

we can adjust the chemistry. We can change the IX, the resin in the columns, or we can add new components.

The important thing is that it is collected, and we adjust, the system is adaptive and flexible that we can adjust to treat it prior to discharge to ensure that it still meets the effluent discharge criteria. So I'll see if Mr. Boyle maybe want to add anything from a management system.

THE PRESIDENT: Mr. Boyle?

MR. BOYLE: So thank you. I would point out that the barrier, the lower barrier, has two levels as Ms. Vickerd described in the original presentation, there's a leak detection section. But it is in fact a leak collection section. So if the first level leaks, it doesn't immediately go into the ground, it goes into this second catches area, and because we can see it now we know that some leak is occurring. That depending on the magnitude of the leak would, I think, determine what kind of action would be taken.

So then the next level is what if we didn't notice that and somehow this leak now is getting into the ground? I would say the management system processes that we have to monitor the performance of the site right now, which is periodic ground water monitoring, soil monitoring, river monitoring, monitoring of animals in

the area, would tell us that something was happening. And the modelling indicates that whatever would happen would happen fairly slowly.

That is that if this -- some of these radionuclides got into the ground, they don't move quickly. I think you saw a number like eight to 12 years to get from the mound into the river. So during that time we would then, based again on what we saw, make a determination of how to deal with it. I think it has been pointed out, we have several instances right now where, as a result of storage processes in the past or waste disposal policies in the past, where we have seen such plumes and we have intercepted them with groundwater recirculation systems that do purification, or other techniques in order to stem the movement of that radioactivity, and I think that's the same thing that would happen here.

THE PRESIDENT: Ms. Murthy?

MS. MURTHY: Kavita Murthy, for the record.

I want to speak a little -- I want CNSC staff to speak a little bit about the environmental follow up monitoring program and as has been discussed, the purpose of this monitoring program is also to have a verification on the predictions that have been made under the EA. So for that I will ask Dr. Nana Kwamena to speak,

please.

DR. KWAMENA: Dr. Nana Kwamena, I'm Director of the Environmental Assessment Division, for the record.

So I know this is a specific example about the wastewater treatment plant and effluent discharge, but I think if we step back a little bit this is also a question about what happens if something doesn't go quite as predicted. So there is under the *CEAA 2012*, there is a requirement to have an EA follow up monitoring program, and the purpose of that program is to verify the accuracy of the EA predictions, determine the effectiveness of the mitigation measures, and then where appropriate implement adaptive management measures to address any unanticipated adverse environmental effects. So that sort of speaks to the question that came up.

So I think CNL sort of walked you through some of what they would do, but it is very important as part of the EA follow up program that there is this adaptive management aspect that sort of, speaks to what happens if things don't go quite as predicted in the EA.

That EA follow up monitoring program, there is a draft version that already exists and it has seeking consultation or feedback if you will, from Indigenous Nations and communities, the federal and

provincial review team, as well as CNSC staff. So I think that's just an important element to consider that there is this program that is in place that will look at, you know, monitoring the environment after if the project is accepted, monitoring the environment and making sure that the mitigation measures are working and ensuring that there is action taken if things don't go as predicted.

THE PRESIDENT: Thank you.

MEMBER LACROIX: May I add something? So from what I gathered, it is possible to trace back a leak to a very specific cell. Am I right?

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

Yes, we would be able to tell because the cell -- we are only operating one cell at a time. And the leachate collection system is cell specific.

MEMBER LACROIX: Okay. And furthermore, let me play the devil's advocate here. The fact that the migration of the pollutants is very long, it's a blessing in disguise in a sense that by the time it is detected it may take years, is it possible? And if it takes years to detect, then the problem might be more serious then?

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the

record.

I'm going to ask our Director of Environmental Services, Mr. Dolinar to answer this one.

MEMBER LACROIX: Okay.

MR. DOLINAR: For the record, George Dolinar, Director of Environmental Services for CNL.

Yeah, I like the way you characterize this a blessing, but perhaps there is also a hidden problem there. So as part of the Environmental Assessment follow up monitoring program, we've specified a whole series of groundwater monitoring wells in the very near vicinity of the NSDF mound.

The other point I want to make is there was a timeframe mentioned for a conservative tracer to make its way from groundwater to Perch Lake or Perch Creek of seven years. So that's a conservative tracer, something that does not get retarded or held up by the soils. Most contaminants will have appreciable holdup times or what we call retardation in their movement.

So this is why we position the groundwater monitoring wells as part of the Environmental Assessment follow up monitoring program very near the, sort of the toe ends of the NSDF facilities. So that, you know, addresses our ability to, in a fairly short timeframe, be able to detect any contamination that's leaving the mound long

before it makes its way to the receiving environment, and certainly something like Perch Creek or Perch Lake.

MEMBER LACROIX: Okay.

MR. DOLINAR: I don't know if you have further questions, but I'll leave it there for now.

MEMBER LACROIX: Yeah. Well, yes, I do have another question. Once you have a defective cell, if you do have a defective cell, would it be possible to fix it? To fix a barrier?

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

I think where I want to start off is pointing out that there is layers of defence here, and that we have two liner systems. We have a primary liner system that is the primary leachate collection system, then we have a leak detection system that then collects anything that might leak past, then we do also have a clay liner -- compact clay layer system that is a very good hydraulic barrier. So it is extremely unlikely that a leak would get past out of the facility.

But to answer your question, yes, we would be able to, you know, if needed, we would correct or resolve the problem.

MEMBER LACROIX: Okay.

MS. VICKERD: Whether it's correcting the baseliner system or adding another layer or isolating that cell with placing a cover system on earlier than needed.

MEMBER LACROIX: Okay, thank you.

THE PRESIDENT: I have a very quick question. Where is the groundwater table compared to the planned/proposed NSDF? Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record. So the average groundwater table is about 4.5 metres below the surface.

THE PRESIDENT: Okay.

MS. VICKERD: If you need more detail, I can certainly have Mr. Dolinar --

THE PRESIDENT: No. No, that's good.

And I'll take this opportunity to turn to our federal and our provincial environment Ministry staff and get their perspectives on the discussion so far, their comments on the EIS and how well those have been dispositioned on the follow-up monitoring program or any other thoughts or perspectives they want to share with the Commission.

So maybe I'll start with Environment and Climate Change Canada first. Ms. Ali, if you're here, I'll ask you to share your thoughts with us first.

MS. ALI: Nardia Ali, Environment and

Climate Change Canada, for the record.

So I should say ECCC because it's a big mouthful to say Environment and Climate Change Canada. But Environment and Climate Change Canada has been involved in the review of the EIS in areas under our mandate, which include, you know, air quality and/or GHG emissions, effluent discharge targets.

We support the conclusions presented by the CNSC and CNL regarding low risk to the environment, receiving environment, from the wastewater treatment plant effluent discharge.

We've also reviewed the draft or the preliminary follow-up monitoring program and provided expert advice regarding the monitoring to be conducted at different phases of the project. This follow-up monitoring program is still being refined. You know, we understand it will be further refined, further detailed, during the licensing process.

So our review focuses on this program being robust and capturing all the possible areas of risk and the ones in our mandate.

I also wanted to comment a little bit on sort of the wildlife aspect. So just bear with me here. We did consult with the Canadian Wildlife Service about, you know, the species at risk that are on the site.

So ECCC administers and enforces the *Federal Species at Risk Act* in partnership with Fisheries and Oceans Canada and Parks Canada. And we also have a special internal procedure under an MoU with the CNSC to ensure efficient coordination of reviews and advice that, you know, deal with the *Species at Risk Act*, *CEA* requirements, and the *Nuclear Safety Control Act* requirements.

So the purpose of the *Species at Risk Act* is to prevent wildlife species from becoming extirpated or extinct as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened.

So there are species at risk at the site, so there are permits that are being processed. So I just wanted to comment on the status of one of the species at risk permits associated with the proposed construction of the NSDF project.

So Environment and Climate Change Canada's Wildlife Service has completed a draft scientific review of the SARA permit application submitted by CNL. It's currently undergoing final review and approval. The permit application was submitted since March 31st, 2017 and is undergoing many updates and changes by CNL as the NSDF EA process has evolved.

So each ECCC will endeavour to analyze the situation and, if appropriate, have the completed SARA permit for construction of the NSDF project ready shortly after the environmental assessment decision and licensing hearings are complete.

ECCC cannot issue the SARA permit until the EA decision has been taken. So this permit will be for construction of the NSDF project and is expected to address risks to Blanding's Turtle, individuals, and certain bats -- Little Brown Myotis, Northern Myotis, and Tri-colored bat -- individuals and their residences.

So that's what I wanted to share I think today. Thank you.

THE PRESIDENT: Well, thank you, Ms. Ali. But let me just confirm. From ECCC's perspective things are moving along fine. You've got no major issues. Whatever has been identified is making its way through the process. Is that a correct summary of what we've heard from you?

MS. ALI: Yes. I guess I was a bit long-winded, but essentially yes. Like, ECCC is satisfied with the way the process is proceeding.

THE PRESIDENT: Okay.

MS. ALI: We agree with the conclusions stated so far.

THE PRESIDENT: Okay, thank you very much. Maybe I'll turn to the Ontario Ministry of Environment and Conservation Protection. Mr. Castro?

MR. CASTRO: Thank you. For the record, my name is Victor Castro, I'm the Water Resources Supervisor for Eastern Region.

With me today I have Mr. Shawn Trimper who's a Hydrogeologist in Eastern Region. I have Ms. Lauren Forrester who is a Surface Water Specialist. And I have Ms. Thandeka Ponalolo who is an Environmental Compliance Office out of the Ottawa District Office.

As you've heard earlier today, the *Ontario Provincial Environmental Assessment Act* was not applicable for this undertaking. Notwithstanding that, we did participate on the federal/provincial review team. We did undertake a review of the environmental impact statement as well as the environmental monitoring report.

The focus of our review was on the hydrogeological aspects as well as the receiving stream and the surface water -- protection of the surface water and reviewing the effluent criteria from the treatment system.

Overall, I think that we've provided comments on several iterations of the EIS. We are satisfied at this point in time with the predicted impacts, the effluent design criteria that have been proposed. We

are satisfied with the environmental monitoring program. We think it is sufficient at this point in time to capture -- early on in the process, capture any types of process upsets, leaks or spills that may occur from this undertaking.

So kind of overall, I think we are satisfied at this point in time as well.

Thank you.

THE PRESIDENT: Thank you very much, Mr. Castro. That's very reassuring.

And I'll move to the Province of Québec, Ministère de l'Environnement et de la Lutte contre les changements climatiques, if you can share with us any concerns or issues that you may have.

M. GÉLINAS : Merci, Madame la Présidente.

Donc, Michel Gélinas du ministère de l'Environnement et de la lutte contre les changements climatiques du Gouvernement du Québec, pour les besoins de la transcription.

Du côté du Gouvernement du Québec, donc, tout au long du processus, l'équipe d'analyse a émis plusieurs commentaires et questions sur les différentes itérations de l'étude d'impact environnemental. Cependant, ce que je peux dire c'est qu'à la fin, nous, notre analyse finale concerne uniquement des enjeux qui sont spécifiques

à la Province de Québec, soit la qualité des eaux de surface et les impacts sur le biote aquatique de la Rivière des Outaouais, ainsi que la santé humaine et les impacts socioéconomiques du projet sur le territoire québécois.

Concernant la qualité des eaux de surface et les impacts sur le biote aquatique, on note aucune augmentation notable des contaminants potentiellement préoccupants dans la Rivière des Outaouais. Donc, nous avons conclu qu'en territoire québécois, le projet aura un impact négligeable sur ces deux composantes, et nous sommes aussi satisfaits des mesures prises par les LNC afin de s'assurer de préserver la qualité des eaux de surface.

Concernant l'enjeu de la santé humaine, nous sommes aussi d'accord avec les conclusions de l'étude d'impact et de la CCSN à ce sujet, encore une fois, spécifiquement pour le territoire québécois. C'est-à-dire que le projet ne devrait pas avoir d'effet néfaste non plus significatif sur la santé humaine et, en effet, selon les informations présentées, donc, on n'attendra pas aucun impact en territoire québécois.

L'équipe d'analyse juge que les impacts socioéconomiques du projet ont été abordés de manière satisfaisante par les Laboratoires nucléaires canadiens. Les éclaircissements qui ont été apportés par l'initiateur au cours du processus d'évaluation environnementale du

projet ont bien répondu à nos questions, aux questions qui étaient soulevées par l'équipe d'analyse, et les impacts socioéconomiques sont de faible ampleur et ont des conséquences négligeables en territoire québécois.

Donc, rapidement une conclusion. L'équipe d'analyse du Gouvernement du Québec ne peut pas se prononcer sur l'acceptabilité environnementale du projet dans son entièreté, le projet étant situé en territoire ontarien. Comme je l'ai mentionné au début, l'analyse réalisée par l'équipe d'experts a ciblé les enjeux pouvant avoir un impact sur le territoire québécois et plus particulièrement sur la Rivière des Outaouais. En considérant la portée de notre analyse, l'équipe d'analyse est satisfaite des réponses reçues de la part des LNC, des révisions apportées à l'étude d'impact, et, conséquemment, nous sommes aussi satisfaits de la manière dont les enjeux pouvant affecter le territoire québécois ont été traités dans l'étude d'impact et concluons que les mesures prises par l'initiateur assureront la protection des composantes valorisées situées dans la Province du Québec.

LA PRÉSIDENTE : Merci beaucoup.

Again, very, very helpful. Thank you.

Okay, back to you, Ms. Maharaj.

MEMBER MAHARAJ: Thank you, Madam Velshi.

I have a couple of questions around the

barrier design. If I could just focus on that for a quick moment. I wanted to understand how the seismic events are accounted for this this multi-layer bottom liner concept and why geomembranes were chose rather than concrete or something more -- intuitively not permeable.

Can I understand that a little better please?

THE PRESIDENT: Hands up, who wants to have a go at responding to this?

Mr. McBrearty. Sorry, I don't know if you have your hand up. Because we have a slide, I can't see whose got their hands up.

MR. MCBREARTY: Okay. President Velshi, thank you very much.

Ms. Vickerd does have her hand up, and she is the expert for us on the bottom and top liner systems. And I'll turn that question over to Ms. Vickerd.

THE PRESIDENT: Over to you, Ms. Vickerd. Sorry about that.

MS. VICKERD: No problem. Meggan Vickerd, for the record.

So for an engineered disposal system the selection of a liner system is most appropriate. Concrete is not as flexible. Geomembranes are actually -- can take more strain and they have more flexibility for withstanding

or being more resistant to seismic events.

We have designed the ECM for a 1/10,000-year seismic event and we've selected candidate geomembranes and tested those candidate geomembranes to the design life according to ASTM standards that are available in the landfill engineering discipline.

You know, a seismic event would create, you know, different mechanisms like shear displacements and such that geomembranes just perform much -- or they're a much better technology than using a concrete barrier system.

If you want a more detailed response, I can certainly hand it over to AECOM who is on the line as well.

MEMBER MAHARAJ: Maybe I can ask a couple more clarifying questions for myself and --

MS. VICKERD: Sure.

MEMBER MAHARAJ: -- you know, feel free for AECOM to jump in.

So are seismic events a significant concern? We've talked about them as though they are, but are they a significant concern in this area?

THE PRESIDENT: Ms. Vickerd, and then we'll turn to our NRCan specialist, Dr. Adams, as well after. But, Ms. Vickerd, you go first.

MS. VICKERD: Sure. And certainly I think Dr. Adams can probably do more justice. But this area is in a low to moderate seismic risk area and the facility has been designed in accordance to not only national building codes, but we've applied a CSA standard that's actually relevant to nuclear power plants. So we've taken a higher risk graded approach.

But perhaps NRCan has a more detailed response for you.

THE PRESIDENT: Dr. Adams?

DR. ADAMS: Dr. John Adams, Natural Resources Canada, for the record.

Yes, there's certainly been earthquakes there. It's a moderate to high-moderate seismic zone along the Ottawa River. Earthquakes are felt every year or so, and we've had earthquakes as large as magnitude 6, Timiskaming.

The way of designing the facility is basically to do a probabilistic seismic hazard assessment. That says, in a statistical sense, how strong the shaking is likely to be during the life of the facility.

NRCan reviewed three iterations of CNL's probabilistic seismic hazard assessments done by consultants. NRCan considered the May 2018 assessment to be thorough. And based on its 1/2,500-year hazard levels

being higher than the national building code 2015, to be acceptable for NSDF design considering that in fact the design is to a much lower 1/10,000-year hazard.

Subsequently, this is an update. NRCan has updated its seismic hazard model for the 2020 National Building Code of Canada. The values in Eastern Canada are generally higher than were issued in 2015. NRCan's 2020 values are now very similar to CNL's 2018 values. Similar in this case is about 10 per cent, which is quite good for seismic hazard.

Therefore, NRCan still considers the seismic design assessment acceptable.

MEMBER MAHARAJ: Thank you, that's really helpful. May I ask a follow-up question?

When we are considering geomembranes versus say a more rigid material for liner, I understand for seismic purposes it may be better to use the geomembrane because they're more flexible.

But is the seismic risk the greatest design risk for this kind of facility or are there other design risks that perhaps would mitigate against that line of design thought, which is geomembranes because of flexibility for seismic events, to a different kind of construction?

I'm trying to understand what's the

biggest risk that was considered in the design process. And if it's seismic, that's an answer, and if it's something else that might be a different answer.

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record. I'm going to have our designer, AECOM, Mr. Mark Lockett, step in here.

But before I do, I just wanted to flag that the design basis using liners in a clay layer is consistent with provincial regulations for designs, prescribed design requirements for landfill disposal.

So, Mr. Lockett, are you able to jump in here and maybe speak to a bounding hazard analysis for the design?

MR. LUCKETT: Yes, thank you, Ms. Vickerd. For the record, Mr. Lockett, AECOM's Senior Project Manager at NSDF.

So, yes, when we look at the longevity and the 550-year design life of the engineered containment mound, geomembranes are an applicable technology. They have been demonstrated as best available technology. We have in fact used them on many near surface disposal facilities in the US.

And as far as the benefits of concrete, concrete does have a design lifetime. It will leak, it is

susceptible to cracking even when buried.

So geomembranes are a more superior material in this case for that. They allow us to follow the contours of the bedrock, they allow us to easily create the ridge and valley system we need on the base of the ECM, which again are critical to the long-term design life for the engineered containment mound.

So perhaps I'll stop there and see if there are any follow-up questions.

MEMBER MAHARAJ: Were those the only two options, geomembranes versus concrete, or were there any other options like, I don't know, plastic, silicones, those kind of things? I have in my mind a bathtub.

MR. LUCKETT: For the record, Mr. Lockett. Again, they are the most suitable. To think of a bathtub or some other -- you think of steel as being a very strong and robust material, but it wouldn't last in that environment and it doesn't have flexibility that we need to create the various layers of the ECM.

Perhaps I'll leave it there and pass it to Ms. Vickerd.

MS. VICKERD: Meggan Vickerd, for the record. I think what I'd like to add, there's multiple layers here, not just a synthetic geomembrane. But we also have the natural clay liner system, and clay is a very good

hydraulic barrier and, in fact, there's lots of evidence from a natural analogue perspective.

THE PRESIDENT: Okay. Ms. Murthy?

MS. MURTHY: Kavita Murthy, for the record. So the question, Ms. Maharaj, was is seismic the greatest risk for the long-term safety of this NSDF.

So in order to give you an answer for that I would like to ask Dr. Shizhong Lei to step up, because he was part of the team that looked at the external hazards for -- external events that could cause damage to the NSDF.

So, Dr. Lei, please go ahead.

MR. LEI: For the record, my name is Shizhong Lei, I'm a Geoscience Technical Specialist.

Internationally it's recognized that the biggest hazard to a near surface facility is actually erosion, and that's long-term erosion.

CNL has conducted a very comprehensive hazard analysis and take into consideration, for example, climate change in the long-term and the erosion. In their safety case they have a severe erosion scenario analyzed.

So for all those safety analyses the dose calculated in the calculated dose is always below the regulatory criteria.

If you need more details, I can provide more information.

MEMBER MAHARAJ: I just have one follow-up question, Dr. Lei. Would the erosion affect the top liner or the bottom liner more or less, or can you give some insight there?

MR. LEI: In CNL's assessment the erosion, in their safety case, they assume that the waste is actually exposed to the surface because of erosion, and they calculate the dose as a result.

MEMBER MAHARAJ: So it would be the top liner that would be the greatest protection from that erosion? That's where we would want to look to ensure that erosion would not be a big concern?

MR. LEI: The first defence would be the cover, right? That has to be eroded to get the waste exposed.

MEMBER MAHARAJ: Okay.

MR. LEI: And in fact that's an extreme scenario. Because based on the long-term climate change modelling, you would have erosion and the deposition. So overall actually it might be evened out. So that's scenario is an extreme case just to demonstrate the safety.

MEMBER MAHARAJ: Okay, thank you.

MS. MURTHY: So, Ms. Maharaj, if I may? The question on earthquake and the seismic events that you asked, I'd like to ask Dr. Joey Wang to speak to that

please.

MR. WANG: Hi, my name is Joey Wang from the Engineering Design Assessment Division, for the record.

So in CNL's design the level of earthquake they consider for the structures and system would depend on the dose analysis. So their dose analysis originally indicated that a 2,500-year earthquake would be sufficient.

However, CNL considered the seismic hazard very seriously. Instead, they used a 10,000-year earthquake in their design.

The reason that they used the membrane is, as explained before, is the flexibility. And there are research available regarding how the membrane will perform under seismic loading and also the base compacting. So they can use the research result and also use the stronger earthquake in demonstrating that the structural aspect of the NSDF will survive a stronger earthquake, 10,000-year earthquake.

They also consider other performance levels at NBCC, the *National Building Code*, level earthquake to assess the deformation, the strains that will result from different levels of earthquake.

This type of membrane, the constitutive model, which represents the strain under certain level of loading, could be traced back to the references. So with

that constitutive model from the experiment available, so the prediction of those seismic performance will be quite convincing to us.

So that's the seismic consideration in NSDF's design by the CNL. Thank you.

MEMBER MAHARAJ: Thank you.

THE PRESIDENT: Ms. Vickerd, you've got your hand up.

MS. VICKERD: Thank you.

Meggan Vickerd, for the record.

I think this is a really good discussion. What I want to highlight here is that the NSDF design is very robust and has been designed to be resistant to an extreme number of events, from erosion to seismic events, but particularly for the design life.

The design life is 550 years because it's established to ensure that that's sufficient to protect -- to contain and isolate the waste until it's decayed to levels that are of no consequence to the public or the environment. So given that's only low-level waste, it will decay in a few hundred years, so the facility's designed to be resistant to any events that that can happen.

We do have data that demonstrates that we expect that its service life will extend beyond the design life, but we've been very conservative and cautious in our

safety assessments to assume that the barriers will degrade. And you know, what is the consequence if the public or environment is exposed if any one of these events happen.

And when I speak to -- you know, we heard about erosion. We look at a number of different types of rain events, not just one type of rain event. There's an approach where you determine your probable maximum precipitation. And we've ensured that the facility is resistant to a very wide array of natural events that can happen for its design life.

MEMBER MAHARAJ: Okay, thank you.

THE PRESIDENT: Okay, maybe I'll turn to our colleagues from Health Canada and see if they have anything they'd like to add around from their perspective on health impact assessments or their comments on the EIS and the disposition of their feedback.

So Mr. Lee, over to you.

MR. LEE: Thank you for the question, Madam Velshi.

My name is Dae Young Lee, for the record. I am an environmental assessment specialist with Health Canada.

Health Canada has been participating in the review of the near surface disposal facility project

since 2016, as requested by the Canadian Nuclear Safety Commission.

Health Canada's review has been limited to potential noise impacts on human health. With respect to human health, Health Canada has provided technical comments related to noise in the following areas: blasting noise, receptor selection, a noise complaints resolution process, the noise impact study, and pre-construction traffic calm study.

Health Canada supports Canadian Nuclear Safety Commission's environmental assessment report conclusion with respect to noise impacts on human health.

Health Canada also reviewed the Canadian Nuclear Laboratories' final environmental impact statement and supporting documents and noted that most of its previous comments had been addressed adequately in the final environmental impact statement.

However, receptors in close proximity to the transportation route, for example, Highway 17 and Plant Road, could be impacted from noise from increased traffic during construction. So Health Canada recommended the proponent verify noise impact predictions by completing a pre-construction traffic calm study.

The pre-construction traffic calm study has not yet been completed, and Health Canada remains

available to review the baseline traffic calmed model verification upon request from the responsible authority.

Yeah, that's the comments I can provide. Thank you.

THE PRESIDENT: Okay, thank you. Thanks very much for that.

And maybe I'll turn to NRCan again, because I understand some of you may have to leave shortly, and give you an opportunity to share any other perspectives you may want to share with the Commission, particularly folks who are involved with the modernization of the waste policy and of the integrated waste management strategy and the likely or potential implications for the NSDF project.

So over to NRCan. Mr. Smith?

MR. SMITH: Good afternoon, Madam President Velshi and Members of the Commission. For the record, my name's Walker Smith. I'm an environmental assessment officer within NRCan's Impact Assessment Division, and an EA lead for the NSDF project.

So NRCan generally participates in EAs based on the department's expertise and technical knowledge related to the department's research programs.

As Dr. Adams already outlined in the previous questioning regarding seismic risk, NRCan is in possession of expertise related to seismicity and the

potential for seismic events to impact the project. I don't suspect we need any more detail on that, but if the Commission does require it, I'm sure Dr. Adams can provide additional detail.

And we also have on the line representatives from the Uranium and Radioactive Waste Division that can provide additional detail regarding the upcoming waste policy. So I'll pass it over to those folks to give a bit more detail about that. Thank you.

MS. YUEN: Thank you, Walker Smith.

Good afternoon. For the record, my name is Pui Wai Yuen, and I'm a senior technical advisor at Natural Resources Canada's Uranium and Radioactive Waste Division. I would like to recognize that I'm joining you today from home in Ottawa, which is in the traditional unceded territory of the Algonquin Anishinaabe Nation.

As you're aware, in the November 2020, NRCan launched an inclusive engagement process to develop a modernized policy for radioactive waste management and decommissioning. This commitment addresses international recommendation, national concerns, and expectations from interested Canadians. NRCan is leading the review and modernization of Canada's radioactive waste policy with the support of other federal departments and agencies with responsibilities for radioactive waste.

So from a policy perspective, NRCan is satisfied with this process, since under the current policy framework for radioactive waste, it is the responsibility of radioactive waste owners to fund and implement long-term waste management solutions to protect public health and safety and the environment.

The review of the radioactive waste policy is part of government's commitment to continuous improvement. So while NRCan is modernizing our policy, existing radioactive waste projects will continue to advance. This approach aligns with the principles developed and used during the government's review of Canada's environmental processes. These principles include that decisions will be based on science, evidence, and Indigenous knowledge; the views of the public will be sought and considered; and that the government will undertake meaningful consultation with potentially affected Indigenous peoples.

We know that project proposals such as the NSDF are subject to a fair regulatory review process, including any effects on the environment based on science, evidence, and Indigenous knowledge. During the review process, there will be opportunities for public input at key stages of the environmental assessment, and we encourage all interested Canadians to participate in this

process.

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

Maybe I'll ask one last question, then we'll shift gears.

How is the NSDF different from the Port Granby facility? This one it is said is first of a kind, and yet there are so many similarities between the two. Highlight some of the key differences for me, CNL, please. Mr. McBrearty?

MR. McBREARTY: Thank you, President Velshi, for that question.

Mr. McBrearty, for the record.

So there is a few key differences between the NSDF and the Port Granby and Port Hope mounds.

First off, the classification of the NSDF is as a Class IB nuclear facility, and the Port Hope and Port Granby facilities are not.

The types of waste that are going into the NSDF are different. Most of the waste going into Port Granby and Port Hope are mostly soils, long-term soils from long-term contamination from operations at the Eldorado plant and its impacts in that region.

There are some differences in the liner construction between the NSDF and the Port Granby project

and some differences in the waste water treatment plant.

I'd like to turn it over to Ms. Vickerd for a bit more detailed approach on or discussion on each of those projects.

So, Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

So as Mr. McBrearty alluded to, there are some differences, but there are some similarities.

They have the same design principle, to contain and isolate waste for a long time period.

They both have low-level waste, but the low-level waste that CNL has at Chalk River is -- has a different fingerprint than Port Hope and Port Granby. And for that reason, the waste water treatment plant has different treatment systems. The waste water treatment plant is design-specific for the types of constituents we'll be expecting to see in the leachate here at Chalk River.

And the liner system, though the principles of design basis are similar and actually align to provincial guidance of developing landfill designs, they can be quite different, depending on your environmental conditions. So Chalk River's a little bit more north than Port Hope and Port Granby, so the liner systems that we

have here are going to be specific for environmental conditions from temperature to rainwater here.

But we have used the lessons and the experience that we've gathered from operating -- from constructing, operating, and closing Port Granby and also continue to learn from Port Hope. We've seen, you know, learned some key lessons around water management, and we've made sure that we applied those in our design basis for NSDF.

THE PRESIDENT: Thanks very much.

Dr. Lacroix, I turn it over to you, and maybe we can move to Indigenous engagement and consultation questions.

MEMBER LACROIX: Well, I still have a question concerning --

THE PRESIDENT: Oh, you still have -- oh, go ahead, go ahead.

MEMBER LACROIX: Yeah, with regards to the cover, I would be surprised to see the erosion of 2.5-metre cover. I mean, from what I understand, the NSDF will be continuously monitored. So if there is an erosion problem, it could be corrected before the top of the radioactive material becomes exposed. But I understand that following a catastrophic weather event such as a flood, a major flood or a landslide, then the top cover could be lost. But

erosion itself, it is a problem that can be corrected, as, from what I understand again, the NSDF is monitored. So that was an observation.

My question is concerning the liners. I've seen in the CNL submission you talk about sacrificial liners used as the base liner. And I was wondering, why a sacrificial liner?

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

Very good point. First, in the institutional control -- our worst-case events, we assume they're after the institutional control period. Because absolutely, during institutional control, the 300 years, or during operation, we have the people, the processes, the management systems here to take action if there's an extreme event. So most of the events that we've analyzed in the post-closure assume no human intervention after institutional control to demonstrate that it's still safe, because the system is passively safe and inventory has decayed sufficiently.

MEMBER LACROIX: Okay.

MS. VICKERD: So back to your question about the sacrificial liner. So the reason for the sacrificial liners are twofold. A, keep in isolation

from -- so it's -- they're usually used to isolate rainwater from -- well, depends which use it's -- so let me step back.

Sacrificial liner during, you know, we clear phase one and phase two. We're going to apply a sacrificial liner to phase two because we're not using it yet. So we're trying to make sure that that water is collected and it goes through our surface water management system. So it's our way of collecting the precipitation in an unused surface of the facility.

Now, we also use sacrificial liners when we're operating the cell as a measure to reduce leachate generation if we're not operating a particular cell for a time period or to mitigate any dust dispersion during operating of a cell.

So the idea is that we're using it for -- to collect and divert non-contact water into our surface water management system so it gets conveyed back into the watershed or to limit the contact precipitation with the waste when we'll filling a cell.

MEMBER LACROIX: I see. Okay, okay.

Thank you, thank you very much.

THE PRESIDENT: Okay.

Ms. Maharaj?

MEMBER MAHARAJ: I expect we could

probably stay in the design phase here for quite a while, but I did have one question about human intrusion, if I could ask that one before we move forward.

CNL's spoken about human intrusion and trying to create a safety model that avoids human intrusion. And where I was starting to be confused is with respect to whether or not there actually is, first of all, a system in place today and anticipated to be in place during the pre-closure period to prevent people from accessing the site at all.

And then my second part of that question is if they do, given the depth of that cover liner, I'm confused about how human intrusion could occur without heavy equipment, which would be noticed.

THE PRESIDENT: Okay. Who -- Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

So I'll have Mr. Boyle speak to our security processes.

You know, CRL site is a restricted site. We have security measures in place. But the inventory that's within NSDF is low-level. It's not a significant security concern, so our main purpose is to restrict access.

For any of those human intrusion events,

we like to say that our waste is our first line of defence in that it's only low-level waste. So sometime far in the future where we no longer have the security measures in place and which -- you know, we've looked at it conservatively, because we absolutely intend to have security measures in place for as long as we need to or as long our current Regulations require us to.

But because it's only low-level waste, it is of -- you know, once it's decayed and been through a couple hundred years of decay, it no longer is a risk to human health, even if in a worst-case scenario some heavy equipment came in and had mass excavation -- which is one of those human intrusion scenarios we look at, actually, where we've bounded a number of our events with some what-ifs as to what if someone does want to come in with heavy equipment and do some mass excavation?

So the consequence to the members -- the future members of the public is quite low because it is only low-level waste and it's decayed at that point.

So maybe over to Mr. Boyle to speak to our security features or, sorry, measures that we have on site.

MR. BOYLE: So Phil Boyle, for the record.

I would just identify that during the period of institutional control, the security at the site certainly would prevent access to this location, let alone

someone getting access and then trying to dig into the waste. So I think that that's pretty well covered.

Additionally, as you may have noticed, the upper layer includes an intrusion barrier. So there's material there that's intended to prevent animals, for example, from being able to dig into the site or even the roots of trees that, absent attention from the site owner, you know, might grow into the area. And the barrier prevents that.

THE PRESIDENT: Mr. McBrearty?

MR. McBREARTY: Thank you, President Velshi.

Mr. McBrearty, for the record.

And Commissioner Maharaj's comment, I think we -- while the site will be safe and we do not need security necessarily for the low-level waste, I'd like to remind the Commission and everyone that this is a secure site. We have a very robust nuclear response force and nuclear security system at our site. It's continually inspected by the CNSC. And we, you know, meet all, you know, federal and provincial requirements to provide security to our sites at all times. So I just wanted to make sure we've got that on the record as well.

And Ms. Vickerd, do you have a comment?

MS. VICKERD: Meggan Vickerd, for the

record.

I think this is a good example of defence in depth that, you know, we have a physical barrier that restricts intrusion. The waste is low level, so that's a good defence in depth to protect some member of the public. And then we also have physical barriers like fences and administrative barriers like restriction of the access to the site. So it's a good example of defence in depth that the system has.

MEMBER MAHARAJ: And does that defence-in-depth system apply to the pre-closure period? So I understand in the institutional control period there's a concept of passive security and all that, but that's a hundred years from now. Right in the next hundred years, which is still a very long period of time, you know, this landfill is in development. And I would think that the risks of human intrusion, should there wish to be that kind of intrusion, would be greatest during the early stages while you may have sacrificial liners and partially open cells and easier ingress to the contents for either mischief or -- I don't know if there's a proliferation risk, but let's go with mischief for the moment.

Can you speak to that?

THE PRESIDENT: Mr. Boyle?

MR. BOYLE: Yes. Thank you, Commissioner.

I think during the period in which the NSDF is actually in operation is probably one of the most secure periods in the sense that the nuclear response force that exists here at the site as a result of this being a high-security site provides quite a bit more security than you would specify for this low-level waste, should it have been somewhere else.

So with the controls we have onto the site in general, the controls that would exist at the NSDF site itself, and then the response capability that the CNL has as a result of being a high-security site I think would convince someone looking at the details that we're well protected against intrusion by individuals or a group of individuals.

MEMBER MAHARAJ: So thank you. That's helpful.

My final question around the whole concept of security is with respect to cyber security. Are any of the operational elements such as, you know, the leachate detection or analysis, any of those kind of aspects, would they be protected from a cyber security approach or attack?

THE PRESIDENT: Mr. Boyle?

MR. BOYLE: So the short answer to that is yes. As a consequence of the entire site's concern for cyber security and a management system that is constantly

attempting to monitor the risks that exist -- I shouldn't say "attempting to monitor" -- monitoring the risks that exist and designing our systems to protect the site against cyber security, it is clearly a topic that's in the forefront of all of our work right now.

And the NSDF is no different. I think it's one of the important parts of this discussion is that here at Chalk River there is a tremendous infrastructure that provides safety in the handling of nuclear materials, from radiological protection to occupational safety control to fire protection to emergency protection to security, cyber and physical, and all of those management systems and capabilities are applicable to the NSDF, and the NSDF benefits by being here at Chalk River, having all those systems in place.

MEMBER MAHARAJ: Thank you.

I think that's an important point to note because I suspect that the public is not overly reassured by a concept of "it's just low-level waste". We heard in a variety of different contexts that any kind of radioactive waste is of concern to the public, so I'm glad to hear that there are sufficient belts and suspenders around the facility to have comfort.

THE PRESIDENT: Ms. Murthy and then Mr. McBrearty.

MS. MURTHY: Thank you.

Kavita Murthy, for the record.

Commissioner Maharaj, your question about cyber security, of course as part of the regulatory framework on security, cyber security is being looked at very seriously by the CNSC.

I would like to invite Justin Sigetich to speak to the cyber security requirements that will be in place for the NSDF.

Justin, please go ahead.

MR. SIGETICH: Justin Sigetich, for the record. I am the Director of the Systems Engineering Division at the CNSC.

CNL is required to follow the CNSC's cyber security requirements that are defined in the CSA Standard N290.7. This cyber security standard requires CNL to protect its important computer-based systems and components. And really, what we call the cyber essential assets, those are the computer-based systems and components that perform safety, security, emergency preparedness and safeguards functions.

This cyber security standard defines requirements for the entire lifecycle of those components and computer-based systems and also for all different phases of a facility. So that includes the design,

construction, operation, maintenance, modification and decommissioning phases.

So as part of the NSDF, the Safety Analysis Report that CNL had submitted, they confirmed that they will be performing a cyber security risk assessment in accordance with their cyber security program. This risk assessment is expected to identify any cyber essential assets and any potential risks that there could be in accordance with their process.

Thank you.

THE PRESIDENT: Okay, Mr. McBrearty.

MR. McBREARTY: Thank you, President Velshi.

Mr. McBrearty, for the record.

I would just like to emphasize some of the things that Mr. Boyle touched on.

We have continual internal and external audits that look very closely at our Cyber Security Program and we've done that ever since the inception of the GoCo contract. And we have a very robust internal and external assessment and audit function looking particularly at cyber security.

Thank you.

THE PRESIDENT: Thank you.

Okay, so let me move on to something else.

As we talk about concerns and issues that members of the public and Indigenous Nations and communities have identified, both CNSC and CNL have identified one of the issue areas being inconsistency with international standards in the plans for the NSDF, and certainly for Part 2, I know I would find it very helpful if both CNL and CNSC were to maybe put some kind of a table to say, "Here are the kinds of concerns that have been raised and some seem to be international standards don't allow any long-lived activity", or whatever it is. It could be any perception that may exist: what is international standard, what is the delta. Because I think it's extremely important that we understand what the nature of those concerns are and are those well-placed or not.

So maybe we can have a quick round today, but certainly I know we will be spending more time during Part 2. So let me start with CNSC first and then we will move to CNL.

Ms. Murthy.

MS. MURTHY: Kavita Murthy, for the record.

So just for starters, Ms. Velshi, CNSC staff's CMD in Appendix E.2 in the technical basis sets out every clause that is there in Safety Series SSR-5 and traces how CNSC staff's assessment has looked at that

aspect of it. So step by step, we have charted where those requirements are internationally and how CNL's application has demonstrated it. For further clarity, we can explicitly bring that out.

All of CNSC's waste regulatory document framework aligns closely with the IAEA requirements on waste. In reviewing this project, CNSC staff looked at SSR-5, which is a document that the IAEA has for waste disposal facilities; SSG, which is a guidance document which outlines good practices and best practices; and also, SSG-23, which looks at safety case. So these are three important documents amongst others which we have required CNL to fulfill all of the requirements that are in it.

In addition to the waste regulatory documents that CNSC has which align with the IAEA, all of our assessment has aligned with the requirements that are set out in the IAEA documents.

Thank you.

THE PRESIDENT: So, Ms. Murthy, I would ask you to then take the next step, which is certainly when we get the interventions that are due mid-April, if any identify that what has been proposed is not consistent with international standards, it would be helpful if CNSC were to map the concern with exactly what the requirement is and, as I said, whether that concern is well-placed or not.

It's fine to say, yeah, of course we're in compliance with everything, look at how we've identified all the requirements, that's not the question. The question is there are many, and you yourself have said you've heard that in your public sessions, that there is concern around known alignment with international standards. So I would like that gap analysis done, please.

MS. MURTHY: Okay, noted. Thank you. We will do that.

THE PRESIDENT: Thank you.

And maybe I can ask CNL on the same front. Ms. Vickerd.

MS. VICKERD: Meggan Vickerd, for the record.

So we have a similar concordance table in our safety case document. The safety case, although not part of the CMD, is available on our website in both official languages in an appendix. We do the same as what the CNSC staff have done, provide a concordance table to key IAEA requirement documents.

What I would like to say in addition is we take the public concerns and interest quite seriously and oftentimes we've had webinars that have focused on that topic, how NSDF is compliant to international standards. Those webinars are archived on our YouTube and actually

available on our webpage as well. So we've walked through IAEA requirements and guidance and demonstrated it in that webinar and have been open to a dialogue, questions and provided answers directly to any members of the public watching.

From a larger concern from the public, the EIS does have a section in it where we highlight feedback from the public. Section 4.3 for CNL's EIS identifies what we heard from the public, what their concerns and interests were, and how we incorporate it into the EIS. That can also be found in formal comments that the public provided us on our EIS and every time we respond to a public comment we point them back to where that information can be found in the EIS specifically.

For the Indigenous groups we have a separate chapter on areas of Indigenous concern and the same kind of process -- well, I think a little bit more detailed process with Indigenous groups, quite honestly, where there have been more opportunities for dialogue, with workshops with specific Indigenous groups in the manner that they want to communicate about the project.

So we have lots of information and we would certainly be happy to provide a supplemental summary table as you've identified or requested.

THE PRESIDENT: Thank you.

We'll take that under consideration. It may make your lives and certainly our lives a lot easier in Part 2.

Okay, Dr. Lacroix.

MEMBER LACROIX: Shall we move on to something else?

THE PRESIDENT: Yes, let's do so.

MEMBER LACROIX: Okay. Well, concerning the First Nations, I have noticed that the First Nations -- well, some of the First Nations disagree strongly with the CNL and CNSC's assessment of the residual impacts of the project on their rights and I was wondering what are the potential ramifications of this disagreement and how it can be alleviated.

THE PRESIDENT: Mr. McBrearty.

MR. McBREARTY: Commissioner Lacroix, thank you very much for that question. Mr. McBrearty, for the record.

Before I turn the microphone over to Mr. Pat Quinn, our Director of Corporate Communications, let me just kind of start it off at a very high level and some of it will summarize some of the points that I had earlier in my statement.

We have been engaging early, we've been engaging often and very specifically with Indigenous

groups. We have identified what we believe are the requisite Indigenous communities and peoples to engage with and we have been doing this for five to six years, from the very beginning.

We understand and actually this process has enabled us, and I think the Indigenous communities as well, to better understand what the risks are, what their concerns are and to be able to articulate them to the point where we can actually properly respond.

As Ms. Vickerd pointed out during her comments, we have had multiple engagements, probably hundreds overall with Indigenous groups, but many specifically with each group. In each group what we want to make sure we're doing is we're dealing with each Indigenous community the way they want to be dealt with.

Now, there are some very specific concerns that Indigenous communities have with respect to historical rights, with respect to avoidance and concerns with the site and just radiation and our activities in general, and the conversations that have come about over the last five to six years have actually gone a long way to be able to I think advance those so that we can properly address those. There will continue to be concerns I expect, but we have a much better understanding of how to address each of the communities' specific concerns.

I would like to turn it over to Mr. Quinn at this point. Now, Mr. Quinn has been deeply involved in this Indigenous engagement process since the beginning and he can provide some more details and I think get to your basic question of what are the risks that are associated with this, sir.

Mr. Quinn.

MR. QUINN: Thank you, Mr. McBrearty.

Pat Quinn, for the record.

With respect to rights and how CNL addresses concerns where a community might see those as being negatively impacted, we've worked closely with the 17 communities that have been identified as part of this EA process. Each community, as Mr. McBrearty has pointed out and Ms. Vickerd, engage in a different way and we tailor our engagement to those preferences.

With respect to rights, we've had success in identifying areas where we can continue to bring communities into the site and participate in activities related to environmental stewardship, for example, where we would have them participate and help to educate us a little bit more, using traditional knowledge, on environmental monitoring and things of importance there.

We also -- as we've heard, there are challenges around site access and being able to access the

Chalk River Laboratory site. One of the things that we've identified -- I've worked with various communities. We've identified and listened to areas of specific importance, the cultural aspect for the community, and those we are able to manage and permit access and help support traditional activities as they might arise.

Also, though, we do know that there are some areas, for example, the relocation of waste to the site, that could be of concern to a community and we know that based on our experience and the work that we've undertaken over the last several years with some specific communities, there is definitely an opportunity to work with that community and to help mitigate those particular concerns.

And so communicating constantly with those communities that are engaged with us, educating and providing the opportunity to learn about the work that we undertake, but likewise listening to what a community is asking and suggesting to us and then incorporating those aspects into the work that we do is of the utmost importance.

I hope that helps to answer the question.

MEMBER LACROIX: Absolutely. And I would like to have -- well, Mr. McBrearty.

MR. MCBREARTY: Yes, thank you,

Commissioner.

I think it would probably be appropriate at this point to invite our colleagues from AECL to comment on the efforts because this is a unified effort. Because the Crown is responsible for the land and we are the contractor working for the Crown, this has been really a joint effort between CNL and AECL, and certainly in concert with CNSC, to ensure that we start to learn and we engage and we engage properly.

So I would invite Mr. Fred Dermarkar to provide a perspective from the AECL side. Thank you.

THE PRESIDENT: So maybe before Mr. Dermarkar shares his thoughts on that, let's take a break so that we're not restless as we're listening to you, Mr. Dermarkar, and we will resume at 3:45 p.m. See you shortly.

--- Upon recessing at 3:29 p.m. /

Suspension à 15 h 29

--- Upon resuming at 3:45 p.m. /

Reprise à 15 h 45

THE PRESIDENT: Welcome back, everyone, and without further ado, Mr. Dermarkar, over to you on your comments around what's happening with Indigenous engagement

and consultation, please.

MR. DERMARKAR: Thank you very much, President Velshi. And for the record, my name is Fred Dermarkar. I'm the President and CEO of Atomic Energy of Canada Limited.

I want to start off by saying that AECL is firmly committed to advancing reconciliation with Indigenous people and building relationships that are rooted in understanding and in accepting truth as seen from the perspective of Indigenous peoples.

As Joe mentioned, we -- or as Mr. McBrearty, I should say, mentioned, we have been working on establishing relationships with communities in whose traditional territory we operate and, in some cases, we have MOUs in place, formal Memoranda of Understanding, and in others, we are working towards developing long-term relationship agreements.

I'd like to highlight some specific things with respect to the way Mr. McBrearty and I have been engaging with Indigenous communities.

As Joe -- as Mr. McBrearty mentioned, each Indigenous community has its own priorities and our job at both AECL and CNL is to adapt ourselves to their needs. And so the way we deal with each Indigenous community is specific to that community.

In this regard, Mr. McBrearty and I have met with senior leaders from various Indigenous communities, including both First Nations and Métis communities.

We have participated in their ceremonies, including smudging ceremonies. We have strived to learn their ways to internalize them so they are reflected in our thinking and in the way we lead our respective organizations and so we can support our organizations in their engagement efforts.

At the end of the day, relationship building happens between people at every level in the organization and then at the organizational level.

What I'd like to do is -- you've heard from Mr. Quinn, who has done an outstanding job for CNL in advancing engagement with Indigenous communities. I'd like to hand off briefly to Ms. Maude-Émilie Pagé, who is Mr. Quinn's counterpart in terms of Indigenous engagement, but working at AECL.

MS. PAGÉ: Thank you, Mr. Dermarkar.

For the record, my name is Maude-Émilie Pagé and I'm the Director of Communications and Government Reporting for AECL.

As was outlined by Mr. Dermarkar, AECL as the site owner and a Crown corporation is certainly

committed to reconciliation and advancing relationships with Indigenous communities and we work quite closely with CNL to do that, recognizing that both organizations have different roles to play, but that together have responsibilities with respect to activities at the Chalk River site.

And Mr. Quinn has outlined quite well some of the activities that we've been doing. Maybe what I would just want to add to avoid repetition is to highlight the fact that there have been lots of engagement and communications around the project itself, so the NSDF project, including trying to identify ways to address some of the concerns and find meaningful ways of moving forward together.

And in some cases, that includes looking at beyond the project itself, but at the site in its totality of its activities and interests in that regard.

So while there's been specific and a lot of work done in terms of addressing some specific concerns with respect to the project, part of what we're also doing is looking at building long-term relationship agreements with Indigenous communities with a view of looking at the much longer-term picture of the site, interest from Indigenous communities with respect to environmental monitoring or cultural protection at the site, partnership

opportunities, employment opportunities and so on so that we can actually build partnerships that are much longer-term and go beyond just the project itself.

And that's aligned with our commitment to reconciliation, and as everyone that's spoken before me has outlined, it is also focused on what the interests of Indigenous communities themselves are and trying to align with that.

THE PRESIDENT: So Ms. Pagé and Mr. Demarkar, thank you for that.

I'd just like to bring you back to Dr. Lacroix's question, which was, what do we -- what do you see as the big challenges and risks to the project based on your interactions and what you have heard about their concerns and issues?

Sorry. Ms. Pagé?

MS. PAGÉ: Yes. Maude-Émilie Pagé, for the record.

So Mr. Quinn has outlined some of the concerns that we and CNL have heard, and some of them have been worked through over the many years that we've been working together, so considerations for environmental monitoring, inclusion of traditional knowledge, considerations for forest management.

So a lot of the issues and interests have

actually -- or rub points, if you will, or areas where -- have been worked through with solutions, we hope, have been found.

In terms of like the outstanding concerns, we have heard concerns around waste -- AECL waste that would come from other sites. While it represents a small volume of the waste that's intended to go in the NSDF, we have heard this concern and continue to work with Indigenous communities to try to resolve that particular concern.

THE PRESIDENT: Thank you.

Ms. Murthy.

MS. MURTHY: Kavita Murthy, for the record.

So with respect to residual impacts identified by Indigenous nations and communities and how the CNSC has considered it in our engagement activities, I would like to, first off, say that since 2016, we have worked to ensure that our consultation approach sought to understand the concerns raised and assess the impacts.

And to give you a little bit more insight into the work that CNSC Staff have done, I would like to ask Jessica Way to respond.

MS. WAY: Jessica Way, Senior Policy Officer in the Indigenous and Stakeholder Relation

Division, for the record.

With respect to residual impacts and concerns raised by Indigenous nations and communities throughout the environmental assessment and regulatory process for the NSDF project, CNSC Staff have been working with the interested and identified Indigenous nations and communities throughout the entire process to understand what their concerns are with respect to impacts from the project.

And while the goal of consultation is to hopefully come to agreement on what those residual impacts are, we do understand that that's not always possible, and so as part of a collaborative consultation process, we've ensured that those views are identified throughout the Environmental Assessment Report, specifically in Chapter 9.

And essentially, at the end of the process, that we were able to agree with the identified and interested Indigenous nations and communities is that, for the project-specific impacts, we were able to land on agreement with respect to conclusions and that the remaining residual impacts were out of scope of the project. And where we were able to address those, for example, broader concerns with respect to the Chalk River Laboratories site, CNSC Staff is working on long-term relationship agreements with those interested and

identified Indigenous nations and communities to help address those broader concerns.

THE PRESIDENT: Thank you very much. Dr. Lacroix, any follow-up question on that?

MEMBER LACROIX: No, thank you.

THE PRESIDENT: Okay.

Ms. Maharaj.

MEMBER MAHARAJ: I did have a quick follow-up question with respect to the CNSC's communication and consultation and accommodation programs. And I think I read that the project-specific engagement activities ceased in 2018 and that, after that point in time, the interactions were more general.

Have I read that correctly or am I mistaken?

MS. MURTHY: Kavita Murthy, for the record.

Let me just try to understand. You're looking at the CNSC CMD and --

MEMBER MAHARAJ: I was, page 109. PDF page 109.

MS. MURTHY: Okay. Just give me 30 seconds.

MEMBER MAHARAJ: Yes. It loads very

slowly. It's a large document.

--- Pause

MS. MURTHY: Okay.

MEMBER MAHARAJ: Yeah. You see it?

MS. MURTHY: Yes, I got it. Thank you very much.

MEMBER MAHARAJ: Okay. It might be referring to just a pause in communication.

MS. MURTHY: Yes. And that is why I'm kind of surprised that that was there because consultation and engagement continued throughout the period, even very, very recently. So I'll ask Jess Way to respond.

MEMBER MAHARAJ: Sure.

MS. MURTHY: Go ahead, Jess.

MS. WAY: Jessica Way, for the record.

So with respect to that text, what we were indicating in the CMD is that at that time, there was ongoing work with respect to the environmental impact statement and so that is why there was a pause, but we did conduct extensive consultation and collaboration with identified and interested Indigenous nations, communities and communities after that.

Examples of that were conclude collection of Indigenous knowledge, incorporation of that Indigenous knowledge, collaborative drafting of rights impact

assessments and collaborative drafting of the sections of the Environmental Assessment Report, so a number of meetings and follow-up emails and sharing of information occurred after that time.

MEMBER MAHARAJ: Specific to the project; right?

MS. WAY: Specific to the project.

MEMBER MAHARAJ: Okay, good. Well, I'm glad I misread it because I was concerned, and so that's fine.

With respect to that pathway of consultation and engagement, how did you accommodate for COVID and the lack of ability to be in person?

MS. WAY: Jessica Way, for the record.

So accommodations for COVID were made. CNSC Staff worked with the identified and interested Indigenous nations and communities to ensure that there was opportunities to shift virtually. So since, you know, we've been working throughout the pandemic, we have regular monthly meetings with a number of the interested and identified Indigenous nations and communities, but we also looked at, you know, what capacity issues were occurring with the nations and communities and was there, you know, opportunities to potentially extend timelines and be as flexible as we could in the process, noting that they were

facing some challenges with respect to the pandemic.

MEMBER MAHARAJ: Did you hear from any of the Indigenous communities and nations you dealt with that virtual communications didn't work for them?

We hear that from time to time, and I just wonder if it was also in this particular consultation, that concern.

MS. WAY: Jessica Way, for the record.

So initially, you know, there -- and throughout the pandemic, there have been concerns raised or preference that if we could do meetings in-person or meet in-person and do consultation activities in-person, that that would be preferred, but for the most part, it has worked well.

I'd like to pass it over to my colleague, Adam Levine, for additional information.

MR. LEVINE: Thanks, Jessica.

This is Adam Levine, Team Lead, Indigenous Relations and Participant Funding, for the record.

So in addition to what Ms. Way laid out, we did hear some concerns, for example, from the Algonquins of Pikwakanagan First Nation. We were working a lot with them on a rights impact assessment along with drafting of aspects of the Environmental Assessment Report.

And one of the tools that they had to get

community input was through an advisory committee made up of community members, and there was a lot of challenges during the early parts of the pandemic in getting them information and convening them virtually, and so we worked with them to be flexible in terms of timelines with some of the work. And I know CNL also contributed some equipment, IT equipment, to help them communicate in the virtual environment, so everyone was putting a lot of effort forward to helping everyone. But in general, it's worked very well and everyone's adapted to the current situation.

MEMBER MAHARAJ: So when, fingers crossed, we see the end of these -- the strictness of pandemic isolation, is it your intention to go back into the communities in person or are you content with an evolution of consultation?

MR. LEVINE: Yeah, I can keep going. Adam Levine, for the record.

So yes, we're going to actually go into a hybrid mode, that's our hope, where we're able to utilize technology and virtual meetings that have actually worked quite well because we're actually able to meet more often as we did pre-pandemic and actually get a lot of work done and do a lot of collaborative drafting of activities and more intensive technical work together. But it doesn't replace the relationship-building aspect of being there in

person, walking the land together, you know, seeing the communities, learning about their history and culture. It doesn't replace the in-person activities, so when it's safe to do so, we want to supplement the online activities and technical work with the in-person activities to build relationships and continue that as well.

So we'll be doing both as soon as it's safe to do so.

MEMBER MAHARAJ: Thank you very much.

THE PRESIDENT: I just want to make a comment. You know, we've heard from CNL, we've heard from AECL, we've heard from CNSC Staff. And the picture that's been presented to the Commission is that it's really come along well, we're doing everything we can, you know, we're making great progress. Just draw your attention to my opening remarks where I'd said we have actually received a request that this hearing get adjourned because there are some nations that don't feel that adequate consultation has happened.

So we're going to be spending a lot more time at Part 2 on this, but I -- you know, it's just a bit of a reality check that there may be a bit of a disconnect there.

I do have a question for CNL, not so much around Indigenous engagement and consultation but more

about public consultation and wanted to know, do you do any public polling? Many of our other licensees do and then they can measure trend. And certainly for this particular project, you have, as has CNSC, done a lot of new, fairly extensive consultation, tried new media and new methods. And I just wondered, have you done the public polling? Is it something you've considered and decided not to pursue?

Mr. McBrearty.

MR. McBREARTY: President Velshi, Mr. McBrearty, for the record. Thanks very much for that question.

I think I'll turn that one right over to Mr. Quinn. He is our public relations expert and I think can handle that question.

So Mr. Quinn, over to you.

MR. QUINN: Thank you, Mr. McBrearty. For the record, Pat Quinn.

With respect to polling in public, yes, we do engage with it, but however, we use an external firm to do that. The last occasion that we were able to poll the region was in 2018, and this spring we are currently conducting another assessment just to determine, you know, have we moved the yardstick, that type of thing.

Basically, on the initial assessment we were looking to understand how people learned about CNL,

NSDF, where they went to get their news, general awareness of our project activity, and so we'll be checking on that.

What I'd also add is that also, we continue to look at, you know, the general assessment activities as well, so with our social media, just doing analytics, what works well, what doesn't.

Then also, we've used focus groups as well. And Ms. Vickerd spoke to one in particular related to the NSDF project on wastewater management from the treatment facility.

And so there's various means that we do check in on how effective our communications are and, you know, are there opportunities to improve.

THE PRESIDENT: Thank you.

Mr. McBrearty.

MR. MCBREARTY: President Velshi, thank you. Once again, Mr. McBrearty, for the record.

I'd like to add just a couple things to Mr. Quinn's comments.

He's being actually a little humble in his activities. When I look at the activities that have occurred over the last since I've been here, for about three years, the public outreach has really increased dramatically, and part of that was maybe a silver lining due to COVID, but it forced us to actually communicate,

communicate more, communicate more often and utilize different -- you know, utilize different means.

And in some cases, it is easier, it's more convenient for folks to do something virtually than it is to get in the car and then come out and meet.

One thing I would like to add, and it's -- I think Ms. Murthy may have mentioned it as well, but -- actually, Mr. Levine may have mentioned it.

Our approach going into the future is pretty much a hybrid approach as well in dealing with Indigenous and the public. Certainly being able to break bread together and see each other face to face is just absolutely important and the ceremonies that we've participated in have just solidified that, but the ability with people now being very comfortable to slide into a chair and do a Teams meeting or watch a webinar, being able to do those actually has enabled us to communicate better, communicate more often and hopefully reach a wider audience in trying to transmit our message and listen to others.

Thank you.

THE PRESIDENT: Thank you.

Back to Dr. Lacroix.

MEMBER LACROIX: Well, it might be a surprise to you, but I have no further questions.

THE PRESIDENT: It is a surprise.

Ms. Maharaj.

MEMBER MAHARAJ: I did have a question, perhaps a little bit less about specific consultation activities but with respect to the concerns around noise impact and traffic and dust impact that Ms. Vickerd spoke to earlier in the day. I think it was Ms. Vickerd.

In any event --

THE PRESIDENT: It was Health Canada.

MEMBER MAHARAJ: It was Health Canada. That's right. Health Canada.

With respect to those specific concerns, are those concerns being raised by the public in general or by Indigenous groups in particular?

THE PRESIDENT: Ms. Vickerd.

MS. VICKERD: Meggan Vickerd, for the record.

I'll certainly hand this over to Dr. Quinn and -- sorry, Mr. Quinn and he can speak about the -- a lot of those concerns, we do have processes already in our public information program, but one of the things that I do want to highlight about the configuration of our site, NSDF is on our site. Our site is very large. It's about 4,000 acres and it's in the middle of the site.

So we are, you know, several kilometres

from the nearest member of the public, so I think that's an important point to make when it comes to impacts around noise and dust is that we have a very large boundary, I would say, to the nearest member.

But I'll have Mr. Quinn speak to our public information program and how we raise awareness. And when you raise awareness of activities is the best way to mitigate concerns.

MR. QUINN: Thank you, Ms. Vickerd. Pat Quinn, for the record.

With respect to the -- I would say the sensory experience around the NSDF project, as been pointed out, this is -- this is a remote location within the site and not visible even from the Ottawa River if you were there.

With the increase of -- anticipated increase of construction activity on the site, we have already been conducting traffic surveys so that those neighbours closest to us, we're able to talk to them about what we anticipate with respect to increased, you know, potential traffic flows, timing of traffic, et cetera on our plant road.

Keeping people up to date on all the activities at the site is critical, and so we maintain several channels through our public information program.

Of course, there's the -- you know, the traditional social media, external websites, but however, in anticipation of increased activity on our plant road, what we will be looking at is actually reaching out directly to those people that are closest to us in the neighbourhood, so to speak, just to keep them up to date and have an open means to have conversation on that front.

THE PRESIDENT: Ms. Vickerd and then Mr. McBrearty.

MS. VICKERD: Sure. Meggan Vickerd, for the record.

I just wanted to correct myself. I said 4,000 acres. It's 10,000 acres, 4,000 hectares.

And on the noise, we've heard the concerns from both -- to answer Commissioner Maharaj's question, we've heard it from both Indigenous and public forums, common concerns, but I just want to point out it is for a short duration during the construction timeframe, and you've already heard why we've determined it to be a low significance.

MEMBER MAHARAJ: Thank you. That was my follow-up question around the timing.

THE PRESIDENT: Okay. Mr. McBrearty.

MR. MCBREARTY: Thank you, President Velshi. Mr. McBrearty, for the record.

And I think -- I think Commissioner Maharaj's comment kind of ties into the feedback loop that we have. We've heard feedback from, as Ms. Vickerd and Mr. Quinn pointed out, from various groups and we've been able to actually take that feedback and introduce it into sustainable, you know, forest management plans, into our environmental follow-up management plan, and thus mitigation plans, for instance, when you talk about, you know, a lot of construction.

The construction site is fairly far away from the populated area, but these are all things that we have -- you know, it's a very robust and iterative system of comments, concerns that come in not only from the public and from Indigenous groups, but also from other federal agencies -- federal and provincial agencies, so it actually has aided us over the last couple of years to develop, I think, pretty robust plans to address most of these issues.

THE PRESIDENT: Thank you.

I've got two quick questions for staff, and one is kind of a follow up to what we've just discussed. So with all the back and forth on the EIS, the Environmental Impact Statement from CNL over like, a four year period and at different federal departments and provincial departments, and members of the public sending comments. I just wondered, how much transparency was there

in the back and forth, and were those comments and the disposition -- or are those comments and dispositions publicly available?

Ms. Murthy?

MS. MURTHY: Kavita Murthy, for the record.

I can give you the short answer and then I'll ask Nicole Frigault to speak in more detail about the EIS process and how comments were dealt with.

So the short answer is yes, the information was available on the registry, and for -- I'm sorry, I think I made a mistake. Nicole Frigault will respond to that question. Thank you.

MS. FRIGAULT: Thank you, Ms. Murthy. Nicole Frigault, for the record. I am the Environmental Assessment Specialist Lead on this file for the Near Surface Disposal Facility Project.

So yes, these comments, there was a lot of back and forth between the federal and provincial review team and CNL throughout the past five years in reviewing the draft Environmental Impact Statement. And these comments were posted on the Canadian Impact Assessment Registry so that the public and Indigenous groups could see the comments that were raised.

The disposition of these comments were

only posted once all of CNL's dispositions were acceptable, and therefore this information was posted in July of 2021, along with the accepted Environmental Impact Statement.

THE PRESIDENT: Excellent, thank you very much. And my last question, because we get asked this, is the Environmental Assessment was done under *CEAA 2012*, had it been done under the *Impact Assessment*. What from an environmental protection and a safety, public safety perspective, what would have been different, if anything, Ms. Murthy?

MS. MURTHY: Kavita Murthy, for the record.

The breadth and rigor of CNSC staff's technical review to assess the safety of the project with respect to the public, workers, and environment for the short and long term, this was done with the rigor that I don't believe would have been different had it been done with the *IAA*. There are aspects of *IAA* that are different, and to speak to that I'd like to ask Dr. Kwamena to comment.

DR. KWAMENA: Dr. Nana Kwamena, for the record.

So as you noted, since the start of the project there has been the coming into force of the *Impact Assessment Act*. So we are confident that nothing would be

different. The project would have still undergone the same comprehensive, robust rigor of an assessment, whether it was done under the *CEAA 2012* as it was done, or under the *Impact Assessment Act*.

The only difference is that the *CEAA 2012* focusses on environmental effects, whereas the breadth of the *Impact Assessment* is a little broader. It considers socio-economic, positive and negative effects of the project. But otherwise, the same rigor, the same robustness of CNSC staff's assessment would remain the same.

I would also add that under our own licensing process that rigor also remains the same. So the applicant would still need to demonstrate that their proposed undertaking is safe for the environment and the public, both now and the entire lifecycle of the project, and that a licence isn't granted unless the Commission is fully that the activity can be carried out safely, so that both the environment and the health and safety of persons are protected.

So just to close that off, it would still be a robust process and nothing would have been different under that process.

THE PRESIDENT: Thank you very much for that.

Okay, Dr. Lacroix, last chance.

MEMBER LACROIX: Okay. Well, I do have something. Yeah, during the public participation activities the credibility of the regulator was kind of a concern. I've seen it in the Environmental Assessment page 158. So could you elaborate on the nature of these concerns?

MS. MURTHY: Kavita Murthy, for the record.

Candida Cianci was one of the primary leads on a lot of the communications and outreach that was done on this project, so I would like to ask her to speak to this please.

MS. CIANCI: Candida Cianci, for the record.

So I'm a Special Advisor to the Canadian Nuclear Laboratories Regulatory Program Division. So with respect to the questions on the independence of the regulator is your question, Dr. Lacroix?

MEMBER LACROIX: M' hmm.

MS. CIANCI: So that relates early on in the process in the Environmental Assessment process whereas we were just in that line of questioning in terms of the *Impact Assessment Act* coming into force, and prior to that, there was a lengthy engagement process on how to modernize

the Environmental Assessment legislation.

So a lot of comments were received about perception that the CNSC was a captured regulator and not independent from the nuclear industry, and who should take on that role of responsible authority carrying out the Environmental Assessments. So it was within that context that we've been hearing that concern.

MEMBER LACROIX: Okay. I understand.

Thank you.

THE PRESIDENT: And Ms. Maharaj, anything else from you?

MEMBER MAHARAJ: I do, if I'm allowed to go back to the environmental impact section. I noted an overall sense of optimism that any effluent discharges would be able to meet ordinarily expected water quality guidelines and thresholds. And similarly, such as they are, the emissions once you're passed into the operational periods.

However, there was a bit of a carve out for tritium. And my questions are around that whole concept of tritium discharge, or tritium in the leachate. Why can't tritium be removed from the leachate through the water processing plant, and why does there need to be a carve out, or a little bit of a sense of flexibility around meeting discharge requirements with respect to tritium in

particular?

THE PRESIDENT: Ms. Vickerd?

MS. VICKERD: Meggan Vickerd, for the record.

I'll hand the bulk of this question over to Mr. Dolinar, our Director of Environmental Services. Before I do, I just want to provide some confidence that, you know, we did do pilot testing. We did develop a surrogate leachate then pilot or bench scale test the proposed treatment system removal. Tritium, and I'll let Mr. Dolinar speak to tritium as far as a constituent in our effluent -- but we do have additional measures to control tritium at the source by putting it in those leachate controlled packages and isolating that from the environment so it doesn't end up in unmanageable concentrations in our leachate.

So over to Mr. Dolinar to speak to it as an effluent.

MR. DOLINAR: For the record, George Dolinar, Director of Environmental Services for CNL.

So I'll try to keep this short, but also I'll try to be complete. So tritium, you know, forms part of a water molecule. So hydrogen -- one of the hydrogen atoms is replaced by a tritium which is a form, an isotope of hydrogen. So it's HTO. So normal, sort of water

processing methodologies won't do anything to separate tritium from the water. So that's sort of the main issue from that perspective.

In terms of being protective of the environment and human health and the targets we've set of the, you know, for the receiving waters, both Perch Lake and Perch Creek, the maximum tritium concentration predicted for Perch Creek is less than -- is half the current drinking water standard. Nobody drinks water from Perch Creek, and you know, orders of magnitude below any kind of threshold associated with impact to aquatic life. So we're protective of human health and also aquatic life, given the levels that we've indicated would be present for tritium.

I should just return, this is at least, you know, significantly controlled by the inventory associated with the NSDF facility and is also part of the waste acceptance criteria and so on. So it forms an entire system of protection to arrive at where we are.

Thank you.

THE PRESIDENT: I have a question for CNSC staff, and bear with me on this. So one of the requests to the Commission is that this proposed NSDF is not permitted under the current licence that CNL has. And as I looked at the proposed licence, other than the two new licence

conditions that were added, I -- draw me to where the permitted activities section is changed to allow the proceeding with an NSDF.

MS. MURTHY: Kavita Murthy, for the record.

So as you would have noted, Ms. Velshi, when you looked at the licence, the activity under -- just give me a sec, I'll just bring it up. Under Section 4, licenced activities, CNL has a broad licence authorization to prepare a site or construct, operate, modify, decommission, or abandon nuclear facilities.

So at face value it feels like they have the right to do the NSDF, so why are we asking them to come in front of you and request? That is because the licensing basis the Commission had not contemplated allowing CNL to have an NSDF when they renewed the licence.

THE PRESIDENT: Right.

MS. MURTHY: And that made it a project that was outside the licensing basis that was approved by the Commission. So in order to allow that to happen, we don't need to modify anything in Section 4 because it's already provided for. But by capturing those licence conditions and having the facility listed as a facility in the Licence Conditions Handbook it now brings it into the licensing basis.

THE PRESIDENT: Thank you. Thank you for clarifying that.

Okay. Well, this concludes part one of the hearing. I thank you all for your active and very helpful participation, and I'll turn the floor over to Denis for closing remarks on this hearing.

THE REGISTRAR: Thank you, Ms. Velshi. I apologize for turning off my camera. I'm having challenges with connectivity. So I will ask Michael Young, our Lead Team Commission Technical Officer to do the closing remarks.

M. YOUNG: Merci. Mon nom est Michael Young et je suis l'Agent technique principal du greffe de la Commission.

This hearing is to be continued with Part 2, starting on May 31, 2022, in Pembroke, Ontario, if we can hold in-person proceedings. A virtual mode of participation will also be available.

The public is invited to participate either by oral presentation or in writing, only on Part 2 of the hearing. Persons who wish to intervene in Part 2 of the hearing must file their submissions by April 11, 2022.

As mentioned earlier, we encourage intervenors to consult the Revised Notice of Public Hearing and Procedural Guidance, to familiarize themselves with the

procedures and ensure that their submissions are within the scope of the hearing.

On encourage les participants à consulter l'Avis révisé d'audience publique, y compris l'information sur les procédures pour les intervenants, afin de se familiariser avec les procédures et s'assurer que leurs interventions respectent la portée de l'audience.

Thank you, merci et bonne fin de journée.

--- Whereupon the hearing adjourned at 4:25 p.m.,
to resume on Tuesday, May 31, 2022 /
L'audience est ajournée à 16 h 25 pour reprendre
le mardi 31 mai 2022