



**Guided by science.
Grounded in knowledge.
Committed to partnership.**

Triennial Report 2020-22

*Check out the digital version of this triennial report
for more interactive and multimedia content.*



Land acknowledgment

The Nuclear Waste Management Organization (NWMO) acknowledges that we have worked in many different Indigenous territories since the inception of the organization. We are grateful to the Indigenous and municipal communities that have worked with us over the past 20 years.

We further acknowledge that today we are working in northwestern Ontario in the traditional territory of Wabigoon Lake Ojibway Nation with the community of Wabigoon Lake Ojibway Nation and the Township of Ignace.

In southern Ontario, we are working in the traditional territory of Saugeen Ojibway Nation (SON) with the two SON communities – Chippewas of Nawash Unceded First Nation and Chippewas of Saugeen First Nation – and the Municipality of South Bruce.

We further acknowledge that in both the northwest and the south, we have the privilege of working with other First Nations and organizations, with Métis communities and the Métis Nation of Ontario, and many municipal communities that have all expressed an interest in learning about our work.

As part of our commitment to Reconciliation, we recognize both the historic and current injustices far too many Indigenous communities endure. We pledge to do our part to encourage well-being in communities with which we work.



NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES

The Honourable Jonathan Wilkinson
Minister, Natural Resources Canada
Ottawa, ON K1A 0A6

March 2023

Dear Minister,

We are pleased to submit to you the Nuclear Waste Management Organization (NWMO) triennial report for fiscal years 2020 to 2022.

We submit this report in compliance with Sections 16(1), 16(2), 18 and 23(1) of the *Nuclear Fuel Waste Act*.

In fulfilling our obligations under Section 24 of the act, we are also making this report available to the public.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Glenn Jager'.

Glenn Jager
Board Chair

A handwritten signature in black ink, appearing to read 'Laurie Swami'.

Laurie Swami
President and CEO

Table of contents

Letter to the Minister	1
Message from Glenn Jager, NWMO Board Chair	4
Message from Laurie Swami, NWMO President and CEO	6
Introduction to the NWMO	8
Aligning with Indigenous perspectives.....	20
Community engagement.....	24
Site assessment.....	37
Engineering, safety and technical research.....	39
International collaboration.....	42
Transportation planning	44
Organizational readiness	47
Preparing for licensing applications	51
Developing a Canadian Integrated Strategy for Radioactive Waste	52
Governance and accountability	54
What we heard on implementing Canada's plan	62
Social, economic and cultural considerations.....	68
Budget forecast 2023-27.....	74
Ensuring funding is in place	75
Auditor's report and financial statements.....	82
Implementing Adaptive Phased Management 2023-27.....	102
Report of the Advisory Council 2020-22	155

Message from Glenn Jager, NWMO Board Chair



The last three years at the Nuclear Waste Management Organization (NWMO) have been marked by both significant technical accomplishments and trail-blazing community milestones.

These achievements are the culmination of decades of work that will propel the NWMO forward as we implement Canada's plan for the safe, long-term management of used nuclear fuel. We are entering into these next years with the confidence and excitement that come with making progress on a project that will protect people and the environment for generations to come.

I am honoured to have taken on the role of Chairperson for the NWMO Board of Directors this year. Coming from the nuclear sector, I have first-hand experience and a deep understanding of the need for this project. While the current storage method is safe on an interim basis, it is not appropriate over the long term. Keeping the used fuel where it is today would mean leaving the burden to future generations to manage. By taking action now, we will instead leave a legacy that will benefit our kids and grandkids. That is why it is so important to the entire Board – and indeed, to Canada – that this project succeeds.

While the Board offers the NWMO the benefits of a wide range of leadership experience, we would like to acknowledge that the organization is strengthened by the guidance of many independent groups of experts from various fields, including, for example, the Advisory Council, Geoscience Review Group and Council of Knowledge Holders.

We are excited to see momentum on the construction of deep geological repositories around the world. The approach we are implementing is not just a theoretical concept. Projects are moving ahead, and there is tangible experience for us to contribute to and rely on.

The NWMO finds itself in the unique position of both being a leader in our field and being able to lean on international best practices. We are not the first to implement a repository project, but we are among those at the front of the pack. We are actively learning from the science and technical innovations of the jurisdictions we collaborate with internationally.

And they lean on us for our expertise on safety, including safety from a social perspective. The NWMO is recognized internationally as a leader for our consent-based site selection process. Other organizations and governments are learning from our significant technical progress, public engagement and momentum towards selecting a site. As we look to the future, we are happy to do our part as a global contributor to the important body of work in this field, and we continue sharing our leadership and learnings.

We have adapted to changing tides from the beginning of this project and even more so as we navigated the COVID-19 pandemic over the past three years. Having completed several key benchmarks, the NWMO is full steam ahead for one of the most important milestones on the horizon – selecting a site for Canada’s deep geological repository for used nuclear fuel. We expect to achieve this goal in the fall of 2024.

Our Board knows we must maintain momentum to get Canada’s plan across the line. The safe, long-term management of used nuclear fuel is within reach, for Canada and for the future.

A handwritten signature in black ink, appearing to read 'Glenn Jager', with a stylized, flowing script.

Glenn Jager
Board Chair

Message from Laurie Swami, NWMO President and CEO



Reflecting on the three years this triennial report covers, it feels like both a lifetime and a blink of an eye. Yet, despite the uncertainty created by the COVID-19 pandemic, the Nuclear Waste Management Organization (NWMO) adapted and maintained our momentum in implementing Canada's plan for the safe, long-term management of used nuclear fuel.

In early 2020, we narrowed down the options for locating the deep geological repository to the two remaining areas – the Wabigoon Lake Ojibway Nation-Ignace area and Saugeen Ojibway Nation-South Bruce area, both in Ontario. With this narrowed focus, we were able to start building capacity and investing in infrastructure.

Then the pandemic hit. The NWMO quickly adapted to the new health protocols to continue working safely. We had hoped to have our drilling program well underway in 2020. The pandemic had other plans. The organization made the decision to wait until the spring of 2021 and put drilling and engagement activities on hiatus.

Reflecting on that time, the NWMO truly maintained momentum by slowing down. Our team had the opportunity to focus on the plan and methodically map out our next steps. It allowed us to focus on what we needed to do to respond to the pandemic, both within the NWMO and in support of the communities engaged in the site selection process. When we safely returned to the communities in April 2021, the wheels were still in motion. We completed our borehole drilling program, and in-person engagement resumed in both siting areas.

In 2022, we completed a full-scale demonstration of the engineered-barrier system designed to safely contain and isolate Canada's used nuclear fuel. This important safety and technical achievement was the culmination of nearly a decade of preparation. It serves to assure Canadians and Indigenous peoples that we can implement Canada's plan in a way that protects people and the environment for generations to come.

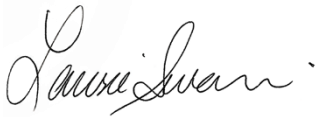
Two years ago, we launched a series of community studies in the municipal communities in the areas we work in, focused on the benefits and impacts of this project, so that we can ensure it supports community well-being. That work concluded at the end of 2022. Each of the 34 studies were centred on the topics most relevant to each potential siting area.

This community-directed work helps guide a mutual understanding of the impacts on each community, including social, economic, environmental and other pressing regional topics. This active collaboration with communities has helped us shape what partnership needs to look like to successfully implement Canada's plan.

With a project of such complexity and multi-generational scope, we have always known that the NWMO would need to adapt over the course of the process, while also keeping an eye on the long view. As we worked through the delays set in motion by the pandemic and provincial lockdowns, our team leaned on our momentum to adapt to the changing environment.

These delays meant a significant loss of time for the meaningful, face-to-face engagement that is so critical to the success of this project. So we made the important decision to shift the timeline for site selection. We now anticipate identifying a preferred site by fall 2024, instead of 2023 as previously planned. However, we do not expect this shift to impact the overall schedule for Canada's plan. Making this small adjustment in timing also gives the potential host communities additional time to review and absorb new information as they consider if hosting the project aligns with their vision and priorities.

As Canada's plan for the safe, long-term management of used nuclear fuel maintains momentum, our organization is evolving to meet the needs of communities and our people. We are committed to a future-focused, diverse workforce representing our country, today and tomorrow.



Laurie Swami
President and CEO

Introduction to the NWMO



Welcome to the Nuclear Waste Management Organization's (NWMO) triennial report for the period covering 2020 through 2022. During this time, we have made significant progress implementing Canada's plan for the safe, long-term management of used nuclear fuel, despite the challenges posed by the COVID-19 pandemic.

Over the past three years, we maintained momentum by advancing our technical studies, building awareness through social engagement, and collaborating with the potential host communities remaining in our site selection process.

Some key milestones were reached during this period, including [completing the initial borehole drilling studies](#) that will help us understand the geology in the siting areas to support site selection, [successfully demonstrating our engineered-barrier system](#) through a mock emplacement trial, and publishing our [Confidence in Safety reports](#) that explain why we are confident that both sites could safely host a deep geological repository. We have also continued to act on the [Reconciliation Policy](#) we established in 2019, most recently by [publishing our first Reconciliation Report \(2021\)](#), continuing our journey towards Reconciliation.

In this triennial report, we provide an overview of our activities to implement Canada's plan during the past three years and an update on our financial position.

Submitting this report to Canada's Minister of Natural Resources and making it available to the public fulfil one of our obligations under the [Nuclear Fuel Waste Act](#) (2002).

The NWMO is committed to meeting or exceeding all applicable regulatory standards and requirements for protecting the health, safety and security of people and the environment. The project we are implementing is regulated by the Canadian Nuclear Safety Commission, which administers its licensing system in co-operation with other federal, provincial and municipal government departments and agencies in areas such as public and worker health and safety, environmental protection and transportation. To learn more about how our work is regulated, visit our [Regulatory oversight](#) web page.

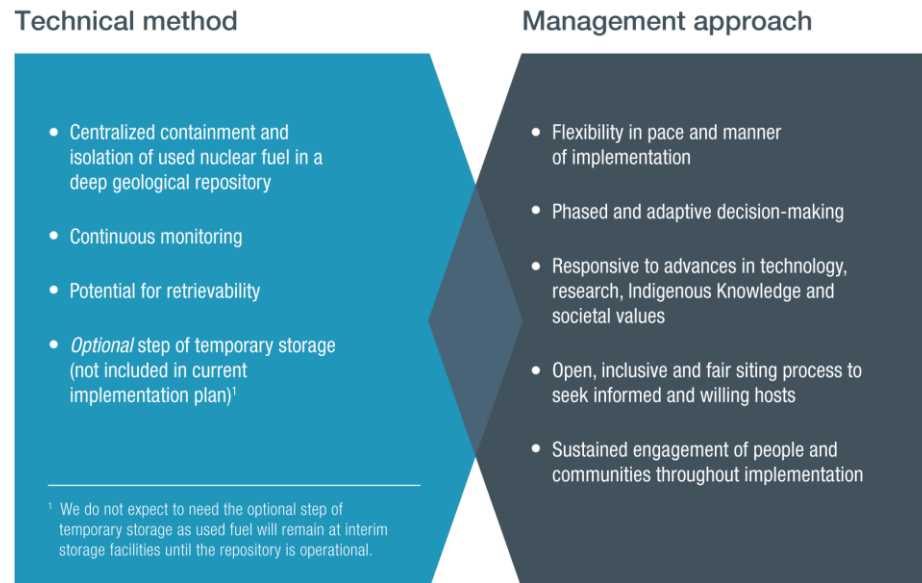
Each year, the NWMO publishes a report that provides an update on the amount of used nuclear fuel in Canada and projections for future amounts from existing and announced projects. As the organization responsible for implementing Canada's plan for used nuclear fuel, we will also be responsible for managing used fuel from new nuclear technologies, such as small modular reactors (SMRs).

In 2022, for the first time, our [Nuclear Fuel Waste Projections](#) report was updated to include projections for two SMR projects that are in the licensing process in Canada. We are confident that we can accommodate the long-term management of both this different type of used fuel and this small increase in volume.

To further demonstrate our ability to continually adapt and help improve accessibility, we have developed the first digital triennial report this year. We encourage you to check out our digital triennial report at [www.nwmo.ca/triennialreport 2020_22](http://www.nwmo.ca/triennialreport2020_22), which includes videos, animations, a search function and more.



ADAPTIVE PHASED MANAGEMENT



Canada's plan, known as Adaptive Phased Management (APM), involves a technical plan and a phased and flexible implementation strategy. It is both a technical method (what we plan to build) and a management approach (how we will work with people to get it done). The technical method involves developing a deep geological repository in a suitable rock formation to safely contain and isolate used nuclear fuel. The management approach involves phased and adaptive decision-making, supported by public engagement and continuous learning.

Initially, 22 communities expressed interest in learning more and exploring their potential to host the project. Through progressive technical studies and engagement efforts designed to help interested communities learn more about the project and express their perspective on it, that list was gradually narrowed down. Since early 2020, we have been focused on two potential siting areas: the Wabigoon Lake Ojibway Nation (WLON)-Ignace area and the Saugeen Ojibway Nation (SON)-South Bruce area, both in Ontario. The WLON-Ignace area and the SON-South Bruce area have both been deeply involved since 2010 and 2012 respectively.

Canada's plan will only proceed in an area with informed and willing hosts. Working together with the communities in potential siting areas, we continue to explore the potential for partnership, provide support for the processes they will use to evaluate and express willingness, and discuss how the project could be implemented in a way that enhances community well-being.

Canada’s plan is adaptive by design. This aspect became especially important during the three years covered by this report. As the pandemic continued to evolve, we found ways to further adapt our work – from how we engage with communities and provide Reconciliation training to our staff, through to how we conduct technical work at our Discovery and Demonstration Centre in Oakville, Ont. We are proud to have maintained momentum in delivering on our mandate.

We are now approaching a significant milestone – we expect to select a site by 2024. The work we are conducting today is laying the foundation for a transition to a new series of activities. Once a preferred site is selected, we will initiate the regulatory decision-making process, construct a Centre of Expertise and begin to transition our operations to the site.

The next phase of our work is fast-approaching, and we will be ready. This project is important for the potential siting areas, for the environment, for industry, and most of all, for protecting Canadians and Indigenous peoples for generations to come.

INFORMING AND GUIDING OUR WORK

Values

Six fundamental values guide our work.

SAFETY We place all aspects of public and employee safety – including environmental, conventional, nuclear and radiological safety – first and foremost in everything we do.	INTEGRITY We act with openness, honesty and respect.	EXCELLENCE We use the best knowledge, understanding and innovative thinking, and seek continuous improvement in all that we do in our pursuit of excellence.
COLLABORATION We engage in a manner that is inclusive and responsive, and that supports trust, constructive dialogue and meaningful partnership.	ACCOUNTABILITY We take responsibility for our actions, including wise, prudent and efficient management of resources.	TRANSPARENCY We communicate openly and responsibly, providing information about our approach, processes and decision-making.

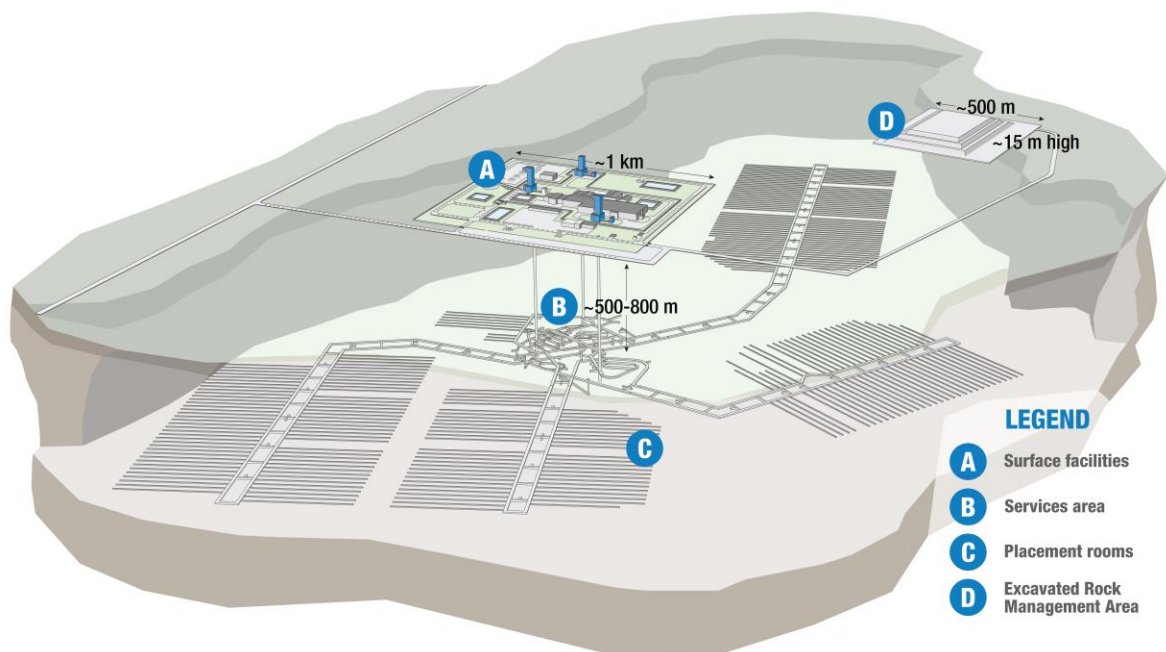
AN ETHICAL AND SOCIAL FRAMEWORK

We are guided by an [Ethical and Social Framework](#) that was first published in 2004. It was developed with the involvement of leading Canadian ethicists and Indigenous thought leaders during the study phase of our work. We continue to build on this framework as the project moves forward.

The *Ethical and Social Framework* incorporates the following principles:

- Respect for life in all its forms, including minimization of harm to human beings and other sentient creatures;
- Respect for future generations of human beings, other species, and the biosphere as a whole;
- Respect for peoples and cultures;
- Justice across groups, regions and generations;
- Fairness to everyone affected, particularly minorities and marginalized groups; and
- Sensitivity to the differences in values and interpretation that different individuals and groups bring to the dialogue.

THE DEEP GEOLOGICAL REPOSITORY



This diagram shows a conceptual layout for the surface facilities, as well as an approximate area of 1,500 acres (600 hectares) for the underground services area and placement rooms in the deep geological repository, at the proposed site with crystalline rock. This design will continue to evolve as the project progresses and will adapt to changes in technology and future decisions about nuclear power generation that may change the volume or type of fuel to be managed.

The deep geological repository uses a multiple-barrier system designed to safely contain and isolate used nuclear fuel over the very long term. Constructed more than 500 metres below ground, the repository will consist of a network of placement rooms that will store the used nuclear fuel.

At the surface, there will be facilities where the used fuel is received, inspected and repackaged into purpose-built containers encased in a bentonite clay buffer box, before being transferred to the main shaft for underground placement. There will also be facilities for administration, security, processing of sealing materials, quality control, and ongoing operation and monitoring of the site.

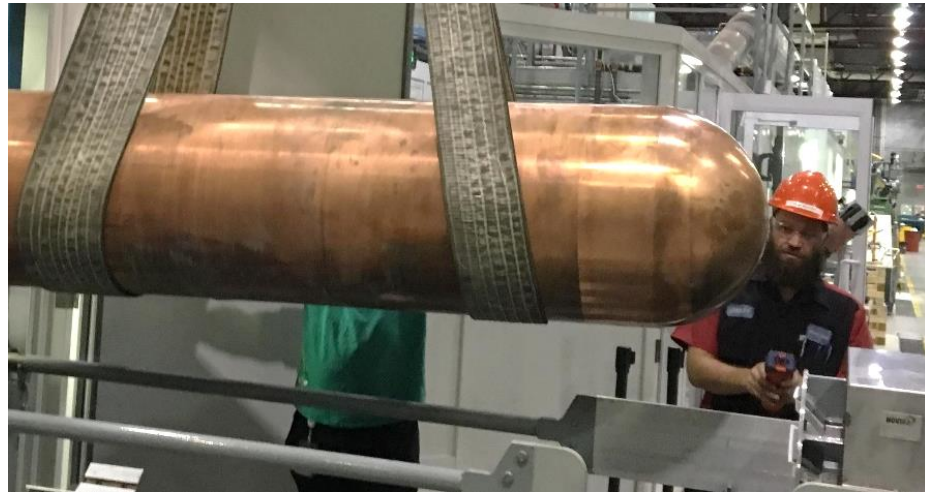
The repository will include a centralized services area that will allow for underground ventilation through three shafts located within a single, secure area. The layout also includes multiple access tunnel arms that will let our technical specialists situate the placement rooms in areas with the most suitable rock. The buffer boxes will be arranged in the horizontal placement rooms, and any spaces left over will be backfilled with bentonite clay pellets or chips.

To prepare for the regulatory decision-making process and construction, the NWMO has begun work on site-specific conceptual designs of the repository layout based on information from geoscience assessments and initial borehole drilling in the potential siting areas. This is an iterative process – as the NWMO develops additional site-specific information, we will continue to evolve the design of the repository. The proposed site in the WLON-Ignace area would be located in crystalline rock, and in the SON-South Bruce area, it would be in sedimentary rock. After site selection, additional site characterization work will begin to further inform the design.

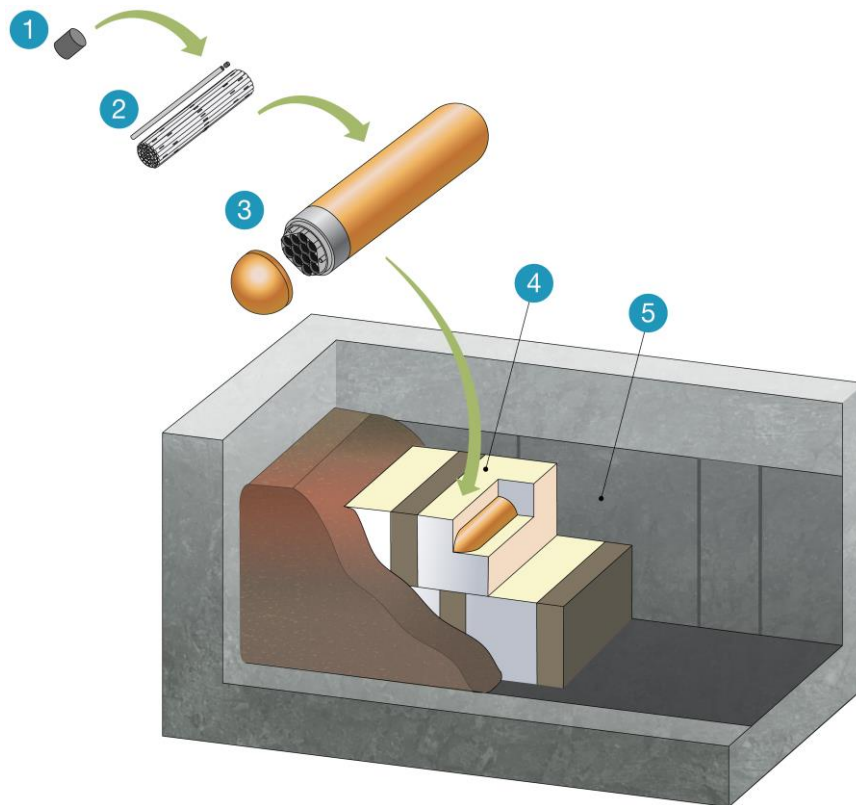
Rigorous safety standards govern the project. We have committed to meet or exceed all applicable federal and provincial regulatory requirements to protect the health, safety and security of people and the environment for generations to come.

THE MULTIPLE-BARRIER SYSTEM

The NWMO's prototype container for used nuclear fuel is unloaded from a machine where a copper coating was applied at the National Research Council's Boucherville facility in Québec.



A series of engineered and natural barriers will work together to safely contain and isolate used nuclear fuel within the repository. Each barrier will provide a unique and stand-alone level of protection, while serving as a backstop to the last barrier. If any of these barriers were to fail, another would be there to ensure any dangerous materials remain contained or isolated.



This diagram shows the multiple-barrier system that will contain and isolate the used nuclear fuel.

1. The first barrier is the fuel pellet. Fuel pellets are a very stable, solid ceramic, made from highly durable baked uranium dioxide powder. They are stored end-to-end in long tubes made of a strong, corrosion-resistant metal.
2. The second barrier is the fuel bundle, made from a highly corrosion-resistant material called Zircaloy, which contains a number of these tubes.
3. The third barrier is a copper-coated steel container. These containers are engineered to resist corrosion and are strong enough to keep the used nuclear fuel completely contained until its radioactivity decreases to safe levels. They are designed to survive underneath 3,000 metres of snow, ice and meltwater, 800 metres of rock and dirt, groundwater, and surrounding clay pressure.
4. The fourth barrier is a buffer box made of highly compacted bentonite clay that encases each container. Bentonite clay is a natural material proven to be a powerful barrier to water flow. It is very stable, as observed in natural formations that are hundreds of millions of years old. It also naturally prevents microbial growth, which will help maintain the integrity of the container over a long time.
5. The fifth barrier is the rock itself, which will protect the repository from disruptive natural events, water flow and human intrusion.

OUR TIMELINES

Although the pandemic has impacted our work, we have remained focused and productive. While some initiatives had to be paused temporarily, we were able to bring forward others by several months. Still, it was necessary to adjust some of the planned timelines to fully address all the work associated with the regulatory decision-making process. This included delaying our timeline for site selection from 2023 to the fall of 2024, due to the loss of time for the face-to-face engagement that is so critical to our consent-based siting process.

By strategically adapting our work plans over the course of the past three years, we have remained on track to meet our timeline to begin construction of the repository in 2033. Site selection will mark the next major milestone in Canada's plan, as the decision will bring to an end the siting process we initiated in 2010. We are committed to moving forward with Canada's plan. The following graphic provides a snapshot of historic milestones for the project and estimated timelines for future key steps in the process.

Developing Canada's plan	2002	The NWMO is created.
	2005	As required by the <i>Nuclear Fuel Waste Act</i> , the NWMO completes <i>Choosing a way forward</i> , a three-year study of the alternatives for the safe, long-term management of Canada's used nuclear fuel. The study involved interested individuals, leading scientists and other experts, Indigenous peoples and the Canadian public.
	2007	Government of Canada selects Adaptive Phased Management (APM) and mandates the NWMO to begin implementation.
Developing the siting process	2008-09	Work takes place with citizens to design a process for selecting a central, preferred site for the deep geological repository and Centre of Expertise.
Identifying a site using the siting process	2010	The siting process is initiated.
	2010-15	Twenty-two communities initially express interest. In collaboration with interested communities, the NWMO conducts initial screenings, followed by preliminary assessment desktop studies and community engagement. Areas with less potential to meet project requirements are eliminated from further consideration.
	2015-24	The NWMO expands assessment to include field investigations. Areas with less potential are eliminated from further consideration as the narrowing down process continues.
	2022	The Government of Canada reaffirms that a deep geological repository is the best solution for Canada's used nuclear fuel.
	2024	A single, preferred site is identified.
Towards construction	2025	Additional site characterization activities are initiated at selected site. The NWMO begins the federal impact assessment process and the Canadian Nuclear Safety Commission's (CNSC) regulatory decision-making process. An updated transportation planning framework is issued (updated every three years).
	2028	Impact assessment studies are submitted as part of the regulatory decision-making process.
	2030	The grand opening of the Centre of Expertise is held. The impact assessment is approved (estimate). The Licence to Prepare Site is granted (estimate). The Licence to Construct application is submitted to the CNSC.
	2032	The Licence to Construct is granted (estimate).
	2033	Construction begins.
Beginning operations	2040-45	Operations of the deep geological repository begin. Transportation of used nuclear fuel to the repository begins.
Extended monitoring	Post-operations	Decades of monitoring are initiated.

THE NWMO BY THE NUMBERS (2020-22)

2

areas remain in the site selection process, both in Ontario: the Wabigoon Lake Ojibway Nation-Ignace area in the northwest and the Saugeen Ojibway Nation-South Bruce area in the south.

10

buffer boxes were assembled using our technology for remote operation in a deep geological repository.

32

blocks of highly compacted bentonite (a key element in the multiple-barrier system) were pressed.

34

community studies published in 2022 focused on the potential benefits and impacts of the project in the siting areas.

77

Learn More Agreements were signed with communities and organizations, through which they receive the resources, information and funding to learn about Canada's plan.

123

new hires at the NWMO included full-time, long-term contract and temporary positions – many were hired directly in the potential siting communities.

20

was the NWMO's age in 2022.



26

NWMO policies, procedures and standards have had a Reconciliation assessment to ensure Reconciliation is reflected in all our work.



35

research groups were supported at 17 Canadian universities.



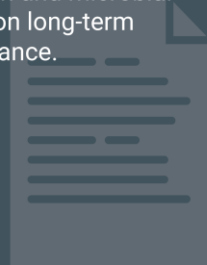
~50

new hires were for summer student and intern positions, which is one of the important ways we engage youth and develop the skills and capacity needed to support this multi-generational project.



70

technical journal articles were published or submitted, and we also published key reviews of topics such as copper corrosion and microbial effects on long-term performance.



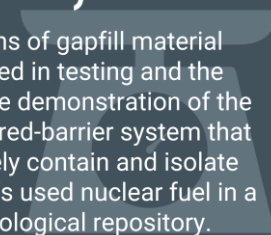
123

events were hosted at our Mobile Learn More Centre, a rolling informational exhibit.



~27,000

kilograms of gapfill material were used in testing and the full-scale demonstration of the engineered-barrier system that will safely contain and isolate Canada's used nuclear fuel in a deep geological repository.



Aligning with Indigenous perspectives

Through ceremony, the NWMO issued a Reconciliation Policy (2019) that sets out how we will contribute to Reconciliation. The NWMO's Executive Committee, Board of Directors and employees were in attendance as we committed to this promise in the presence of the Council of Knowledge Holders.



In the NWMO [Reconciliation Policy \(2019\)](#), we follow the Truth and Reconciliation Commission's (TRC) definition of Reconciliation as “an ongoing process of establishing and maintaining respectful relationships.”

Over the past three years, we have worked to meet our commitment to Reconciliation and measured our progress using both qualitative and quantitative approaches. The same year the policy was released, the NWMO developed a Reconciliation baseline, and since then, we have developed a Reconciliation measurement matrix and applied our Reconciliation assessment tool to evaluate where we are in our contributions to Reconciliation.

Our Indigenous Relations team worked with Reciprocal Consulting – an Indigenous-owned firm specializing in Indigenous evaluation and monitoring – to develop our first annual [Reconciliation Report \(2021\)](#). The Reconciliation Report is an important development in the NWMO's Reconciliation journey, building upon a strong foundation of meaningful dialogue with Indigenous peoples since our inception in 2002. It also provides a resource for other Canadian companies to consider how they will publicly set out to contribute to Reconciliation in their work.

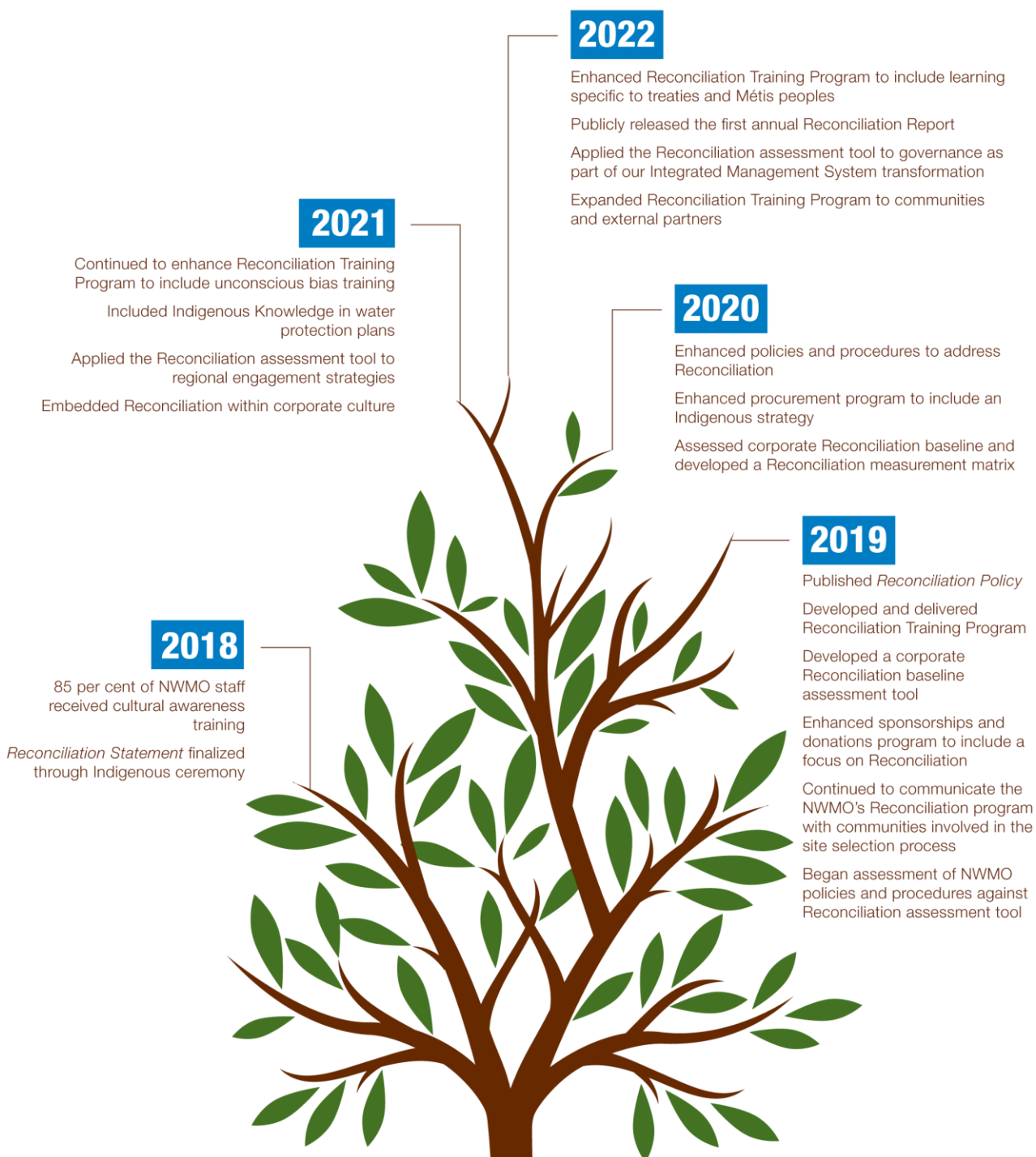
In summer 2022, the Reconciliation Report (2021) was published, fulfilling our commitment to measure annually and report contributions to the TRC's calls to action by providing an evaluation of the NWMO *Reconciliation Policy's* impacts since its formalization in 2019. Activities tracked have included, but are not limited to:

- Mandatory staff Reconciliation training;
- Continuous learning opportunities;
- Culturally based workshops;
- Holistic support systems for staff that benefit mental health, such as Indigenous sharing circles; and
- Community-driven work plans.

The NWMO staff have engaged in our Reconciliation Training Program that includes training and cultural awareness learning opportunities, which we have also extended to contractors and external partners. By learning to understand and honour Indigenous Knowledge, perspectives and worldviews, we are living our values and helping set new standards for corporations who adopt the United Nations Declaration on the Rights of Indigenous Peoples (including call to action 92).

Our efforts have not gone unnoticed. The NWMO received international recognition for communications around our Reconciliation journey – the 2020 Gold Quill Award from the International Association of Business Communicators.

NWMO RECONCILIATION STRATEGY



CREATING A RECONCILIATION CULTURE

Creating a Reconciliation culture has required daily practices such as land acknowledgments, ongoing training and learning opportunities, as well as recognition and support of Indigenous-led events.

Throughout the past three years, a significant focus of our Reconciliation work has been on advancing learning as it relates to meaningful conversations and the “ongoing process of establishing and maintaining respectful relationships.” This three-part Reconciliation Training Program includes training modules focused on cultural awareness, ReconciliACTIONS we can all take, identity and land, and recognition of the importance of treaties. By the end of 2022, more than 80 per cent of our staff had completed Part II of the Reconciliation Training Program, and 50 per cent had completed Part III.

In 2022, the NWMO developed, piloted and delivered additional mandatory training to the NWMO’s staff focused on Métis awareness, to further enhance organizational learnings on Reconciliation. This emphasis on educating staff about Métis history, rights and culture will aid us as we continue to strengthen our understanding of how to best respect Métis interests in our work.

In 2020, a land acknowledgment guide was created and made available to staff on the NWMO’s intranet. Learnings from it were presented at a staff lunch and learn, with a focus on the importance of heartfelt and authentic land acknowledgments. We continue to encourage staff to reflect on and evolve these acknowledgments as related to their own Reconciliation journeys.

We also continue to participate in Indigenous dates of significance and events to enhance learning and promote discussion about Indigenous worldviews and history. For example, we annually recognize Red Dress Day, National Indigenous History Month, National Indigenous Peoples Day, the adoption of the United Nations Declaration on the Rights of Indigenous Peoples, and National Day for Truth and Reconciliation, also known as Orange Shirt Day.

THE IMPORTANCE OF INDIGENOUS KNOWLEDGE

As stated in our *Indigenous Knowledge Policy (2020)*, “Indigenous Knowledge is an evolving, complex and sophisticated system of knowledge drawing on millennia of wisdom and experience. It is an evolving knowledge system that ranges in diversity from governance, ecology, biology, ecosystems, harvesting, science and other aspects. It constantly grows and expands with the experience of new generations.” Since our inception in 2002, creating space for Indigenous voices, as well as understanding and honouring Indigenous worldviews, has improved the quality of our technical work and ability to engage with communities.

In line with our *Indigenous Knowledge Policy*, it is important that we consider different perspectives and how aspects of Indigenous Knowledge systems can be respectfully aligned with the project moving forward. Since 2018, we have hosted annual workshops as part of our Indigenous Knowledge and Western Science event series. Workshop discussions have explored opportunities for these two worldviews to align on topics that benefit research applications related to our project such as the importance of water, the historic and present-day significance of copper, and understanding the importance of relationship building.



A visual scribe captures the spirit of the fifth annual Indigenous Knowledge and Western Science workshop focused on taking action on our Reconciliation commitments.

Importantly, these group discussions evolved from describing this shared work as “interweaving” to “aligning.” Following guidance from the NWMO’s [Council of Knowledge Holders](#), it was decided that “alignment” is more reflective of the event series’ tradition of respectful exchange between different worldviews. These dialogues set out to ensure that both knowledge systems can contribute fully while retaining their distinctiveness.

The annual workshops that happened from 2020 through 2022 were built on the thoughtful dialogue of previous years, with workshop topics anchored by discussions on fundamental differences, interconnectedness and aligning worldviews to address the safe and secure storage of nuclear waste.

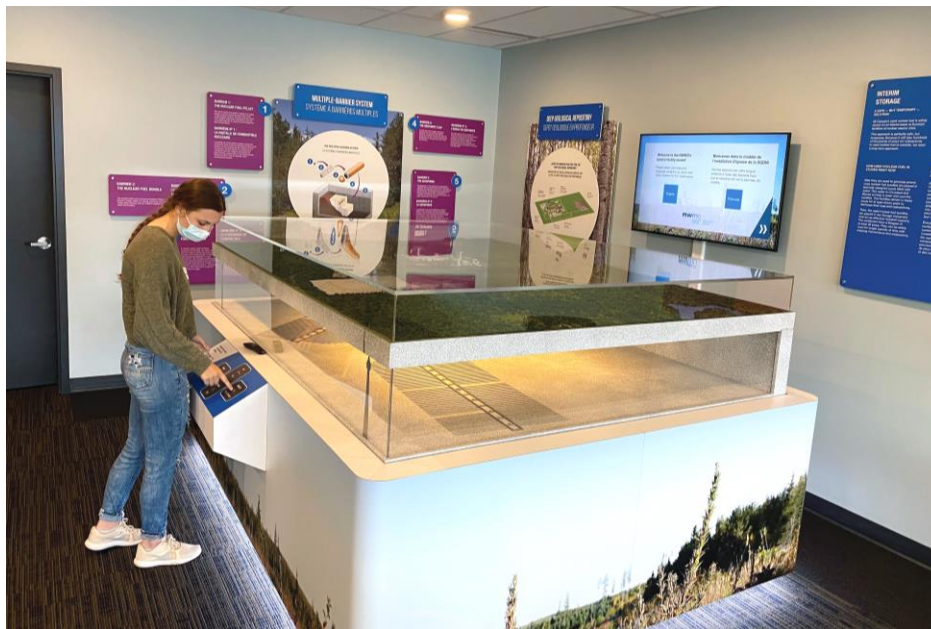
For example, in 2021, our workshop, titled “Water First,” focused on creating space to understand the importance of water protection and the sacred relationship that Indigenous women have with water. Bridging the gap that exists between these two worldviews required relational work to nurture a different understanding – the concept that water has memory.

The NWMO is working to align with Indigenous Knowledge systems throughout our work as we continue to develop our understanding of Mother Earth – and its evolution over time – when considering the safe, long-term management of Canada’s used nuclear fuel.

The importance of relationship building and exchange with Indigenous peoples is critical to the success of Canada’s plan.

Community engagement

The renovated NWMO Ignace Learn More Centre features new displays, including a large 3D model of a deep geological repository.



Since early 2020, two areas remain in our site selection process – the Wabigoon Lake Ojibway Nation (WLON)-Ignace area and the Saugeen Ojibway Nation (SON)-South Bruce area, both in Ontario. We continue to support communities and create meaningful connections through our engagement work to develop broad awareness and understanding of Canada's plan. A full list of engagement activities is published as a separate document, available in the [reports](#) section of our website.

Our engagement activities with Indigenous peoples in and near the siting areas continue, as we work to align with Indigenous Knowledge throughout our work. Through extensive engagement, we continue to move collaboratively towards defining partnership in both potential siting areas.

The pandemic had a significant impact on the NWMO's activities, creating unprecedented challenges to engagement. There were periods of time when public health measures required most staff to work from home, limited or prevented meetings and gatherings altogether, and closed our offices in Toronto – and for some time, our offices in the potential host communities. However, the NWMO ensured we remained present, virtually when necessary, as we adapted alongside the communities working to select a site for Canada's plan.

In 2021, NWMO President and CEO Laurie Swami visited the Township of Ignace, WLON and the Municipality of South Bruce, and met with leadership from SON, as part of her commitment to ongoing conversations with communities participating in the site selection process. These conversations continued in 2022 with further visits and meetings.

Throughout 2022, the NWMO shared our commitment to safety and protecting water, aligning our communication efforts with what we have heard from communities that they want to learn more about with respect to the project. Across a variety of platforms, the NWMO has worked hard to ensure we are providing people with accessible, fact-based information on Canada's plan that responds to the feedback and questions we hear most frequently.

Since this project is multi-generational, it is critical that the NWMO invest in the education of youth in STEM (science, technology, engineering and mathematics) learning. The NWMO also puts sponsorship and donation dollars to work to meet the needs of students and community groups.

The work of the NWMO continues to gain greater public attention as we approach identifying the preferred site in fall 2024. We continue to lean on science and explore meaningful ways to share information about Canada's plan that resonate with people living in potential host communities and beyond.

MUNICIPAL ENGAGEMENT ACTIVITIES

Over the last three years, much of our engagement in municipalities has been focused on explaining the technical aspects of Canada's plan. Throughout 2022, we also began sharing some of the important socio-economic benefits associated with the project. The NWMO has worked to build community awareness and understanding through multiple channels and in-person events. Our proactive in-person and virtual presence in communities – supporting local events and priorities – has been aimed at sharing information, answering questions and addressing concerns.

The NWMO has engaged with local municipal leadership and community liaison committees in each of the remaining siting areas. These committees provide input as we work collaboratively to build awareness and understanding. We also conducted other public outreach activities through meetings in person and online, and by phone. For example, we held workshops in the WLON-Ignace area and the SON-South Bruce area to share information and seek input about the environmental baseline monitoring program, which were held virtually once the pandemic began.



The NWMO's staff visit Formosa, a community in South Bruce, Ont., with the Mobile Learn More Centre.

Since our Mobile Learn More Centre launched in 2019, this rolling information exhibit has visited interested and neighbouring communities in both potential siting areas, as well as the broader regions. Once we were able to reopen in 2021, we carefully followed pandemic-related safety protocols, including wearing masks, limiting attendance and following public health guidelines to ensure our in-person engagement was the safest possible for the communities.

Our approach to defining willingness for siting the project has always been community-driven. Each of the potential host communities remaining in the site selection process have developed individual processes for defining willingness. The NWMO continues to support the communities and residents by providing the information required to make informed and willing decisions.

In 2022, the NWMO issued responses to the Municipality of South Bruce on its [36 guiding principles](#), a set of principles developed by the community that reflect its priorities and expectations for the project. These responses formed the basis of the Memorandum of Understanding (MOU) signed by the NWMO and the municipality in 2022.

This MOU provided the NWMO and the Municipality of South Bruce a starting point to begin negotiations on a draft hosting agreement – an agreement between the community and the NWMO that will provide details around elements such as employment, training, procurement, environmental monitoring, the role of the community in the project and the benefits of the project. Similar discussions took place with the Township of Ignace, creating the foundation for an MOU and negotiation framework.

ENGAGING INDIGENOUS COMMUNITIES

Over the past three years, Indigenous communities often closed off access to in-person engagement activities out of concern for the health of their vulnerable populations during the pandemic. Through this period of reduced access to these communities, the NWMO continued to engage virtually, and when appropriate, in person, with Indigenous peoples in and near the potential siting areas. As we sought to build sustainable relationships with First Nation and Métis peoples in the siting areas, we maintained ongoing engagement with national, provincial and treaty Indigenous organizations. These engagements include over 22 separate groups and communities across Ontario and New Brunswick.

The NWMO actively engaged with Elders, youth and community members (both on- and off-reserve), as well as Chiefs and Councils or leadership, to provide information about Canada's plan. We also hosted specialized sessions with subject matter experts on issues such as the environment, geology, radiation, transportation and baseline studies.

Throughout the 2020-22 period, we attended community events, open houses, drop-in sessions, regional learning and sharing gatherings, youth conferences, cultural awareness workshops, assemblies, conferences and special occasions in the area. Extensive use of the Mobile Learn More Centre was featured in Indigenous communities in both siting areas. Once the pandemic restrictions were relaxed, the NWMO also invited interested community members to attend tours of Ontario Power Generation's used fuel dry storage facilities, as well as to visit our Discovery and Demonstration Centre in Oakville, Ont., and the research reactor at McMaster University in Hamilton, Ont.

There are many ways that funding from the NWMO's programs for supporting participation in the engagement process are used in and by Indigenous communities, including community well-being activities such as food hampers, traditional land use studies, strategic planning, pandemic supplies, cultural verification, youth gatherings, wellness camps, Reconciliation events and science camps.

The First Nation and Métis communities that we engaged between 2020 and 2022 include:

- Aamjiwnaang First Nation (Ont.)
- Aboriginal People of Wabigoon (Ont.)
- Assembly of First Nations
- Congress of Aboriginal Peoples
- Dryden Native Friendship Centre
- Eagle Lake First Nation (Ont.)
- Grand Council Treaty #3 (Ont.)
- Historic Saugeen Métis
- Lac des Mille Lacs First Nation (Ont.)
- Lac Seul First Nation (Ont.)
- Ontario Coalition of Indigenous Peoples
- MAWIW Council (N.B.)
- Métis Nation of Ontario – Georgian Bay Traditional Territory Métis Community (Ont.)
- Métis Nation of Ontario – Northwestern Ontario Métis Community (Ont.)

- Métis Nation of Ontario Secretariat, including 30 Chartered Councils (Ont.)
- Mi'gmawe'l Tplu'taqnn Inc.
- Naotkamegwaning (Whitefish Bay) First Nation (Ont.)
- Nigigoonsiminikaaning (Red Gut) First Nation (Ont.)
- Ojibway Nation of Saugeen (Ont.)
- Saugeen Ojibway Nation (Chippewas of Nawash Unceded First Nation and Chippewas of Saugeen First Nation) (Ont.)
- Seine River First Nation (Ont.)
- New Brunswick Indigenous Career College (formerly Union of New Brunswick Indians Training Institute)
- Wabigoon Lake Ojibway Nation (Ont.)
- Wabauskang First Nation

We held a range of online activities with the Métis Nation of Ontario (MNO) during the pandemic, from environmental workshops and transportation engagement sessions, to in-depth dialogues on the importance of water. All engagement sessions with MNO have seen an increase in participation from years past. In collaboration with MNO staff, we mapped out water sampling locations for a Métis-specific monitoring program, conducted by the Métis, for the Métis, in the South Bruce area.

With lockdown restrictions easing, we also brought the Mobile Learn More Centre to the northwestern Ontario Métis community, as well as all four Métis Councils in the South Bruce/Georgian Bay area. Following several years of engagement, these Métis communities now know more about the project and what aspects of it they want to learn more about. We anticipate that in the following years, engagement with the MNO will have greater focus on those areas of importance to the Métis and how the MNO may collaborate with the NWMO in the future.

In southern Ontario, the NWMO's Indigenous engagement staff travelled to the SON communities of Chippewas of Nawash Unceded First Nation and Chippewas of Saugeen First Nation on a weekly basis. We held drop-in information sessions and participated in various community events such as the SON Vendor Market and Trade Show and holiday celebrations. The team met with the SON Environment Office staff on a weekly basis to discuss upcoming events, provide updates on engagement and share organizational information. We also met occasionally with SON leadership at joint council meetings and through its advisory team.

In response to the pandemic, our southern Ontario Indigenous engagement staff rolled out a virtual home visit presentation program. They met with groups or families virtually, sharing information with participants and giving them the opportunity to ask questions. To date, the team has delivered approximately 20 of these presentations to SON members, on- and off-reserve.

YOUTH ENGAGEMENT

Building capacity and creating awareness drove our youth engagement over the past three years. We continue to increase youth engagement in new and innovative ways that are interesting to youth. For example, in northern Ontario, we established day camps with a supporting curriculum that incorporates contributions from the NWMO's environmental, geoscience and Indigenous relations teams.

Education is at the heart of our youth engagement initiatives. The NWMO has expanded educational activities to include secondary, college and university students. In 2020, the NWMO signed a five-year agreement with Ontario Tech University to support access to education. The following year, the NWMO's Women for STEM Scholarship was awarded to two recipients, and five students received contributions towards tuition costs through the Indigenous Student Success Award.



The NWMO's staff and Ontario Tech University mentees kick off the STEM mentorship program in January 2020.

During this time, we co-funded with the Ontario Research Fund a five-year project bringing together nine academic researchers with diverse expertise, including young scholars. This group of experts works to fully understand and improve the long-term integrity of the NWMO's multiple-barrier system and the deep geological repository.

We also helped teachers and administrators bring more STEM education into classrooms. Since 2016, we have implemented a funding program called Early Investments in Education and Skills (EIES). Among other investments, the EIES program helps teachers and school administrators purchase and implement technology to teach everything from coding to robotics.

In 2022, the NWMO was awarded a Diversity and Inclusion Award for our work on engaging young Canadians and Indigenous peoples on the development of an Integrated Strategy for Radioactive Waste. This international recognition came from the International Association for Public Participation (IAP2). The award demonstrates effective engagement with marginalized, vulnerable populations, where the size, scope and scale reflect the breadth of geography of Canada (including remote, rural or vastness of geography).

DIGITAL ENGAGEMENT

Over the past three years, the NWMO's digital communications team has continued to share, listen to and engage with online communities across multiple social media platforms, while also using digital channels such as Google ads and our website to reach them.

In response to the challenges the pandemic posed to in-person engagement, the NWMO further ramped up our use of digital engagement. These efforts included releasing digital content branded with #DistantButSocial, which shared information about Canada's plan while affirming our commitment to pandemic safety. This hashtag was used to highlight content such as our sponsorship of community initiatives for pandemic supplies and photos demonstrating the safety precautions taken at the NWMO's events.

Our digital engagement activities aim to grow and foster online communities by sharing engaging content about Canada's plan. We have fostered that community growth by engaging with community members' questions and comments. We have also shared local initiatives and news to community members in the WLON-Ignace area and the SON-South Bruce area on a regular and consistent basis.

Our digital campaigns and online presence have sustained year-over-year growth for the NWMO. The information we share is achieving greater reach, and we expect the audience will continue to grow.

Throughout the pandemic, we also used digital engagement to share information about Canada's plan on YouTube, so that people could access this information in the safety of their homes. This included posting webinars on subjects such as our multiple-barrier system and water protection efforts, as well as #AskTheNWMO videos that seek to demystify Canada's plan by addressing topics such as the transportation of used nuclear fuel.



In response to feedback we received about the complexity of some of our online materials, the NWMO also used social media to distribute a series of 60-second [animations](#) that explain Canada's plan in a digestible and accessible fashion.

Digital engagement was also used to raise awareness about our technical accomplishments over the past three years. This included sharing footage of our emplacement trial on YouTube that demonstrated the safety of our multiple-barrier system. We also ran a series of sponsored articles in major Canadian publications that drove online engagement and provided opportunities to respond to questions from readers.

While we engage with a wide range of audiences on each social media platform, we find that certain audiences are easier to reach on specific platforms, and we keep this in mind when considering our digital engagement strategy. For example, Facebook has served well as a platform to engage community members from the siting areas to keep them informed about local events and programs. On LinkedIn, we share news and success stories with the nuclear industry, our international audiences and others interested in our work. We have also found that Twitter is an effective platform for reaching both domestic and international audiences that want to learn more about the NWMO's work.

GIVING BACK THROUGH SPONSORSHIPS AND DONATIONS

The NWMO takes part in a game to celebrate the return of minor league baseball to the Township of Ignace, Ont.



Over the past three years, the NWMO's sponsorship programs continued to demonstrate our commitment to being a good corporate neighbour by supporting the programs that are a high priority within potential host communities and the region. Some of our sponsorship and donation activities are intended to support long-term community development and well-being, while others promote education and environmental stewardship.

From 2020 through 2022, this included helping communities navigate the pandemic and supporting recovery from its impacts. We were able to move quickly to approve sponsorship requests to respond to the unique needs of communities during the pandemic.

We continued supporting partners that are focused on youth education in STEM, Reconciliation and environmental sustainability – sponsoring organizations that are well-regarded and doing good work, while acting on our commitment to be a reliable and committed partner.

We contributed annually to Scientists in School, Science North and Shad Canada to promote STEM learning in the siting areas and beyond. In 2020, the NWMO expanded our sponsorship of Science North in response to the pandemic and made virtual workshops and STEM kits available to communities across northwestern Ontario. In 2021 and 2022, Science North continued to deliver online workshops to students across northwestern Ontario. Shad also held webinars for youth across Canada, and Scientists in School delivered virtual classroom and community workshops in the SON-South Bruce area. We also supported a digital summer camp to teach young people about STEM topics through the Nuclear Innovation Institute.

In 2022, the NWMO continued to provide new sponsorships to organizations aligned with our corporate objectives and work priorities. For example, consistent with our commitment to protecting the environment, we sponsored the Maitland Valley Conservation Authority. We also sponsored the Legacy of Hope Foundation in 2020, in honour of the National Day for Truth and Reconciliation, also known as Orange Shirt Day.

ENGAGING WITH GOVERNMENT



NWMO President and CEO Laurie Swami speaks at the Rural Ontario Municipal Association Conference in January 2020.

As the NWMO prepares to move into the regulatory decision-making process, it is important that we engage with governments across Canada to ensure they are aware of the project and have the understanding necessary to make informed decisions about it.

Over the past three years, our staff engaged with representatives of federal and provincial governments to provide information about Canada's plan and our progress implementing it. We remain connected on topics of shared interest such as fieldwork activities, siting process updates and land access. The NWMO's staff work with key ministries within the federal and provincial governments as our primary points of contact and are working to expand relationships across all relevant government departments.

Our government relations work ensures that federal and provincial elected representatives are aware of updates and advancements in the project, including key ministers, parliamentary assistants, portfolio critics, and representatives of ridings involved in the siting process. Over the past three years, this work has included providing government officials and staff with tours of our Discovery and Demonstration Centre, accompanying the Ontario's Minister of Energy on a tour of Finland's deep geological repository, and participating in a roundtable with the Minister of Natural Resources Canada at the International Atomic Energy Agency's International Ministerial Conference on Nuclear Power.

In 2022, the NWMO participated in a study led by the House of Commons Standing Committee on Environment and Sustainable Development on how nuclear waste should be governed. Following this study, the committee published a report providing recommendations to the Government of Canada, several of which reflected positively on the NWMO's work, including significant emphasis on prioritizing the need for a deep geological repository for used nuclear fuel.

The Government of Canada issued a formal response to this report that affirmed the effectiveness of the NWMO's engagement efforts, highlighted how our work is consistent with international best practices, and positioned Canada as a global leader in the advancement of deep geological repositories. Included in this response, Natural Resources Canada also reiterated its support for Canada's plan to safely contain and isolate used nuclear fuel in a deep geological repository.

PARTNERSHIP

Together with the communities engaged in the site selection process, we follow a partnership road map that outlines a sequence of partnership-building topics to explore.

Continued refinement and development of a community-specific vision, identification of key considerations and allocated funding to each community will aid project advancement and ongoing community well-being efforts. This will ensure that each of our potential siting areas is in a positive position for participation.

The NWMO worked on project visioning with siting area communities in 2020. In the Township of Ignace, residents took part in online and in-person workshops, as well as providing written feedback. Additionally, many individual conversations were held regarding the project vision over the course of visits from our Mobile Learn More Centre, and a drop-in event at our Learn More Centre in Ignace. In the Municipality of South Bruce, this visioning process was facilitated through workshops. From there, the community identified a set of principles to guide discussions.

Road map to partnership

ALIGNED PARTNERSHIPS

Through a schedule developed and agreed upon with partners

Throughout the visioning process, residents of both regions were encouraged to reflect on the NWMO's community well-being framework that includes the pillars of people, economics and finance, infrastructure, community and culture, and the natural environment.

INVESTMENTS

Identify and deliver investments that drive capability and economic prosperity for partners

In 2021 and 2022, the NWMO continued to work alongside communities from the two siting areas – as well as the surrounding municipalities, and First Nation and Métis communities – to build awareness of the project, while developing and sustaining relationships.

IDENTIFY REQUIRED PARTNERSHIPS

Identify required partnerships with whom, at what level, in what combination, and when

In 2022, the NWMO invited residents of the two areas remaining in the site selection process to provide feedback on the latest conceptual architectural drawings of the Centre of Expertise. The Centre of Expertise will be a multi-million-dollar investment making it a tangible benefit of the project. As a place for world-class science and innovation, and enriching social services identified by local residents, the Centre will also bring new, high-value jobs to the community for generations to come, including scientists and experts from a wide variety of disciplines.

DEVELOP VISION FOR THE PROJECT

Develop the project vision that will meet the NWMO's and community's interests, and potential partners as well

Public feedback will be reflected in a Centre of Expertise vision summary report that will be shared with the communities in 2023 as part of the NWMO's ongoing journey of learning and dialogue with the potential siting areas. We will continue to work with the communities in the coming years as we advance the facility requirements for the Centre of Expertise.

VALUES AND PRINCIPLES TO GUIDE PARTNERSHIP DISCUSSIONS

Agree on common values and principles to guide partnership discussions

Starting from the bottom and moving upwards, the road map guides our discussions about partnership with communities.

Site assessment



Based on the results of several years of technical studies, the NWMO's team of scientists and engineers is confident that a deep geological repository can be constructed at either potential site to safely and responsibly manage Canada's used nuclear fuel for the long term.

The NWMO published [Confidence in Safety](#) reports for each site in June 2022. These reports summarized our understanding of the potential sites as of early 2022, which indicated both sites would be suitable for hosting a repository from a technical perspective. The reports are intended to support public discussion around site selection and are part of a larger and ongoing site assessment process. Ongoing and future technical work will include further site characterization studies, design development and safety analyses to confirm and build on the results to date.

From 2020 through 2022, the site assessment team continued to advance geoscientific understanding of both the Wabigoon Lake Ojibway Nation (WLON)-Ignace and Saugeen Ojibway Nation (SON)-South Bruce sites, despite the pandemic. We completed significant field programs, including the drilling and testing of deep boreholes at both sites, as well as data integration and modelling. Ongoing fieldwork activities include maintenance of equipment, monitoring the sites and collecting data, and continuing to collect and analyze groundwater samples.

An aerial view shows the borehole drilling site in the Wabigoon Lake Ojibway Nation-Ignace area.



We were able to safely demobilize our borehole drilling sites due to the pandemic in spring 2020 and remobilize them the following spring. Through 2020 and 2021, advancing fieldwork, as well as interpretation and modelling work, were important ongoing activities for the site assessment team.

In 2022, all initial site characterization field activities were completed. In total, we completed drilling and testing of six boreholes in the WLON-Ignace area and two boreholes in the SON-South Bruce area. Our technical team installed a shallow groundwater well network and a microseismic monitoring network in both areas. We are analyzing the data to further our three-dimensional understanding of the geosphere at both potential sites. We have now transitioned to an ongoing maintenance, monitoring and sampling phase of fieldwork, while also establishing detailed plans for additional site investigation after the site selection decision.

While this technical site assessment work is critical to our process to select a site, just as important is the potential for supportive and resilient partnerships. Canada's plan will only proceed in an area with informed and willing hosts, where the municipality, First Nation and Métis communities, and others in the area are working together to implement it. To learn more about the NWMO's approach to partnership, see the section [Community engagement](#).

ACCESSING LAND

In the WLON-Ignace area, the potential repository is located on Crown land, and we have worked with the appropriate government bodies to secure access for studies. We will continue to work with these governmental agencies if the area is selected.

In the SON-South Bruce area, through a series of agreements signed with landowners between 2019 and 2021, the NWMO has aggregated just over 1,750 acres of land – enough to host a deep geological repository if this site is selected. The agreements include a combination of option and purchase arrangements, which allows the NWMO to conduct studies while agricultural and quarrying activities continue on the land.

Engineering, safety and technical research



The NWMO prepares for the emplacement trial at our Discovery and Demonstration Centre in Oakville, Ont.

ENGINEERING

Over the past three years, the NWMO's engineering program focused on advancing the design of the deep geological repository and continuing to develop the project's safety assessments. This included further development of the engineered-barrier system, including manufacturing and testing of several Used Fuel Container and bentonite clay buffer prototypes. We have also been preparing conceptual designs of the deep geological repository for the two potential sites, conducting layout analysis for the Used Fuel Packaging Plant, and establishing the conceptual used fuel transportation system.

In 2022, we renamed our Proof Test Facility in Oakville, Ont., and reopened for it for in-person tours as the NWMO Discovery and Demonstration Centre. This change recognizes the value it provides to people who want to learn more about our innovative work and see it first-hand.

After more than eight years of preparation, a full-scale emplacement trial of the engineered-barrier system began at our Discovery and Demonstration Centre in spring 2022. The demonstration showcased the NWMO's ability to manufacture, handle and place the engineered barriers in a simulated underground emplacement room that replicates the deep geological repository.

In preparation for the emplacement trial, the engineering team designed, fabricated, installed and commissioned key components of the engineered-barrier system, including copper-coated Used Fuel Containers, bentonite clay blocks and gapfill bentonite clay (pellets or chips). We also fabricated the purpose-built custom equipment that will be required to manufacture and transfer the physical prototypes.

Additionally, we completed the first iteration of a conceptual design for the Used Fuel Packaging Plant. We continue to study options for the best layout to facilitate the process of repackaging the used nuclear fuel into the long-lived Used Fuel Containers.

Our repository engineering team updated the conceptual designs for the repository facility and documented them in the [2021 Deep Geological Repository Conceptual Design Report](#). Based on these revised designs, associated cost estimates were also updated as input to the [2021 lifecycle cost estimate](#), which is prepared every five years by the NWMO to comply with the *Nuclear Fuel Waste Act* and the Canadian Nuclear Safety Commission's (CNSC) licensing requirements.

SAFETY AND TECHNICAL RESEARCH

Safety assessment

For the NWMO, safety is our top priority, both in the near term, when the deep geological repository is operating, and for the long term, after it is filled, sealed off and closed. With the narrowing of the potential sites to two in 2020, the NWMO moved our focus from developing generic safety assessments (often referred to as “case studies”) to starting to develop preliminary site-specific safety assessments. This included conducting regional studies around the siting areas and site-specific supporting studies, and beginning preparatory work for site-specific safety assessments.

Regional studies completed during the period 2020 through 2022 included an assessment of potential climate change effects in the two siting regions, as well as a preliminary flood hazard assessment, including consideration of climate change. For the Saugeen Ojibway Nation-South Bruce area, we published a comprehensive review of the regional petroleum resource potential, which indicates a low potential in the proposed siting area. At both sites, there are no known resources that people in the future might want to extract such as economically exploitable minerals, gas or salt. That means that even if knowledge of the repository is lost in the distant future, the risk of human intrusion into the repository is low.

For both regions, studies on the recent seismic history were also completed to understand the occurrence and frequency of earthquakes in the region. These studies concluded that both siting areas are low risk for earthquakes.

A 3D seismic survey is being performed in the Saugeen Ojibway Nation-South Bruce area.



In site-specific supporting studies during the period 2020 through 2022, our safety and technical research team installed material test modules in a deep borehole at one of the potential repository sites. This will allow us to confirm the real-world performance of materials used in the engineered-barrier system when exposed to actual underground conditions at the site.

The NWMO's *Confidence in Safety* reports summarize our present understanding of the safety of each potential site based on information to date, including geological characteristics. The reports explain why we are confident that a deep geological repository can be constructed at either potential site and that both are suitable to safely and responsibly manage Canada's used nuclear fuel for the very long term.

The NWMO continued to advance the safety assessment work that will examine the safety and performance of the repository and be submitted in support of a licence application once a site for the repository has been selected. Since 2020, our work in this area has focused on developing updated computer models that allow for more detailed analysis of the repository, as well as preparing for the development of site-specific models for the two sites.

Research and development

The NWMO continued to advance our understanding of the science supporting the project through our research and development program. In addition to publishing key review papers on topics such as copper corrosion mechanisms and microbial effects on long-term performance, the NWMO has submitted 70 other technical journal articles during the past three years.

Pandemic-related travel and gathering restrictions meant we had to hold our annual NWMO Geoscience Seminar virtually in 2020 and 2021. This seminar brings together the NWMO's staff and university experts, as well as our international collaborators and observers – such as those from the CNSC – to share relevant research and development activities. Although we could not meet in person, the virtual format of the seminars allowed a record number of participants to attend. In 2022, we returned to our in-person format.

We were also able to maintain progress in our research activities with our university partners despite the many challenges to in-lab research caused by pandemic restrictions. In 2020, we collaborated with 30 university research groups from 19 universities; in 2021, we supported 29 research projects with 17 universities; and in 2022, we supported 33 projects with 18 universities.

International collaboration

Dr. Jeff Binns, a scientist at the NWMO, examines a clay bearing feature in the Adventure Copper Mine in Greenland, Mich.



The NWMO is committed to partnering with and learning from other organizations worldwide that are also responsible for the safe management of used nuclear fuel. Partnering with other radioactive waste management organizations allows us to foster international co-operation on developing and demonstrating the technology, to learn from other countries' experience, and to keep abreast of repository design and safety case development for various host rock formations.

Over the past three years, we have continued our collaboration with international partners to share information, conduct joint research and learn from shared experiences. In particular, the NWMO continued our participation in Posiva's Full-Scale In-Situ System Test project at its ONKALO repository in Olkiluoto, Finland. This was a full-scale underground emplacement trial of its engineered-barrier system and simulated thermal testing for modelling validation. This repository is planned to begin operations in the mid-2020s.

We also continued to support several underground experiments at the Mont Terri Project and Grimsel Test Site in Switzerland. These projects include studies of chemistry, corrosion, microbiology, sealing system performance and groundwater behaviour in natural underground conditions.

Specialists at the NWMO contributed to international projects, including:

- The Effective Rock Mass and POST Projects (with SKB of Sweden);
- The Nuclear Energy Agency (NEA) Clay Club and Crystalline Club, including support for publication of the Catalogue of Characteristics of Argillaceous Rocks;
- The NEA Integration Group for the Safety Case;
- The NEA Expert Group on Operational Safety;
- The NEA Forum for Stakeholder Confidence; and
- The DECOVALEX coupled-process modelling project.

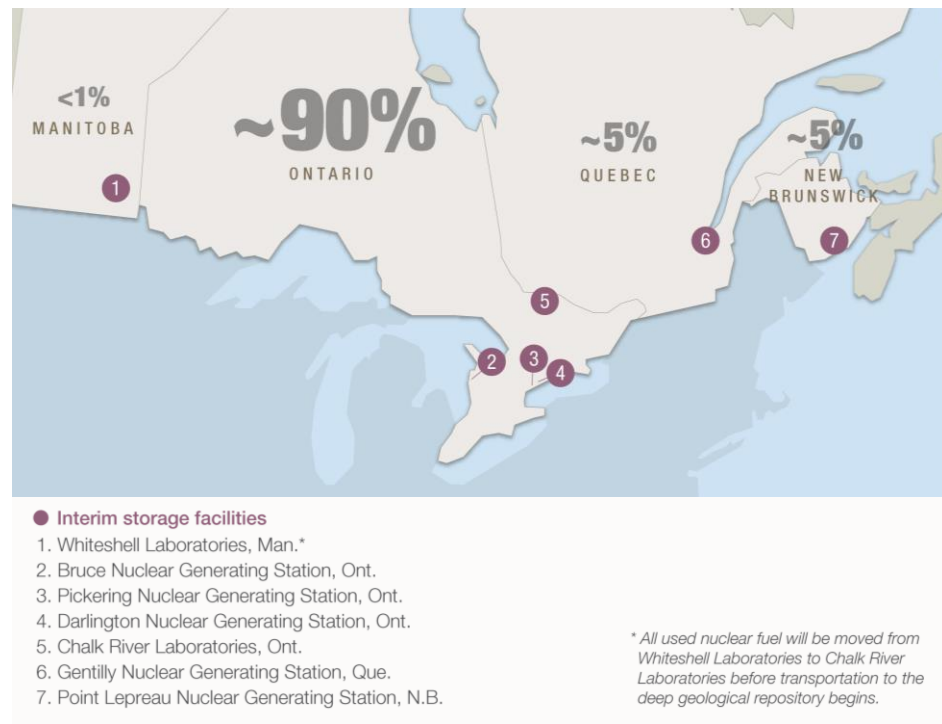
The NWMO continued to maintain our ongoing co-operation agreements with international counterparts in Belgium, France, Finland, Japan, Sweden, South Korea, Switzerland and the United Kingdom. These agreements help ensure we are considering international best practices, as well as sharing our experiences as we implement Canada's plan. As part of working with the United Kingdom in 2020, we took part in the Canada-U.K. Nuclear Energy Summit in February 2020, before the pandemic paused international travel in Canada.

In December 2021, Posiva in Finland submitted an operating licence application for its encapsulation and final disposal facility. In January 2022, SKB in Sweden received approval from the Swedish government regarding the encapsulation facility in Oskarshamn and the final repository in Östhammar. In July 2022, France published the official decree recognizing the public utility of Cigéo, which was a key step in its project for storage of nuclear fuel waste. In September 2022, Nagra in Switzerland selected a site for its deep geological repository. In November 2022, a royal decree was published in Belgium establishing a national policy for the safe, long-term management of high-level or long-lived radioactive waste, as recommended by ONDRAF/NIRAS.

In the period between 2020 and 2022, we also had the pleasure of hosting Dr. Yusuke Ogawa from Japan's Nuclear Waste Management Organization (NUMO) for several months as we co-operated with Nagra and NUMO on copper coatings.

Transportation planning

Canada's used nuclear fuel is safely stored on an interim basis at seven licensed facilities.



Once the deep geological repository is operational in the 2040s, the used nuclear fuel will be transported from the interim storage facilities where it is currently stored. The NWMO is responsible for ensuring our transportation activities, whether by road or by rail, are conducted safely and securely.

When transportation begins, used nuclear fuel will be transported in specially designed transportation packages certified by the Canadian Nuclear Safety Commission (CNSC) to meet stringent testing and regulatory requirements. The NWMO must do this in a way that meets technical and regulatory requirements, and addresses safety from a social perspective through the lens of Reconciliation, Indigenous Knowledge and western science.

As the used nuclear fuel will need to be transported through communities and traditional territories to arrive at the repository, it is essential that the transportation plan reflects public priorities and concerns. While transportation is not expected to begin until the early 2040s, work is already underway to develop the transportation plan.

The NWMO has engaged in thousands of conversations with communities and interested parties to identify their priorities and concerns, which are described in our [transportation planning framework](#). We are taking feedback from these conversations into account and have developed a draft [Preliminary transportation plan](#) and committed to updating our transportation planning framework every three years until we start transporting used nuclear fuel.

ENGAGEMENT, PLANNING AND REFINING**#DidYouKnow**

How are we
planning to
safely
transport
used nuclear
fuel in Canada?

*Check out our animation
on how we plan to safely
transport used nuclear fuel
in Canada.*

The focus of our work on transportation from 2020 through 2022 has been understanding the priorities of Canadians and Indigenous peoples related to transportation planning, documenting and incorporating them into our early planning. We actively sought feedback from Canadians and Indigenous peoples through engagement sessions, panel discussions, workshops and surveys, both virtually and in person. Our work also continues to be guided by the Council of Knowledge Holders and a new Community-Based Transportation Working Group, established in 2021.

Based on the information we gathered, we developed and published a draft transportation framework in 2020, summarizing the priorities that were identified and outlining a proposed approach to collaborative transportation planning. We then sought further input from people and communities about the draft framework and published the results in a *What we heard* report in 2021.

Using that feedback, we revised the draft framework and sought additional comments and questions about it. We then released a revised framework, reflective of people's key questions, concerns and priorities, alongside a *Preliminary transportation plan*. The *Preliminary transportation plan* was developed to begin to answer some of the more technical questions about safety and logistics that we heard as part of our engagement on the draft framework.

We continued to engage with First Nation and Métis communities as we advanced our transportation planning. Applying a Reconciliation lens to this work helps us to fully understand how planning can be implemented in a sustainable way that considers how to plan for the next seven generations, takes into account Indigenous priorities and is guided by Indigenous Knowledge.

We remain committed to engaging in conversations about the NWMO's transportation program and Canada's plan with those new to the project. During the pandemic, we found new ways to engage with people (including through virtual platforms) that we are continuing to use to reach audiences we might not otherwise be able to hear from.

We also continue to inform governments about our transportation planning through one-on-one updates with federal and provincial representatives, as requested. Over the past three years, this included providing information to an interjurisdictional working group of public servants from Transport Canada, the CNSC, and provincial transportation ministries from Ontario, Québec and New Brunswick, which meets every year.

The NWMO's transportation planning remains a work-in-progress. The transportation framework is intended to be a dynamic document. We will update our transportation planning documents every three years to properly reflect planning priorities, questions and concerns as we continue to engage with Canadians and Indigenous peoples. This is one of the ways we are committing to ensure that our planning is reflective of community values and future generations.

Please check our [transportation web page](#) for a summary of conversations and public attitude research reports related to the topic of transportation.

Caitlin Burley, Manager of Transportation Engagement at the NWMO, talks to a visitor at the Mobile Learn More Centre in the Wabigoon Lake Ojibway Nation-Ignace area.



Organizational readiness



During the period from 2020 through 2022, we focused on ensuring the NWMO has the resources we need to carry out our responsibilities in advance of site selection in 2024, and that we will be ready to undertake the many new activities that will follow. This includes having the right people, in the right jobs, at the right time. It also means giving them the training and support they need, and ensuring we continue to put safety first in everything we do. After a site is selected, there will be increased activity in the local and regional area. It will also mark the beginning of a multi-phase organizational transformation for the NWMO.

HUMAN RESOURCES

Like all organizations in 2020, the NWMO had to quickly adapt to the pandemic so our employees could continue to work safely. Through technical and training resources, employees effectively transitioned to remote work and online collaboration. Our Human Resources team was instrumental in managing the impacts of the rapid changes, and developed several processes, new safety governance and the introduction of a hybrid work model that brought employees back into the offices in October 2021.

This new hybrid work environment allows most employees to work from home up to two days per week, helping employees manage work while balancing other personal demands. During this time of variability between in-office and remote work, our Human Resources team continued to provide staff and supervisors with employee relations support and workplace coaching, and directed them to essential resources to support their mental and overall health.

Through these measures and the commitment of the NWMO's staff, contractors and advisors, we were able to maintain operations and continue preparing for the new phase that will begin when a site for the repository is selected in 2024.

To support existing work and prepare for this next phase, our Human Resources team ramped up staff recruitment with a strong focus on increasing diversity, specifically in areas of underrepresentation. 123 new employees were hired over the past three years, including full-time, long-term contract and temporary positions. Of these new hires, 47 per cent of STEM (science, technology, engineering and mathematics) vacancies were filled by women, 7 per cent identified as Indigenous (with 2 per cent hired into roles not related to Indigenous engagement or relations), and 31 per cent were visible minorities. We hired many of these employees directly in the potential host communities and filled approximately 50 summer student and intern positions, which are an important way we engage youth and develop the skills capacity needed to support this multi-generational project.

In early 2020, after 18 months of work, we implemented the Human Capital Management phase of the NWMO's Enterprise Resource Planning System, which includes a central employee database and record system, payroll and finance interface, time and attendance tracking, performance management, process workflow and an applicant tracking system to support our recruitment activities.

During the 2020 to 2022 period, important changes were made to our organizational structure to align resources with expanding areas of work and to support business plans. This resulted in an increase of staff and several promotions. Creating opportunities for career growth and development will continue to be a key retention tool as we move closer to transitioning operations to the selected site.

The NWMO's President and CEO signed on to the Electricity Human Resources Canada Leadership Accord, a public commitment to promote gender diversity within the organization, and committed to the Clean Energy Education and Empowerment Initiative's Equal by 30 campaign, a pledge to advance gender equality in the energy sector by 2030.

Throughout the past three years, we have advanced our Inclusion, Diversity and Equity initiatives to foster a safe and inclusive environment for employees, free from discrimination, harassment and violence, and to ensure our workforce is representative of the available labour market. We created short- and long-term diversity and inclusion goals and targets and are proud of our strong representation of women, Indigenous peoples and visible minorities in the workforce (43 per cent, 8 per cent, and 29 per cent respectively).

We trained our employees in diversity and inclusion fundamentals and unconscious bias. We also participated in two industry surveys to track and improve diversity, inclusion and intersectionality within the workplace. Intersectionality is a concept that describes how systems of inequality based on gender, race, ethnicity, sexual orientation, gender identity, disability, class and other forms of discrimination overlap to create unique dynamics and effects.

We further developed new governance and training related to changes to the *Canada Labour Code* to prevent workplace harassment and violence, consistent with other emerging changes to federal legislation. We also completed our annual reviews and revisions of the NWMO's *Code of Conduct*.

To further support these actions, two of our governing documents – our *Recruitment Procedure* and our *Whistleblower Policy/Procedure* – underwent a Reconciliation review to ensure Human Resources governance considers and incorporates Indigenous Knowledge into its practices.

CONTINUING TO BUILD A LEARNING ORGANIZATION

Canada's plan will be implemented over several generations and will continue to evolve. That means as an organization, we also need to be good at adapting, transferring knowledge and transforming our culture for different phases of work. An essential element of that culture is continuous learning.

During the 2020 to 2022 period, we have improved our ability to manage our learning and development process through enhanced governance and integrated scheduling and by creating a one-stop shop for learning through a platform for employees, called NWMO-University.

We also ramped up the breadth and depth of our training. In 2022 alone, we delivered more than 100 training sessions to more than 250 staff, with staff attending 11 training sessions on average. We also enhanced the ability for staff to self-direct their learning and development through the introduction of self-serve training in NWMO-University. We have also piloted a skills-based coaching program to support staff in strengthening skills.

MOBILIZATION

Even now, in the early stages of implementation, the work associated with Canada's plan employs approximately 630 people – about 230 of these are directly employed by the NWMO, and about 400 are working to support the communities' participation, the technical program and engagement work.



Over the past three years, we continued to advance the NWMO's workforce planning and mobilization strategy for the post-site-selection phase, when we will begin transitioning our operations to the site. Mobilization will be a significant undertaking and will mark an important step in our transformation through to the next project phase.

The NWMO is committed to careful advanced planning to minimize disruption to our staff and the communities we work with. Mobilization will also be an exciting opportunity for change and to implement community partnerships. Our mobilization plan is designed to ensure qualified, competent staff are trained and available to work in whichever area is selected to host the repository, in accordance with operational needs and community readiness.

The mobilization plan takes into consideration our collective agreements and human resources policies and procedures, so that we can work optimally in a new environment in the selected host area. Throughout this process, our Mobilization Information Team has continued to provide a forum for employee questions and information sharing relative to mobilization.

The NWMO seeks to maximize job opportunities in the local municipality and surrounding region, including First Nation and Métis communities, and to build capacity in communities through investments in training and education.

Preparing for licensing applications



Joanne Jacyk, Site Director for the Wabigoon Lake Ojibway Nation (WLON)-Ignace area (formerly Environment Program Manager) at the NWMO, and Andrew Milling, Aquatic Fisheries Technician at North/South Consultants Inc., conduct environmental DNA sampling to further understand aquatic species in the WLON-Ignace area.

Once a preferred site for the deep geological repository is selected in 2024, we will begin the regulatory decision-making process. This will include conducting detailed analysis of the project's environmental impact, completing a formal impact assessment, applying for a Licence to Prepare Site, and developing the materials needed to apply for a construction licence. These next steps will be rigorous and challenging – as they should be – to provide Canadians and Indigenous peoples with the assurances they need and deserve.

The NWMO has developed our regulatory decision-making plan based on the *Impact Assessment Act* and the *Nuclear Safety and Control Act*. We are also continuing our ongoing dialogue with the Canadian Nuclear Safety Commission to seek additional guidance about the information the NWMO must provide when preparing for licence applications and eventually seeking those licences.

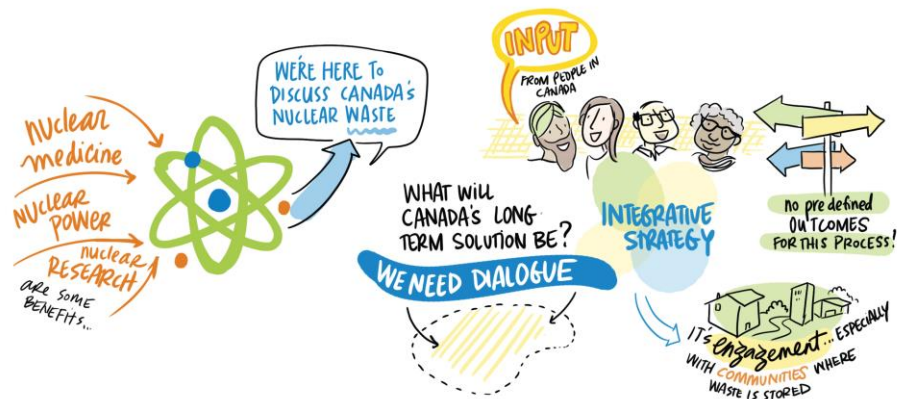
During the 2020-22 period, we have continued to work in close collaboration with Indigenous and non-Indigenous community members to establish environmental monitoring programs in the two potential siting areas. The process for designing a monitoring program for the Wabigoon Lake Ojibway Nation (WLON)-Ignace area was completed in 2020, while the process in the Saugeen Ojibway Nation (SON)-South Bruce area was completed in 2021. These programs will be updated annually.

Data collection for the environmental baseline studies in both areas began in 2021 and includes information on a number of environmental conditions such as water, air, soil and habitat. We are working with WLON in the WLON-Ignace area and with the Saugeen Valley Conservation Authority in the SON-South Bruce area. These studies will help establish an understanding of the environment in both areas before project development begins, so that any changes due to the project can be assessed, and appropriate mitigation measures can be incorporated into the design of the repository.

Working with the municipal communities, we also began data collection for socio-economic baseline studies in both potential siting areas, to give us insights into the current social, cultural, economic and health conditions. This will help us determine the extent of the changes the project will bring to those communities, including benefits from new employment and business opportunities.

Developing a Canadian Integrated Strategy for Radioactive Waste

People from across Canada are contributing to the development of an Integrated Strategy for Radioactive Waste. This is an artist illustration of one of our conversations.



All Canada's low- and intermediate-level radioactive waste is currently safely managed in interim storage. However, that storage is temporary and requires a long-term strategy.

In November 2020, Canada's Minister of Natural Resources formally launched an inclusive engagement process to ensure Canada has a modern radioactive waste policy matching international best practices and standards, while reflecting the values of Canadians and Indigenous peoples.

Recognizing the NWMO's 20 years of expertise in engaging Canadians and Indigenous peoples, the [Minister of Natural Resources asked the NWMO](#) to lead the development of an Integrated Strategy for Radioactive Waste (ISRW) to plan for the long-term solution for Canada's radioactive wastes.

The NWMO led the strategy development through a separate engagement process from that of Natural Resources Canada's engagement on the radioactive waste policy and in parallel with Canada's plan for used nuclear fuel.

Our open and transparent engagement process was built to yield a comprehensive radioactive waste management strategy that is reflective of Canadians and Indigenous peoples and informed by practical recommendations.

In 2021, the first Canadian Radioactive Waste Summit was held, with more than 500 participants engaged. Between May 2021 and March 2022, the NWMO engaged with nearly 4,000 participants through various activities. We conducted more than 70 community engagement events, technical workshops and roundtable sessions to gather opinions and insights on Canada's Radioactive Waste Strategy from individuals, industry, youth, academics and other key stakeholder groups. We further engaged with Indigenous peoples through dedicated activities.

Through our extensive engagement efforts, the NWMO's youth engagement activities saw participation from 170 diverse young Canadian and Indigenous peoples, between 14 and 29 years of age, across the country. This youth engagement process took place from April to November 2021 and included 15 virtual sessions that were conducted in English and French.

As part of our commitment to transparency, the NWMO has published a report on technical options and created several tools to ensure resources are accessible to anyone interested. We have also produced a plain language summary report on the technical options.

"What we heard" reports were also published early in 2022, summarizing what the NWMO heard from participants at various engagement events. The NWMO used these insights to help understand the priorities and preferred options for managing Canada's radioactive waste and inform the ISRW.

In August 2022, the NWMO published the draft ISRW for public comment. The draft identifies gaps in current plans for the long-term management for radioactive waste and provides technical options to address these gaps. The resulting recommendations consider options for the number of long-term waste management facilities in Canada, as well as for the staging, integration, siting, establishment and operation of these facilities for all the radioactive waste in Canada. This draft strategy does not replace other projects currently in progress but rather includes these plans.

Canadians and Indigenous peoples were invited to provide feedback. The 90-day public comment period allowed Canadians and Indigenous peoples to lend their voices to the ISRW. The final report will be submitted to Canada's Minister of Natural Resources, following the release of the revised Policy for Radioactive Waste Management and Decommissioning, to ensure the final recommendations align with and support this policy.

Governance and accountability



Canadians and Indigenous peoples can trust that the organization responsible for the safe, long-term management of Canada's used nuclear fuel has a strong governance structure in place.

Transparency is one of the NWMO's corporate values and is built into our governance structure, underscoring our commitment to communicate openly and responsibly, and to provide information about our approach, processes and decision-making. The NWMO is guided by a [Transparency Policy](#) that is aligned with all relevant freedom of information, access to information and privacy legislation.

The NWMO is federally mandated under the *Nuclear Fuel Waste Act (NFWA)*. Our members are provincially owned Crown corporations that produce used nuclear fuel. As a not-for-profit corporation, the NWMO falls under the *Canada Not-for-profit Corporations Act*.

We are governed by a nine-member Board of Directors that is elected by the member organizations. The Board represents a range of perspectives from within and outside the nuclear industry and takes a leadership role in developing the corporation's strategic direction.

The Advisory Council, an independent advisory body established under the *NFWA*, provides ongoing advice to the NWMO. Additional guidance and review on technical, social and Indigenous matters is provided by other independent expert bodies.

Sharing information and encouraging an exchange of perspectives are fundamental to our mandate to implement Canada's plan. That is why we also seek independent review of our work through a number of external committees, including the Council of Knowledge Holders, Municipal Forum, Geoscience Review Group, Environmental Review Group and Site Selection Review Group. This helps ensure we are continuously pursuing excellence.

The NWMO's integrated management system ensures we are well equipped to implement our vision, while protecting people and the environment for generations to come. During the 2020-22 period, we continued to enhance our management system to make sure it supports staff in executing their work in a manner that is appropriate for our evolving program and operations.

ANNUAL AND TRIENNIAL REPORTING TO THE MINISTER

In accordance with the *NFWA*, the NWMO produces an annual report every year that is tabled in Parliament and published on our website. The Minister of Natural Resources issues a [statement](#) on it each year.

Every third year, the NWMO produces a triennial report as required by the *NFWA*. This report is an expanded version of the annual report and covers the previous three years. The previous triennial report was for the 2017-19 period that was published in March 2020.

REPORTING TO MEMBER ORGANIZATIONS

The founding members of the NWMO are Ontario Power Generation, New Brunswick Power Corporation and Hydro-Québec. The Membership Agreement and bylaws set out member roles and responsibilities in support the objectives of the *NFWA* and the NWMO's implementation mandate. The NWMO regularly briefs our member organizations and holds an Annual General Meeting.

INTEGRATED MANAGEMENT SYSTEM

The NWMO continues to focus on ensuring our integrated management system supports our work on the project for the long-term management of used nuclear fuel. That includes meeting the requirements of the Canadian Nuclear Safety Commission and protecting people and the environment for generations to come. This is particularly important as we get closer to selecting a site for the deep geological repository in 2024 and then begin the regulatory decision-making process.

During the 2020-22 period, we continued to augment our management system to satisfy the CSA N286-12, *Management System Requirements for Nuclear Facilities*. We conducted N286-12 training and adapted our performance assessments to better assess compliance with N286-12 requirements. We developed a continuous learning and improvement program to engage all staff in contributing to the NWMO's efforts to learn from experience and continually improve our processes. We also launched an enhanced process and tool for identifying appropriate quality assurance requirements using a risk-based assessment.

BOARD OF DIRECTORS

Chair of the Board: Glenn Jager

President, CEO and Director: Laurie Swami

Directors: Lesley Gallinger, Sean Granville, Ronald L. Jamieson, Jason Nouwens, Josée Pilon, Subo Sinnathamby and Beth Summers.

The [Board of Directors](#) convened 22 formal meetings between 2020 and 2022. This included some additional meetings in 2020 to ensure strong governance as the organization managed the impacts of the pandemic. In 2021 and 2022, the Board continued to focus on recovery from the impacts of the pandemic on the NWMO's work.

In addition to its regular meetings, the Board holds a strategy session each year with the NWMO's executive team to consider long-term challenges and opportunities. However, this was not possible in 2020 as a result of the pandemic. Instead, strategic discussions were included in each of the Board's other meetings that year. The Board continued to receive regular reports from the Advisory Council and held its annual meeting with the Advisory Council virtually to discuss relevant topics of importance.

The Board also endeavours to meet annually with the Council of Knowledge Holders to ensure decision-making aligns with Indigenous Knowledge and perspectives. These meetings, which were held both virtually and in person from 2020 through 2022 due to the pandemic, provide an opportunity to exchange ideas and understand decision-making that reflects upon and respects Indigenous peoples' traditions, customs and values.



Board of Directors (from left to right, starting with top row): Glenn Jager, Laurie Swami, Lesley Gallinger, Sean Granville, Ronald L. Jamieson, Jason Nouwens, Josée Pilon, Subo Sinnathamby and Beth Summers.



Committees of the Board***Audit, Finance and Risk (AFR) committee***

The AFR committee is responsible for monitoring the integrity of the NWMO's internal control and management information systems, making recommendations to the Board for the approval of the annual financial plans, ensuring the integrity of the NWMO's reported financial performance, and providing oversight of the NWMO's pension fund. The AFR committee met 16 times during the period from 2020 through 2022, and had three joint AFR-Human Resources, Compensation and Governance committee meetings.

As of Dec. 31, 2022, the committee had five directors: Beth Summers (Chair), Lesley Gallinger, Glenn Jager, Ronald L. Jamieson and Josée Pilon.

Human Resources, Compensation and Governance (HRCG) committee

The HRCG committee is responsible for overseeing the NWMO's human resources functions, including compensation practices, human resources policies, organization design, labour relations, the pension plan and governance. The HRCG committee met 16 times during the period from 2020 through 2022, and had three joint AFR-HRCG committee meetings.

As of Dec. 31, 2022, the committee had five directors: Lesley Gallinger (Chair), Sean Granville, Glenn Jager, Josée Pilon and Beth Summers.

Project Oversight committee (previously Technical committee)

In 2020, the Technical committee transitioned to become the Project Oversight committee, reflecting the evolution towards a greater focus on project execution and oversight, while still maintaining primary oversight for the technical program.

The Project Oversight committee provides oversight of the NWMO's project planning and execution, including safety, recommending new projects for Board approval, project planning and controls, contracting strategies and contractor performance, technical matters and project risk as it relates to the implementation of Canada's plan. The Technical committee met two times in 2020, and the Project Oversight committee met 10 times during the period from 2020 through 2022.

As of Dec. 31, 2022, the Project Oversight committee had four directors: Sean Granville (Chair), Lesley Gallinger, Jason Nouwens and Subo Sinnathamby.

Siting committee

Through the Siting committee, the Board maintains oversight of the site selection process and advises on, oversees and monitors any identified risks associated with its execution. The committee met 12 times during the 2020-22 period.

As of Dec. 31, 2022, the committee had five directors: Ronald L. Jamieson (Chair), Sean Granville, Glenn Jager, Jason Nouwens and Subo Sinnathamby.

OFFICERS (as of Dec. 31, 2022)



Chair of the Board:
Glenn Jager



President and CEO:
Laurie Swami



Vice-President and Chief Engineer:
Chris Boyle



Vice-President of Communications:
Lisa Frizzell



Chief Financial and Risk Officer:
Georgina Kossivas



Vice-President of Site Selection:
Lise Morton



Vice-President of Human Resources, and Chief Ethics Officer:
Jennifer Spragge



Vice-President and General Counsel, and Board Secretary:
Doug Taylor



Vice-President of Indigenous Relations and Strategic Programs:
Bob Watts



Vice-President of Regulatory Approvals:
Allan Webster

Executive Committee (from left to right, starting with top row): Laurie Swami, Chris Boyle, Lisa Frizzell, Georgina Kossivas, Lise Morton, Jennifer Spragge, Doug Taylor, Bob Watts, Allan Webster and Derek Wilson.



Chief Operating Officer:
Derek Wilson

ADVISORY COUNCIL

The **Advisory Council** is an independent, arm's-length body that reviews and comments on the NWMO's work, as required by the *NFWA*. Its reports appear in the NWMO's triennial reports, published every three years.

The Advisory Council's role is to:

- Ensure the views of the public and communities of interest are considered and reflected in a thoughtful, balanced way in the proposed approaches and reports of the NWMO; and
- Assist the NWMO in ensuring our processes are of good quality and are open, transparent, thorough and sound.

As the NWMO's work progresses towards site selection, and as affected Indigenous organizations and potential host regions are identified, the *NFWA* requires that representatives from these communities be included in the Advisory Council.

Council members

There are currently nine Advisory Council members, representing a broad range of expertise, including engineering, community engagement, public affairs, environment, sustainable development, Indigenous relations, Indigenous Knowledge and community-based research.

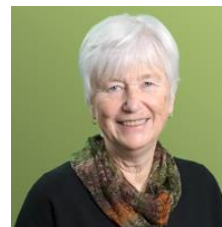
As of Dec. 31, 2022, the members are: David R. Cameron (Chair), Donald Obonsawin (Vice-Chair), Joseph Cavallancia, Monica Gattinger, Dean Jacobs, Diane M. Kelly, Dougal McCreath, Stella Swanson and Linda Thompson.

During the 2020-22 period, the Advisory Council continued to provide advice to the NWMO in these key areas:

- Site assessment, engineering and technical transportation activities;
- Plans for establishing the final siting decision process and community willingness;
- Partnership development and community well-being funding to support building partnership agreements;
- Assessments of risks related to the NWMO's work;
- Development of the NWMO's transportation planning framework;
- Business planning activities and recovery plans related to pandemic delays;
- Development of the NWMO's regulatory plans;
- Topics related to used fuel transportation;
- Reconciliation and Indigenous Knowledge activities; and
- Technical matters related to long-term safety.



Advisory Council (from right to left, starting with top row): David R. Cameron, Donald Obonsawin, Joseph Cavallancia, Monica Gattinger, Dean Jacobs, Diane M. Kelly, Dougal McCreath, Stella Swanson and Linda Thompson.



COUNCIL OF KNOWLEDGE HOLDERS (PREVIOUSLY COUNCIL OF ELDERS AND YOUTH)

The [Council of Knowledge Holders](#) is an independent advisory body with members from Indigenous communities. It provides counsel to the NWMO on the application of Indigenous Knowledge in the implementation of Canada's plan, and on enhancing the development and maintenance of good relations with Indigenous communities.

Knowledge Holders have much traditional knowledge to share with others. One of their roles is to aid decision-making based on this ancient knowledge. The NWMO is honoured to have received the counsel of Knowledge Holders over the past several years, including the period covered by this report.

The Council of Knowledge Holders grew from the Elders Forum, an advisory group established in 2005. In 2012, the Elders Forum evolved into a new advisory group, the Council of Elders and Youth, which was renamed the Council of Knowledge Holders in 2022.

MUNICIPAL FORUM

The [Municipal Forum](#) is an assembly of municipal leaders with experience and expertise in municipal issues and challenges. Established by the NWMO in 2009, in collaboration with the Federation of Canadian Municipalities, the Municipal Forum provides advice on municipal perspectives and processes to help guide the NWMO's engagement and outreach. It helps the NWMO incorporate best practices when communicating with local governments and associations, as well as helping us understand the needs and practices of municipalities that are considering hosting the project.

Membership of the forum has been refreshed during the 2020-22 period, as previous members retired or took on different roles.

ENVIRONMENTAL REVIEW GROUP (ERG)

The [ERG](#) was established by the NWMO in 2018 to provide independent expert advice and guidance on environmental programs and impact assessment theory and practice, including engagement and aligning with Indigenous Knowledge. The ERG is made up of professionals from a variety of academic and cultural backgrounds. It meets four times a year to discuss strategic issues related to assessing potential impacts of the project on the natural environment.

ADAPTIVE PHASED MANAGEMENT GEOSCIENTIFIC REVIEW GROUP (APM-GRG)

The [APM-GRG](#) is a group of internationally recognized geoscientific experts from Canada, Sweden, Switzerland and Australia. The group reviews and provides advice and guidance on the NWMO's geoscience site assessment approach, methods and findings. It was established by the NWMO to ensure that site evaluations are conducted in a consistent and traceable manner that consistently meets or exceeds best international practices. The five group members combine extensive multidisciplinary experience in areas relevant to the siting of deep geological repositories in both crystalline and sedimentary rock formations.

SITE SELECTION REVIEW GROUP

The [Site Selection Review Group](#) is made up of two internationally respected members from varied professional backgrounds. They are currently seeking to add a third member. The group provides independent advice and guidance on the NWMO's final stock-taking approach, as well as methods and criteria in advance of the site selection in 2024 to ensure the decision-making process is reasonable, comprehensive, credible and rigorous.

These review group members have knowledge and experience in nuclear waste-related siting processes and international best practices, and are seeking to add a new member with experience in the application of Indigenous Knowledge to national infrastructure projects and partnerships.

COMMUNITY-BASED TRANSPORTATION WORKING GROUP

The NWMO established the [Community-Based Transportation Working Group](#) to seek feedback from a broad range of individuals across Ontario, Québec and New Brunswick about how to implement the organization's transportation planning framework, including collaborative transportation planning and engagement and dialogue for the transportation program. The members of the working group are individuals acting as independent advisors.

PEER REVIEWS

In order to ensure our work is based on the best science, the NWMO works with leading scientists and experts from universities, in the industry or as part of international research groups. We continue to seek independent external experts to review and comment on our technical work through [peer reviews](#) when publishing research results in scientific journals and at conferences. These external reviews help ensure high technical standards are met, as well as consistency with international best practice.

What we heard on implementing Canada's plan



Engaging with Canadians and Indigenous peoples is foundational to all our work. That is why we publish an annual report outlining what we heard through ongoing dialogue and engagement with Canadians, Indigenous peoples, organizations in the remaining siting areas and the broader public. This section summarizes those reports during the 2020-22 period.

These reports have sparked adjustments to Canada's plan to reflect the priorities of Canadians and Indigenous peoples. Year to year, the overarching themes remain similar. These topics include:

- Safety;
- Transportation of used nuclear fuel;
- Canada's plan and the site selection process;
- Reconciliation and Indigenous Knowledge; and
- Partnership and willingness.

Through our engagement efforts, people in the siting areas have developed a deeper understanding of the project. The feedback we receive at meetings, at public events and by correspondence helps us understand what is important to communities in the potential siting areas and to a wider range of audiences. We also use social media, digital surveys and virtual open houses to understand people's concerns and questions. This creates opportunities for more informed conversations and for the NWMO to select topics to engage on that are relevant to the siting areas.

Community engagement informs all our work. We are committed to sharing our knowledge, learning together and addressing concerns as they arise.

SAFETY

Our highest priority is protecting people and the environment for generations to come. Over the past three years, the NWMO has continued to hear that safety in all forms is the most common concern across all regions.

The NWMO's environment program is based on a continuous learning model that adapts through the project's life to address the questions and concerns of the community co-designers as they progress through the different phases of the project. Through the environmental baseline monitoring program, the NWMO has identified community concerns around the potential impacts of Canada's plan.

Through 2020, the remaining potential host communities were able to help shape a deeper understanding of their local environmental conditions by getting involved in biodiversity impact studies. We heard that the future environmental impact of settlement brought on by the project is already on the minds of citizens.

Community workshops kicked off the design phase of the environmental baseline monitoring program. Initial input received from these workshops ranged from what should be monitored, to who should be involved and how information should be shared. It was also noted that experts should lead the design.

Based on the input we received, we are currently working with various stakeholders and rights holders on incorporating Indigenous ceremony, implementing quarterly program updates, creating opportunities for community oversight, identifying training and educational opportunities, and working with local organizations to independently collect data. Examples of community-led local data collection include the data collected by the Saugeen Valley Conservation Authority and the Township of Ignace.

Many events and meetings were held virtually for much of 2020 and into 2021, allowing people to participate in site selection activities despite the public health restrictions. When it was safe to do so, repository safety experts and other specialists began working out of community offices to better engage residents eager to have their questions immediately answered by the NWMO's specialists. We know we build trust by being available for routine interaction with residents near borehole drilling sites, municipal and regional officials, and members of local civil society. We are also aware of the need to share information based on science to demonstrate the long-term safety of hosting the repository.

Community feedback regularly inspires new areas of study. For example, in 2021, we began working with residents in northwestern Ontario to launch a community-based biodiversity program to test the baseline chemistry of various plants and animals. In southern Ontario, we partnered with the Saugeen Valley Conservation Authority to launch a joint program to conduct surface water and hydrology studies on behalf of the NWMO.

Water and the environment

Water safety is a commonly discussed theme in many conversations about Canada's plan. We often hear in both siting areas about the value of protecting water. For example, residents asked that we establish a drinking water supply monitoring program and perform a study of water cycles. We initiated both as part of our environmental baseline monitoring program.

In response to information about our multiple-barrier system, we often hear interest in learning about the behaviour of water at depths below 500 metres and how it can be studied. We continue to hear about the importance of maintaining clean, safe water above and below ground, at whichever site is selected for a deep geological repository.

We have also heard from Indigenous peoples about their sacred relationship with water and its role in the lives of animals, people and communities. The NWMO is committed to aligning with Indigenous Knowledge in our work, and we continue to learn from traditional teachings through the Knowledge Holders participating in the project.

In 2021, the Safety and Technical Research team continued to improve our understanding of Indigenous Knowledge, including conducting an Indigenous Knowledge and western science workshop on the subject of water. As work progresses, the team will seek input from Indigenous peoples on our safety assessments, including considering local lifestyles representative of the communities in the potential siting areas.

Our commitment to protecting water and responding to people's concerns led to several other essential work streams. For example, in February 2021, our Geoscience team and a contractor completed pre-drilling water sampling and testing at the potential repository site in South Bruce. In response to feedback from the community, we expanded private water well testing to include more wells.

TRANSPORTATION OF USED NUCLEAR FUEL

Planning for the safe and secure transportation of used nuclear fuel is an important component of Canada's plan. Even though transportation is not expected to begin before 2040, it is an area of interest for communities, interested individuals and groups. To date, the NWMO has engaged thousands of Canadians and Indigenous peoples to hear their comments, questions and concerns, and to provide information on transportation-related topics.

In 2020, we released and sought feedback on a [draft transportation planning framework](#) to continue the dialogue, which was then updated in 2021 based on the feedback we received. The draft framework was based on engagement between 2016 and 2019.

The response to the draft framework was generally positive. We heard that overall, the document reflected people's priorities and values. People also gave the NWMO valuable insights into how the document could be enhanced, and what they are interested in learning more about as we move through the collaborative planning process. In 2021, the NWMO published [What we heard about the draft transportation planning framework](#), a summary of the results from engagement on the draft transportation planning framework.

We use two planning documents to continue to address the wide range of priorities, questions and concerns heard to date about the transportation of used nuclear fuel:

- *Moving forward together: Planning framework for the transportation of used nuclear fuel* sets out objectives, priorities and considerations for transporting used nuclear fuel, informed by public feedback on an initial draft released in August 2020.
- The *Preliminary transportation plan* provides an overview of the technical approaches, regulatory requirements and planning assumptions that the NWMO will build on to ensure safe and secure transportation that protects people and the environment.

The NWMO's transportation approach will be subject to ongoing review and public reporting. The NWMO will review and revise the transportation planning framework every three years. These evolutions will consider updates based on factors such as evolving best practices, new technologies, ongoing adaptation and continuous improvement.

CANADA'S PLAN AND THE SITE SELECTION PROCESS

The two remaining siting areas have been engaged in a variety of site selection activities over the past three years. These range from collaborating in environmental, social and economic studies, to involvement in the planning and undertaking of technical studies like the borehole drilling program that began in 2017 and concluded in 2022.

During our engagement work in the lead up to borehole drilling, people expressed interest in the potential environmental, social, economic and cultural effects of borehole drilling. For example, we heard about the importance of protecting fish and wildlife habitats and preventing environmental contamination. In response, we established baseline monitoring of fish and wildlife habitats, and also collected samples of soil, well water and surface water to ensure we could monitor any impacts from the borehole drilling.

Additionally, some people who use the land near boreholes asked questions about how we would manage drilling activities so that these did not interfere with hunting, fishing and trapping activities. Once borehole drilling began, many people expressed interest in learning about the drilling results and sought regular updates on the status of the boreholes.

In the Saugeen Ojibway Nation (SON)-South Bruce area, we have heard a range of perceptions about the likely potential impacts of Canada's plan on neighbouring property values. In response to these concerns, the NWMO and the Municipality of South Bruce agreed to establish a program to compensate property owners within five kilometres of the repository site if values are adversely affected by the project, should it be sited in the SON-South Bruce area.

Among the prevailing community-based conversations, a few landowners and residents expressed concerns about the project's potential impact on perceptions of the community's agricultural products in national and international markets. Some business owners expressed concerns about the project competing for local labour.

In 2021, the results of independent community surveys commissioned by the NWMO in the WLON-Ignace area and the SON-South Bruce area showed high levels of community awareness about the NWMO and our work. Most residents in both siting areas indicated they are aware of the NWMO and know that their communities are part of the site selection process.

RECONCILIATION AND INDIGENOUS KNOWLEDGE

In the 2020-22 period, the NWMO listened to and worked with Indigenous communities in the siting areas to overcome some of the unique challenges posed by the pandemic. For example, we heard that Indigenous communities prioritized keeping their members safe. As a result, the NWMO paused engagement and partnership discussions in spring 2020.

We have heard from Indigenous communities that many are happy with the NWMO's commitment to Reconciliation, but that they are still working through their role in the process. From non-Indigenous peoples, we often hear that they feel encouraged by the NWMO's [Reconciliation Policy](#) (2019) and that these discussions have helped create opportunities to advance Reconciliation with their Indigenous neighbours. However, they have also indicated they still desire support in identifying and implementing next steps. Finally, among our peers in the nuclear industry and corporate Canada, we have heard a lot of very positive feedback about the leadership role that the NWMO has taken on Reconciliation.

When asked how the NWMO's Reconciliation work could be more relevant to their communities, community members frequently indicated that there could be more opportunities for reciprocal knowledge sharing, including the importance of Reconciliation and the history of residential schools in Canada.

Building on the Reconciliation Training Program we began delivering in 2019, we rolled out a second Reconciliation training module to staff and communities in the siting areas in 2021. A third training module was delivered to staff and communities in the siting areas in 2022 as a further evolution of the Reconciliation Training Program.

By expanding the reach of this program to include the municipal communities in the siting areas, we also prioritized creating space for learning and sharing between Indigenous and municipal governments, as well as between communities. Delivering this training program to the communities was intended to help them build better relationships with the NWMO and one another.

Indigenous communities continue to highlight the importance of protecting the water, air and land. We also heard about the need to make technical information as accessible as possible by collaboratively designing learning materials and creating opportunities for Indigenous peoples to learn more.

PARTNERSHIP AND WILLINGNESS

With municipalities and Indigenous communities bearing the weight of many of the public health challenges presented by the pandemic, the NWMO continued to listen to communities and respect their needs. Switching to largely online engagement was a challenge we met through active collaboration with local leaders and interested residents in the siting communities.

Working with communities and citizens taught us that the complex topic of radioactive waste is often best suited to face-to-face discussions without firm time limits.

Conversations and engagement activities explored whether there is potential for the support the project will need. Through the community visioning process that began in 2020 in both siting areas, the potential host communities have told us they will need information from borehole studies, community studies and draft hosting agreements to determine if they are willing to host the project. As a result, social, economic and health studies were conducted in both areas, concluding in 2022. Consultants with expertise in a variety of subject matter specialties studied available datasets and gathered information where required, including speaking to dozens of residents and officials in and around the siting areas.

We made much of this information available through the publication of community studies reports at the end of 2022. However, a message we heard loud and clear from people in siting areas was that all this research must be summarized and presented in an easy-to-digest manner. In response, the NWMO developed [virtual open houses](#) for each siting area's studies.

OTHER TOPICS OF INTEREST

The [annual *What we heard* reports](#) include lists of frequently asked questions, comments and concerns we hear from the public.

Over the years, this list has expanded to address a variety of emergent topics, and some conversations have evolved over the 2020-22 period. For example, interest and questions about small modular reactors (SMRs) increased as people in siting areas and around Canada reacted to public announcements about investments in this emerging technology. These conversations often led to questions about the kinds of used fuels that will result from SMRs and how the NWMO monitors alternate fuel cycles to anticipate any changes in the types of waste we might be required to manage in the future. In response to these discussions, we update the public with an annual watching brief on advanced fuel cycles and alternative waste management technology, as well as resources on SMRs, available [online](#).

Social, economic and cultural considerations

Brayden Moore, Assistant Engineer/Scientist at the NWMO, helped kids make their own borehole samples while he answered questions about geology at the White Otter Days celebration in Ignace, Ont., during summer 2022.



The NWMO's commitment to any host communities and the surrounding area is that long-term well-being is fostered through participation in the project. This requires awareness and analysis of how the project may impact social, economic and cultural considerations in the siting areas, both during the site selection process and once a preferred site has been selected.

Over the past three years, the NWMO has contributed to community well-being in numerous ways through our activities. However, we also acknowledge that as people learn more about the project, we hear a range of perspectives emerging. We hear from people who support the project, people who oppose the project, and those who have not yet made up their mind.

The NWMO recognizes the potential for this range of opinions to cause tension within potential host communities. We continue to work with local leadership and community members to help address this issue through our engagement efforts, and by responding to community needs and providing fact-based information about the project.

Below you will find illustrative examples of the NWMO's work that have impacted communities' social, economic and cultural aspirations.

CAPACITY BUILDING

The NWMO works collaboratively with communities to build their capacity for participation in the project specifically, as well as more generally through transferable skills that could be applied to other projects or workplaces.

In the Saugeen Ojibway Nation (SON)-South Bruce area, the NWMO partnered with the Saugeen Valley Conservation Authority (SVCA) on the Water Well Improvement Program to protect local aquifers and drinking water sources. The NWMO has also partnered with the SVCA on field data collection for the environmental baseline monitoring program that monitors the physical environment in the region. The NWMO supported two water resource technicians to help implement the program.

Additionally, in the SON-South Bruce area, the NWMO partnered with the Métis Nation of Ontario and the Toronto Zoo to recruit and train 25 Métis citizens to become “community scientists” that aided in studies on biodiversity and endangered bats. In this project, citizens were provided with an opportunity to learn about bat conservation and scientific monitoring from experts with the Toronto Zoo Native Bat Conservation Program, while also learning about Canada’s plan for used nuclear fuel.



The NWMO’s partnership to protect endangered bats is showcased at the Canada Pavilion at the United Nations 15th Conference of the Parties (COP15) in Montreal, Que.

This partnership is an exemplary model for collaboration between industry, the scientific community, Indigenous peoples and local communities, working collectively to save and protect endangered bats in Ontario and to advance Reconciliation. In 2022, a joint presentation about this partnership was presented at the United Nations Biodiversity Conference (COP15) as an outstanding example of leadership in biodiversity conservation.

In the Wabigoon Lake Ojibway Nation (WLON)-Ignace area, the NWMO supported a number of First Nations through the BEAHR Indigenous training programs developed by Environmental Careers Organization Canada. This locally customized training is intended to provide Indigenous community members with introductory training for those seeking employment in the environmental sector.

The NWMO has also implemented an Early Investments in Education and Skills program, an ongoing initiative that is intended to assist communities in a manner that best suits their needs. Dozens of requests have been supported during the past three years, including:

- Business courses;
- First aid training;
- Robotics education;
- Student bursaries;
- Trades education; and
- Other STEAM (science, technology, engineering, arts and mathematics) initiatives.

NEAR-TERM INVESTMENTS IN COMMUNITY SOCIAL AND PHYSICAL INFRASTRUCTURE PROJECTS

Over the past two years, the NWMO's Near-Term Investments in Community Social and Physical Infrastructure Projects program has offered funding to communities for investments in "community readiness" projects, as they move into more intensive phases of study in the site selection process.

For example, in the Township of Ignace, this has included support for the redevelopment of the Ignace Shopping Plaza, as well as updates and expansion to a seniors' walk and urban art trail. In the Municipality of South Bruce, this program has provided support for the development of the new Teeswater Medical Centre, a multi-use ice pad, the purchase of a fire pumper truck, and a landfill compactor. This program has also been provided to the core Indigenous communities in each siting area.

SUPPLY CHAIN

The NWMO is committed to working with municipalities, Indigenous communities and businesses to foster resilient, positive and mutually beneficial long-term relationships that will create social and economic opportunities. We also recognize that supplier development through procurement is a meaningful way to increase the diversity and capacity of the local business base in the siting areas. This could encourage business development and entrepreneurship, and bring jobs and wages to communities leading up to and beyond the selection of a site.

The recently completed borehole drilling programs in both siting areas are examples of the steps being taken to fulfil this commitment. Local firms were contracted to build and maintain access roads, supply water, remove wastewater, and provide fuel and solid waste disposal services. Additionally, drilling staff lived close to the drilling sites, purchasing food, gasoline and other supplies during their work in the area. This work was performed alongside Indigenous cultural monitors and guides to make sure land uses and culturally sensitive locations were protected.

COMMUNITY STUDIES AND KNOWLEDGE BUILDING

Beyond monitoring the ongoing effects of our work, the NWMO also takes social, economic and cultural considerations into account by undertaking studies that anticipate the potential future impacts of the project. As was recognized when Canada's plan was initially developed, its implementation provides opportunities for capacity building, as well as contributions to the well-being of the communities.

For example, early studies showed that the project has the potential to align with the social, cultural, economic and spiritual aspirations of the potential host communities and siting areas. Further studies were required to confirm the potential contribution of the project in either siting area to the aspirations of the potential host communities, as expressed through their project visioning exercises.

The numerous studies the NWMO has completed help communities become more informed about local and regional community well-being, as well as environmental conditions and possibilities. Regardless of whether the project is sited in an area, the insights communities obtain from these studies provide a foundation for future community initiatives. We have also been working with the municipalities as they build up their understanding of Indigenous Knowledge and advance their Reconciliation journeys.



Lyndon J. Linklater is a Traditional Knowledge Holder and Storyteller from Thunderchild First Nation (Plains Cree) in Saskatchewan. He leads cultural awareness training for NWMO staff and communities in our potential siting areas.

In 2020, both the Township of Ignace and the Municipality of South Bruce participated in project visioning processes that involved engagement with the community. Questions, concerns and aspirations held by the community were identified and organized around five pillars of community well-being. In South Bruce, this process resulted in Council adopting [36 guiding principles](#).

Between 2021 and 2022, the Township of Ignace and the Municipality of South Bruce worked with the NWMO to complete a series of socio-economic community studies. The studies were designed to respond to the project visioning topics in Ignace and the 36 guiding principles in South Bruce.

In 2022, 34 social, economic and cultural studies were completed, covering topics such as:

- Labour and workforce;
- Housing;
- Infrastructure;
- Economic development;
- Health services and infrastructure; and
- Community and culture.

Each study describes current baseline conditions, identifies potential changes with the project, and assesses options to mitigate impacts or leverage opportunities within the communities. Community studies will be considered as part of the discussions around the draft hosting agreements that will define what partnership will look like.

These community studies involved distinct collaborative approaches between the NWMO and each municipality. In South Bruce, a collaborative peer review process was implemented. This entailed an ongoing review process for the full life cycle of the studies, from design through final reporting. Each study has an accompanying peer review report. The South Bruce studies, including the peer review reports, are available on the [Municipality of South Bruce website](#).

In northwestern Ontario, an Ignace Area Working Group was established comprised of representatives from local and regional organizations and communities. The working group reviewed studies as these progressed, contributing local insight and knowledge, as well as feedback on option assessments. Each of these collaborative processes built shared knowledge and understanding about potential project impacts and options for the way forward. These studies are available through the [Ignace Community Nuclear Liaison Committee website](#).

SAFETY AND ENVIRONMENTAL ASSESSMENTS

In June 2022, the NWMO published [Confidence in Safety](#) reports for each of the two potential sites being considered to host a deep geological repository to safely manage Canada's used nuclear fuel. The *Confidence in Safety* reports for both the SON-South Bruce area and the WLON-Ignace area will be used to support continuing dialogue with Canadians and Indigenous peoples about the project, including helping inform the communities that are considering their willingness to host the project.

Social, economic and cultural considerations are embedded in our safety assessments, including safety from a social perspective. Site-specific assessments are grounded within recognizable and relatable social contexts. We consider an expanded set of lifestyles in these assessments: town residents, rural residents, Indigenous lifestyles and a hunter-gatherer. The NWMO's assessment analyses respond directly to concerns raised during discussions with community members. Additional assessment scenarios have been added to respond directly to concerns raised during discussions with community members.

The NWMO's siting safety group are routinely available in our community offices, to share assessment outcomes in person and informally. This engagement helps us hear first-hand specific community questions, concerns, and sometimes, misunderstandings. We are working to improve the connections between safety assessment and the remaining siting communities, to build confidence around safety from a social perspective.

Environmental assessment work has also included social and cultural considerations. For example, prior to completing the sample design for the environmental baseline monitoring program, a number of workshops were led by the NWMO in both siting areas to gather right-holder and stakeholder input on the environment.

Protecting water quality was identified as a high priority, and many people expressed how important this is to them. As such, the regional surface water quality sample programs were designed in a participatory manner. Surface water is being collected from lakes or waterbodies identified as important to local right-holders and stakeholders.



Tulloch Environmental completed water well sampling at several properties in South Bruce, Ont., to better understand water quality.

Budget forecast 2023-27

THE NWMO'S ANNUAL BUDGET PROCESS

The NWMO's business planning process begins with senior management discussing and confirming proposed strategic directions and objectives for the five-year planning period. The development of each five-year plan takes into account the input received through public reviews of implementation plans and engagement activities. Each year, the five-year business plan is presented to the Board of Directors for review and discussion. Each fall, the Board approves the budget for the upcoming fiscal year. The 2023-27 strategic plan for Adaptive Phased Management (APM) is presented in the section *Implementing Adaptive Phased Management 2023-27*.

ADAPTIVE PHASED MANAGEMENT (APM) BUDGET FORECAST FOR 2023-27

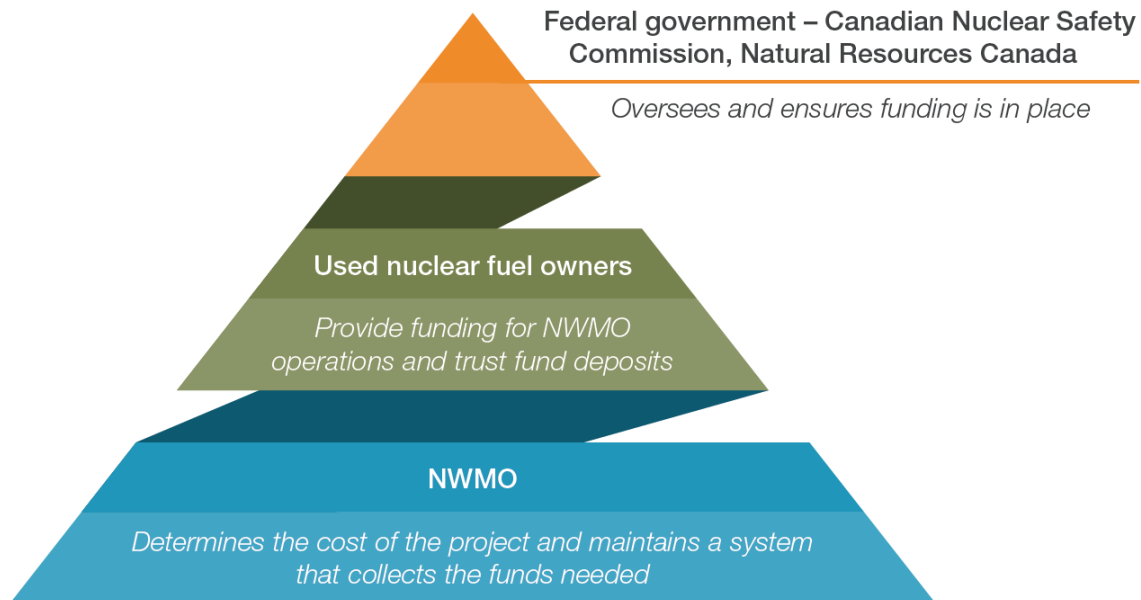
The budget forecast supports the major APM work program objectives described in the five-year strategic plan. A summary of the costs in each of the seven work program areas and staffing and administration is provided in the table below.

APM projected costs (\$ million)					
Program	2023	2024	2025	2026	2027
Engineering	11.5	17.5	19.9	22.0	22.1
Site assessment	13.6	7.2	29.3	59.7	63.5
Safety	4.8	4.3	5.4	4.5	4.2
Regulatory decision-making	10.1	11.4	14.3	14.7	17.7
Engagement	47.8	91.7	85.7	81.9	52.2
Transportation	0.9	2.2	3.8	4.6	4.6
Communications	6.5	8.0	7.1	7.1	6.3
Staffing and administration	66.7	73.1	91.9	105.4	106.0
Proposed plan	162.0	215.3	257.3	299.8	276.6

In addition to the APM budget, the NWMO is supporting preliminary analysis of potential small modular reactor used fuel requirements; any expenses incurred will be on a cost-recovery basis. The NWMO also expects to incur nominal expenses in 2023 to finalize recommendations and issue the final report on the Integrated Strategy for Radioactive Waste as requested by Natural Resources Canada as part of the Government of Canada's [Radioactive Waste Policy Review](#).

Ensuring funding is in place

A key aspect of our commitment to accountability is ensuring that the funding necessary to pay for the long-term management of Canada's used nuclear fuel will be available when needed. The roles and responsibilities of financial surety are summarized in the diagram below.



TOTAL COST ESTIMATE

One of the NWMO's important responsibilities is determining the lifecycle cost of the project so we can ensure the funds will be available when needed. Updated every five years based on the latest information, the lifecycle cost estimate explains what we anticipate the project will cost from beginning to end and why. It helps ensure accountability and transparency as we implement Canada's plan for the safe, long-term management of used nuclear fuel. The NWMO completed a full update of the [cost estimate](#) for the Adaptive Phased Management project in 2021, with the next update planned for 2026.

The estimate includes costs to develop, construct, operate, monitor, and decommission a long-term facility, including the deep geological repository and Centre of Expertise, and to transport the used nuclear fuel to the repository. As this is a 175-year estimate, many assumptions have been taken for planning purposes to ensure sufficient funds are available, and where possible, have been and will continue to be revised and made more specific as the plan advances.

Many factors impact the eventual cost of the project. They include the type and volume of used nuclear fuel to be managed, the facility's location, the surrounding infrastructure, rock type and characteristics, the design of the repository, and the length of time allocated to monitoring the site following fuel placement. The total amount of used nuclear fuel in Canada, which is currently about 3.2 million fuel bundles, could be impacted by the longevity and productivity of nuclear reactors, decisions on refurbishments or new nuclear reactors, and other factors. Every year, we update fuel bundle volume estimates and trust fund balances that impact the project's cost estimates and funding requirements, based on fuel bundle estimates provided by the nuclear energy producers. We then determine the trust fund contribution requirements for the following year to ensure sufficient resources for future use.

Our 2021 cost estimate was based on an expected volume of 5.5 million fuel bundles, the anticipated volume at the end of the planned operation of Canada's existing nuclear reactors. Based on this expected volume, the total lifecycle cost of the project – from the beginning of site selection in 2010 to the completion of the project – was approximately \$26 billion (in 2020 dollars). This amount covers many decades of lifecycle activity.

It is important to determine the amount that is required, in today's dollars, in order to have the necessary funds in place when needed in the future. The funds in place today will grow to cover the full cost of the project over the long term, based on continued additional payments from the funders of the project and through expected investment income that will also grow over time. The funding required to manage approximately 5.5 million fuel bundles from 2023 onwards is \$10.7 billion (using Jan. 1, 2023, present value).

PRE- AND POST-CONSTRUCTION COSTS

The \$10.7 billion funding requirement (using Jan. 1, 2023, present value) includes \$3.1 billion to select a site for the repository, complete a detailed design, develop the Centre of Expertise, acquire the site, evaluate environmental impacts, and obtain the site preparation licence and the construction licence under the *Nuclear Safety and Control Act (NSCA)*. These pre-construction nuclear facility costs are paid for by the waste owners based on the annual NWMO budget, as approved by the Board of Directors.

The remaining \$7.6 billion funding requirement is to construct the facility, transport existing and future fuel bundles to the repository, and operate, close and monitor the repository. The *Nuclear Fuel Waste Act (NFWA)* requires that costs after the Licence to Construct is granted must be funded through contributions to the *NFWA* trust funds established by Ontario Power Generation (OPG), Hydro-Québec (HQ), New Brunswick Power (NBP) and Atomic Energy of Canada Limited (AECL). As of December 2022, the total value of the *NFWA* trust funds was approximately \$4.8 billion.

Waste owners will continue to contribute annually as the used fuel inventory increases, to ensure that the full \$10.7 billion funding requirement is fulfilled. The costs of interim storage at the reactor sites and retrieval of the used fuel from storage are not funded through the NWMO because they are the responsibility of the waste owners.

FINANCIAL REPORTING REQUIREMENTS

The *NFWA* specifically addresses the future financial obligations expected for managing used nuclear fuel over the long term, as described in the box below. All the requirements defined in Subsection 16(2) of the *NFWA* are addressed in this section *Ensuring funding is in place*.

Requirements of the NFWA (2002)

The NWMO is required to provide a range of financial information in each of our annual reports following the government's decision, as defined in Subsection 16(2) of the *NFWA*.

16(2) Each annual report after the date of the decision of the Governor in Council under Section 15 must include:

- (a) the form and amount of any financial guarantees that have been provided during that fiscal year by the nuclear energy corporations and Atomic Energy of Canada Limited under the *Nuclear Safety and Control Act* and relate to implementing the approach that the Governor in Council selects under Section 15 or approves under Subsection 20(5);
- (b) the updated estimated total cost of the management of nuclear fuel waste;
- (c) the budget forecast for the next fiscal year;
- (d) the proposed formula for the next fiscal year to calculate the amount required to finance the management of nuclear fuel waste and an explanation of the assumptions behind each term of the formula; and
- (e) the amount of the deposit required to be paid during the next fiscal year by each of the nuclear energy corporations and Atomic Energy of Canada Limited, and the rationale by which those respective amounts were arrived at.

Based on the *NFWA*'s requirements, trust funds were established in 2002, and each waste owner has made annual contributions since. The total value of these funds, including investment income, was approximately \$4.8 billion as of the end of 2022. Additionally, the companies have set aside other segregated funds and financial guarantees for nuclear waste management and decommissioning. The *NFWA* built in explicit provisions to ensure the trust funds are maintained securely and used only for their intended purpose. The NWMO may have access to these funds only for the purpose of implementing the management approach selected by the government once a construction or operating licence has been issued under the *NSCA*.

Owner	Trust fund balance (\$ million)
	December 2022
OPG	4,404
NBP	187
HQ	174
AECL	72*
Total	4,837

All figures in the table above are approximate.

** NOTE: AECL is not a member of the NWMO and is required to contribute to a trust fund for used nuclear fuel under the NFWA. See next section for more detail.*

As required by the NFWA, the NWMO makes public the audited financial statements of the [trust funds](#) when they are provided by the financial institutions annually.

CANADIAN NUCLEAR SAFETY COMMISSION (CNSC) FINANCIAL GUARANTEES REPORTING

As mandated under the NSCA, the CNSC requires waste producers to provide financial guarantees to cover the cost (in present value terms) associated with decommissioning, interim storage and the long-term management of radioactive waste (including used nuclear fuel) produced to date. The guarantees available for 2023 total \$22 billion. They are reviewed independently by the CNSC as part of the waste owner licence requirements and are satisfied by segregated funds (totalling approximately \$25 billion as of year-end 2022) and in the form of Provincial Guarantees.

The status of these guarantees is presented as follows:

Ontario Power Generation (OPG)

In accordance with the NSCA, the CNSC requires OPG to have sufficient funds available to discharge its existing nuclear waste management and nuclear-decommissioning obligations. The CNSC process requires the CNSC Financial Guarantee requirement to be updated once every five years, and OPG to provide an annual report to the CNSC on the assumptions, asset values, and resulting financial guarantee requirements. The CNSC Financial Guarantee requirement calculation takes into account nuclear waste expected to be generated to the end of each year.

The CNSC Financial Guarantee requirement continued to be satisfied, in part, by the forecast fair market value of the federally mandated Ontario NFWA Trust, and the remainder by the two segregated funds governed by the *Ontario Nuclear Funds Agreement (ONFA)* between OPG and the Province of Ontario (collectively, the “Nuclear Funds”) without the requirement of a Provincial Guarantee for 2023. As per the terms of the ONFA, the province is committed to providing a Provincial Guarantee to the CNSC as required, on behalf of OPG, should there be a shortfall between the CNSC Financial Guarantee requirement and the fair market value of the Nuclear Funds during 2023.

The CNSC Financial Guarantee requirement for 2023 is \$20,480 million (Jan. 1, 2023, present value). This will be satisfied by the 2022 year-end fair market value of the Nuclear Funds of \$23,998 million without the requirement of a Provincial Guarantee. The Nuclear Funds of \$23,998 million include \$4,404 million in the Ontario *NFWA* Trust.

NB Power (NBP)

NBP has provided the CNSC with a Decommissioning Financial Guarantee that covers the costs associated with the long-term management of used fuel projected to be produced from the Point Lepreau Generating Station and the cost of station decommissioning, including the long-term management of low- and intermediate-level radioactive waste.

- The Financial Guarantee requirement is based on the present value of future costs to manage used fuel produced to the end of 2022 and the present value of future estimated costs for station decommissioning.
- The Financial Guarantee requirement is satisfied by three separate funds: a Used Fuel Fund, a Station Decommissioning Fund, and the *NFWA* Trust Fund.
- The total market value of the funds at Dec. 31, 2022, was approximately \$875 million and was comprised of the following:
 - Used Fuel Fund – \$242 million;
 - Station Decommissioning Fund – \$446 million; and
 - *NFWA* Trust Fund – \$187 million.

Hydro-Québec (HQ)

The fair value of the *NFWA* Trust Fund as of Dec. 31, 2022, was estimated at \$174 million.

HQ has also provided the CNSC with a Decommissioning Financial Guarantee of \$685 million that includes a guarantee associated with used fuel arising from the operation of Gentilly-2 and the cost of station decommissioning, including the long-term management of low- and intermediate-level radioactive waste. The guarantee is in the form of an expressed commitment of the Province of Quebec to HQ that provides a guarantee of payment.

The *NFWA* Trust Fund and the Financial Guarantee provided by the Province of Quebec covered the future financial obligations as follows:

- \$465 million for decommissioning and long-term management of low- and intermediate-level radioactive waste; and
- \$293 million for used fuel.

Atomic Energy of Canada Limited (AECL)

AECL is not a member of the NWMO and is required to contribute to a trust fund for used nuclear fuel under the *NFWA*. Its Financial Guarantee is in the form of an expressed commitment by the Government of Canada to the CNSC, combined with supporting estimates of the financial liability and the basis for same. The AECL *NFWA* Trust Fund contained approximately \$72 million as of Dec. 31, 2022.

BUDGET FORECAST FOR 2023

For 2023, the NWMO Board of Directors approved a budget envelope of \$162 million to continue implementing Adaptive Phased Management. Annual costs beyond 2023 are subject to further review. Sharing of these costs will be in accordance with the percentages defined in the Membership Agreement, as amended from time to time. The 2023 cost-sharing percentages among the waste owners are OPG: 93.68%, NBP: 3.66%, HQ: 2.07%, and AECL: 0.59%.

FUNDING FORMULA

The NWMO funding formula has been in place since its approval by the Minister of Natural Resources in April 2009. The formula allocates liabilities and trust fund contribution requirements to each waste owner. Costs common to all waste owners are shared based on a cost-sharing percentage agreed to by the members. The nuclear fuel waste owner is responsible for expenses that are owner-specific.

POSSIBLE FUTURE REACTORS

The NWMO has begun initial reviews of the funding requirements related to potential new fuel waste streams from small modular reactor (SMR) projects. Preliminary work on SMRs has been completed on a cost-recovery basis with waste owners developing this new technology. However, as potential SMR projects are still in the early stages of development, there is insufficient information available to include in our forecasting. We expect this will be addressed as projects progress to the later stages of development.

TRUST FUND DEPOSITS FOR 2023

The 2023 NFWA trust fund deposit requirements have been developed based on the NWMO's project cost estimate completed in 2021. Under the approved funding formula, the funding for post-construction licence costs is divided into two parts:

1. Funding for historical used fuel bundles (committed liability); and
2. Funding for used fuel to be produced each year (future liability).

Committed liability represents all costs that will be incurred regardless of whether any further used fuel bundles are generated in the future. This liability includes all fixed costs for the facility and variable costs attributed to the historical used fuel bundles. Considering the deep geological repository would be available between 2040 and 2045, contributions for the committed liability are to be amortized to the midpoint year 2043 in equal present value payments. This funding method has the advantage of distributing the funding obligations evenly to each year, while considering the time value of money. Future liability represents the incremental cost of transferring used fuel bundles to the repository, facility expansion, and additional operating and monitoring costs associated with used fuel bundles to be produced each year. Each future used fuel bundle would incur the same cost in present value terms, taking into account the time value of money.

The 2023 trust fund deposit requirements are shown in the table below.

Total trust fund deposits: Year 2023		
Owner	Trust fund balance (\$ million)	Deposit to trust funds (committed and future bundles) (\$ million)*
	December 2022	2023
OPG	4,404	93
NBP	187	6
HQ	174	0
AECL	72	0.4
Total	4,837	99

** Annual trust fund deposits are required to be made within 30 days of the submission of the annual report. A deposit date of April 27 is assumed for illustrative purposes.*

Auditor's report and financial statements

MANAGEMENT'S RESPONSIBILITY FOR FINANCIAL REPORTING

The accompanying consolidated financial statements of the Nuclear Waste Management Organization (NWMO) and all the information in this annual report are the responsibility of management and have been approved by the Board of Directors.

The consolidated financial statements have been prepared by management in accordance with Canadian accounting standards for not-for-profit organizations set out in Part III of the Chartered Professional Accountants Canada Handbook. When alternative accounting methods exist, management has chosen those it deems most appropriate in the circumstances. Financial statements are not precise since they include certain amounts based on estimates and judgments, particularly when transactions affecting the current accounting period cannot be finalized until future periods.

Management has determined such amounts on a reasonable basis in order to ensure that the consolidated financial statements are presented fairly, in all material respects, and in light of information available up to February 14, 2023.

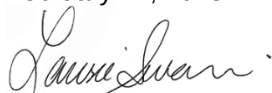
Management has a system of internal controls designed to provide reasonable assurance that the consolidated financial statements are accurate and complete in all material respects. The internal control system includes an established business conduct policy that applies to all employees. Management believes that the system provides reasonable assurance that transactions are properly authorized and recorded, financial information is relevant, reliable and accurate, and the Organization's assets are appropriately accounted for and adequately safeguarded.

The Board of Directors is responsible for ensuring management fulfils our responsibilities for financial reporting, and is ultimately responsible for reviewing and approving the consolidated financial statements. The Board carries out this responsibility through its Audit, Finance and Risk Committee (the Committee).

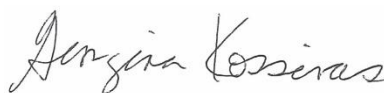
The Committee is appointed by the Board and meets periodically with management, as well as the external auditor, to discuss internal controls over the financial reporting process, auditing matters and financial reporting issues; to satisfy itself that each party is properly discharging its responsibilities; and to review the consolidated financial statements and the external auditor's report. The Committee reports its findings to the Board for consideration when approving the consolidated financial statements for issuance to the members. The Committee also considers, for review by the Board and approval by the members, the engagement or reappointment of the external auditor.

The consolidated financial statements have been audited by Deloitte LLP, the independent external auditor, in accordance with Canadian generally accepted auditing standards on behalf of the members.

February 14, 2023



Laurie Swami
President and CEO



Georgina Kossivas
Chief Financial and Risk Officer

Consolidated financial statements of Nuclear Waste Management Organization

December 31, 2022

Independent Auditor's Report	1-2
Consolidated statement of financial position	3
Consolidated statement of operations	4
Consolidated statement of changes in net assets	5
Consolidated statement of cash flows	6
Notes to the consolidated financial statements	7-17

Independent Auditor's Report

To the Members of
Nuclear Waste Management Organization

Opinion

We have audited the consolidated financial statements of Nuclear Waste Management Organization (the "Organization"), which comprise the consolidated statement of financial position as at December 31, 2022, and the consolidated statements of operations, changes in net assets, and cash flows for the year then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies (collectively referred to as the "financial statements").

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Organization as at December 31, 2022, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards ("Canadian GAAS"). Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of our report. We are independent of the Organization in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Organization's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Organization or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Organization's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian GAAS will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian GAAS, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Organization's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Organization's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Organization to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Organization to express an opinion on the financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

The logo for Deloitte LLP, featuring the word "Deloitte" in a stylized script font followed by "LLP" in a clean, sans-serif font.

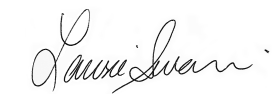
Chartered Professional Accountants
Licensed Public Accountants
February 14, 2023

Nuclear Waste Management Organization
Consolidated statement of financial position
As at December 31, 2022

	Notes	2022 \$	2021 \$
Assets			
Current assets			
Cash		4,658,353	7,461,090
Member contributions receivable	5a	14,753,680	13,316,377
Other receivable from members and AECL		1,667,638	1,317,420
Accounts receivable	12	134,607	143,600
Prepaid expenses and deposits		2,756,344	2,130,029
		23,970,622	24,368,516
Capital assets	3	37,999,136	37,835,394
Accrued pension asset	7	40,901,678	70,044,678
		102,871,436	132,248,588
Liabilities			
Current liabilities			
Accounts payable and accrued liabilities	7 and 12	24,096,341	23,139,624
Deferred lease inducements	8	376,504	460,171
Deferred/payable contributions from members and AECL	5b	147,777	1,368,721
		24,620,622	24,968,516
Deferred capital contributions	6	37,999,136	37,835,394
Deferred contributions from members and AECL	5c	9,736,886	12,513,656
Other post-employment and pension benefits liability	7	23,116,838	29,156,068
		70,852,860	79,505,118
Net assets		7,397,954	27,774,954
		102,871,436	132,248,588

The accompanying notes are an integral part of the consolidated financial statements.

Approved by the Board of Directors on February 14, 2023



, Laurie Swami, President and CEO, NWMO



, Beth Summers, Chair – Audit, Finance and Risk Committee, NWMO

Nuclear Waste Management Organization
Consolidated statement of operations
Year ended December 31, 2022

	Notes	2022 \$	2021 \$
Revenue			
Contributions from members	4	131,080,904	147,149,000
Contributions from AECL		249,410	1,554,595
		131,330,314	148,703,595
Change in deferred capital contributions	6	(163,742)	(4,341,259)
Change in long-term deferred contributions from members and AECL	5c	2,776,770	268,132
Change in member contributions receivable	5a	1,437,303	2,719,273
Change in deferred/payable contributions from members and AECL	5b	1,220,944	(491,627)
Total contribution revenue	11	136,601,589	146,858,114
Interest and other revenue	11	156,326	46,305
Total revenue		136,757,915	146,904,419
Expenses			
Adaptive Phased Management			
Staffing and administration		55,910,623	46,262,829
Engagement		29,552,351	24,338,440
Site assessment		17,576,557	40,735,475
Regulatory decision-making		10,979,726	8,788,414
Engineering		10,054,032	10,673,210
Communications		5,537,718	3,753,314
Safety		3,676,771	4,346,321
Transportation		347,119	671,295
		133,634,897	139,569,298
Services for OPG's Deep Geologic Repository Geoscience		—	2,932,266
Integrated Strategy for Radioactive Waste			
Communications and engagement		1,073,779	1,959,027
Technical and project management		368,128	859,504
		1,441,907	2,818,531
Amortization of capital assets		1,681,111	1,584,324
Total expenses	11	136,757,915	146,904,419
Excess of revenue over expenses for the year		—	—

The accompanying notes are an integral part of the consolidated financial statements.

Nuclear Waste Management Organization
Consolidated statement of changes in net assets
Year ended December 31, 2022

	2022	2021
	\$	\$
Net assets, beginning of year	27,774,954	9,499,954
Excess of revenue over expenses for the year	—	—
Remeasurements during the year:		
Accrued pension asset	(28,776,000)	8,628,000
Other post-employment and pension benefits liability	8,399,000	9,647,000
Net assets, end of year	7,397,954	27,774,954

The accompanying notes are an integral part of the consolidated financial statements.

Nuclear Waste Management Organization
Consolidated statement of cash flows
Year ended December 31, 2022

	Notes	2022 \$	2021 \$
Operating activities			
Cash received from contributions		129,627,828	142,767,671
Interest and other revenue received		156,326	46,305
		129,784,154	142,813,976
Cash paid for salaries and benefits, materials and services		(132,586,891)	(138,556,774)
		(2,802,737)	4,257,202
Investing activity			
Purchase of capital assets	3	(1,702,487)	(5,935,924)
Financing activity			
Cash received from contributions used for purchase of capital assets		1,702,487	5,935,924
Net (decrease) increase in cash		(2,802,737)	4,257,202
Cash, beginning of year		7,461,090	3,203,888
Cash, end of year		4,658,353	7,461,090

The accompanying notes are an integral part of the consolidated financial statements.

1. Description of organization

The Nuclear Waste Management Organization (“NWMO”) is a not-for-profit corporation without share capital, established under the *Canada Corporations Act*, as required by the *Nuclear Fuel Waste Act* (“NFWA”), which came into force on November 15, 2002. The NWMO transitioned to the *Canada Not-for-profit Corporations Act* and obtained a Certificate of Continuance on December 20, 2012.

The NFWA requires electricity-generating companies which produce used nuclear fuel to establish a waste management organization. In accordance with the NFWA, the NWMO established an Advisory Council, conducted a study and provided recommendations on the long-term management of used nuclear fuel to the Government of Canada. The results of the study and the recommendations were submitted in November 2005. As part of the long-term mandate, the NWMO is now responsible for implementing Adaptive Phased Management (“APM”), an approach selected by the Government of Canada to address the management of used nuclear fuel.

The NWMO formally began operations on October 1, 2002. Its founding members are Hydro-Québec, New Brunswick Power Corporation, and Ontario Power Generation Inc. (“OPG”) (“members”). The NFWA requires that the NWMO offer nuclear fuel waste management services at a fee to all owners of nuclear fuel waste produced in Canada, including non-members and Atomic Energy of Canada Limited (“AECL”).

Pursuant to a Membership Agreement, cost sharing of APM costs in 2022 is based on the principle of “producer pays,” based on the projected total number of fuel bundles and the assumed timing of access to the long-term used fuel management facility. This cost-sharing formula has been in effect since January 1, 2018.

The NWMO had an agreement with OPG to provide services supporting its Low- and Intermediate-Level Waste Deep Geologic Repository (“DGR”). The NWMO’s activities related to this program were reduced since 2018 as the project management activities were transitioned back to OPG, and the DGR Services Agreement ended on December 31, 2021.

On November 13, 2020, the Minister of Natural Resources Canada (“NRCan”) tasked the NWMO with leading the development of Canada’s Integrated Strategy for Radioactive Waste (“ISRW”). This strategy will address all Canada’s radioactive waste, with the work that the NWMO is leading focusing on existing gaps, specifically in the long-term management for low- and intermediate-level waste. The resulting integrated strategy is not intended to replace other projects currently in progress, but rather incorporate them as part of the recommendations. A draft report was published in August 2022, and work will continue into 2023, pending completion of NRCan’s review of Canada’s existing Radioactive Waste Policy Framework.

In accordance with the NFWA, the NWMO is responsible for the management of all nuclear fuel waste, including from small modular reactors (“SMR”) that are in development. The NWMO will support technical assessment of long-term storage options for SMR fuels and related analysis with cost-recovery-based contracts. The NWMO has entered into one such agreement in 2022.

2. Significant accounting policies

Basis of presentation

The NWMO has elected to present consolidated financial statements that included its accounts and those of its wholly owned subsidiaries (collectively, the "NWMO").

The consolidated financial statements of the NWMO are the representations of management prepared in accordance with Canadian accounting standards for not-for-profit organizations set out in Part III of the Chartered Professional Accountants Canada ("CPA Canada") Handbook using the deferral method of reporting restricted contributions. The significant accounting policies adopted by the NWMO are as follows:

Principles of consolidation

The NWMO's wholly owned subsidiaries are those entities over which the NWMO has control and has the right and ability to obtain future economic benefits, and is exposed to the related risks. Control is the continuing power to determine the strategic operating, investing and financing policies of the other entity without the co-operation of others.

Consolidated wholly owned subsidiaries include:

- NWMO Property Management 1 Inc.;
- NWMO Property Management 2 Inc.; and
- NWMO Property Management 3 Inc.

On January 2, 2020, the NWMO incorporated its three wholly owned subsidiaries under the *Canada Business Corporations Act* to support site assessment activities.

Capital assets

Capital assets are recorded at cost. Amortization is provided for on the straight-line basis over their estimated useful lives as follows:

Office building	15 years
Furniture and office equipment	7 years
Transport and work equipment	7 years
Vehicles	5 years
Computer equipment and software	3 years
Leasehold improvements	Initial lease term plus one renewal period

Income tax

The NWMO and its wholly owned subsidiaries are not-for-profit organizations, and pursuant to section 149(1)(1) of the *Income Tax Act* ("ITA"), are not subject to income tax.

2. Significant accounting policies (continued)

Revenue recognition

Contributions received from members and AECL are treated as restricted contributions, and as such, they are recognized as revenue when qualifying expenses are incurred. Any excess or shortfall of member contributions is recorded as deferred/payable contributions or member contributions receivable, respectively.

Contributions used for the purchase of capital assets owned by the NWMO are initially recognized as deferred capital contributions and amortized into revenue at the rate corresponding with the amortization rate of the related capital assets.

Pension and other post-employment benefits

The NWMO's post-employment benefit programs include a contributory defined benefit registered pension plan, a defined benefit supplementary pension plan, and other post-employment benefits, including group life insurance and health-care benefits. The NWMO has adopted the following policies with respect to accounting for these post-employment benefits:

- (i) The NWMO accrues its obligations under pension, supplementary pension plan, and other post-employment benefit ("OPEB") plans. The defined benefit obligation for pension is determined using the projected benefit method pro-rated on service and is measured based on the actuarial valuation prepared for funding purposes (but not one prepared using a solvency, wind up, or similar valuation basis). Under this method, the benefit costs are amortized over the average remaining service period of active employees as indicated in Note 7. For other unfunded plans such as supplementary pension plan and OPEB, a similar accrual method is used and the benefit obligations are measured based on the actuarial valuation for accounting purposes. Remeasurements for the period are recorded through the consolidated statement of changes in net assets.
- (ii) The obligations are affected by actuarial assumptions, including salary escalation, inflation, and cost escalation of specific items (e.g., cost of living, health-care cost trend). Pension and OPEB costs and obligations are determined annually by independent actuaries using management's best estimate assumptions. The discount rate used by the NWMO in determining projected benefit obligations and the costs for the NWMO's pension plan is based on the funding valuation on a going concern basis, while other employee benefit plans' discount rates are based on representative AA corporate bond yields in effect at the end of the year.
- (iii) Pension fund assets are valued using market-related values for the purposes of determining actuarial gains or losses and the actual return on plan assets. The plan's assets consist of pooled funds, fixed income securities and limited partnership units in a real estate fund. Market and credit risk on these securities are managed by the plan by placing plan assets in trust and through the plan's investment policy.

Research and development

Research and development costs are charged to operations as expenses in the year incurred.

Foreign currency translation

Monetary assets and liabilities denominated in foreign currencies are translated into Canadian currency at the year-end exchange rate. Any resulting gain or loss is reflected in staffing and administration expenses. Transactions in foreign currencies throughout the year have been converted at the exchange rate prevailing at the date of the transaction.

2. Significant accounting policies (continued)

Financial instruments

Financial instruments include cash, member contributions receivable, other receivable from members and AECL, accounts receivable, and accounts payable and accrued liabilities.

Financial assets and financial liabilities are initially recognized at fair value when the NWMO becomes a party to the contractual provisions of the financial instrument. Subsequently, all financial instruments are measured at amortized cost. Financial assets measured at amortized cost are assessed at each reporting date for indications of impairment. If such impairment exists, the asset is written down and the resulting impairment loss is recognized in the consolidated statement of operations.

Related party transactions

Related party transactions are recorded at the exchange amount.

Use of estimates

The preparation of consolidated financial statements in conformity with Canadian generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosures of contingent assets and liabilities at the date of the consolidated financial statements, and the reported amounts of revenues and expenses during the reporting period. Due to the inherent uncertainty in making estimates, actual results could differ from those estimates. Accounts requiring significant estimates include accrued pension asset, other post-employment and pension benefits liability, certain accrued liabilities and amortization which is based on the estimated useful life of the capital assets.

3. Capital assets

	Cost \$	Accumulated amortization \$	2022 Net book value \$	2021 Net book value \$
Land	31,838,644	—	31,838,644	31,838,644
Computer equipment and software	5,964,244	4,292,483	1,671,761	1,031,396
Transport and work equipment	6,170,715	3,132,670	3,038,045	3,661,339
Furniture and office equipment	1,890,383	1,466,112	424,271	510,223
Leasehold improvements	2,364,251	2,018,967	345,284	30,990
Office building	1,182,612	511,384	671,228	750,069
Vehicles	380,679	370,776	9,903	12,733
	49,791,528	11,792,392	37,999,136	37,835,394

Capital asset additions totalling \$247,104 (\$104,738 in 2021) have been excluded from the consolidated statement of cash flows as they remain unpaid at year-end. During 2022, capital asset additions totalling \$104,738 (\$115,079 in 2021) have been included in the consolidated statement of cash flows as they were accrued at December 31, 2021, and paid in 2022 (accrued at December 31, 2020, and paid in 2021).

4. Related party transactions and balances

Transactions and balances not otherwise disclosed separately in these consolidated financial statements are as follows:

	APM \$	DGR \$	ISRW \$	2022 Total \$	2021 Total \$
Transactions during the year					
Member contributions					
Ontario Power Generation Inc.	123,624,000	(89,096)	1,176,000	124,710,904	138,046,000
New Brunswick Power Corporation	4,441,000	—	41,000	4,482,000	5,908,000
Hydro-Québec	1,872,000	—	16,000	1,888,000	3,195,000
	129,937,000	(89,096)	1,233,000	131,080,904	147,149,000

5. Member and AECL contributions

The NWMO is solely funded through contributions it receives from its members and AECL. The contributions are restricted in nature, and thus revenue is recognized when qualifying expenses are incurred. Amounts received in advance of qualifying expenses are recorded as deferred contributions. Commitments for contributions that have not been received by the NWMO are recorded as member contributions receivable when the amount is determinable and the ultimate collection is likely.

(a) Contributions receivable from members

Contributions receivable from members are comprised of the following:

	2022 \$	2021 \$
Ontario Power Generation Inc.	14,063,048	13,244,997
New Brunswick Power Corporation	493,584	71,380
Hydro-Québec	197,048	—
	14,753,680	13,316,377

(b) Deferred/payable contributions from members and AECL – current

Deferred/payable contributions from members and AECL are comprised of the following:

	2022 \$	2021 \$
Hydro-Québec	—	688,534
Atomic Energy of Canada Limited	147,777	680,187
	147,777	1,368,721

5. Member and AECL contributions (continued)

(c) Long-term deferred contributions from members and AECL

Long-term deferred contributions from members and AECL represent amounts received or receivable to fund various employee future benefits as follows:

	2022 \$	2021 \$
Accrued pension asset	40,901,678	70,044,678
Other post-employment and pension benefits liability	(23,116,838)	(29,156,068)
Other post-employment and pension benefit liabilities – short term (Note 7)	(650,000)	(600,000)
Remeasurements in net assets	(7,397,954)	(27,774,954)
	9,736,886	12,513,656

(d) Continuity of deferred contributions from members and AECL

The continuity of deferred contributions from members and AECL is as follows:

	2022 \$	2021 \$
Balance, beginning of year		
Deferred/payable contributions from members and AECL – current	1,368,721	877,094
Deferred contributions from members and AECL – long term	12,513,656	12,781,788
	13,882,377	13,658,882
Contributions received	131,330,314	148,703,595
Contributions receivable	14,753,680	13,316,377
Contribution revenue recognized	(136,601,589)	(146,858,114)
Amounts received previously recognized	(13,316,377)	(10,597,104)
Change related to deferred capital contributions	(163,742)	(4,341,259)
	9,884,663	13,882,377
Balance, end of year		
Deferred/payable contributions from members and AECL – current	(147,777)	(1,368,721)
Deferred contributions from members and AECL – long term	9,736,886	12,513,656

6. Deferred capital contributions

	2022 \$	2021 \$
Balance, beginning of year	37,835,394	33,494,135
Contributions for the purchase of capital assets	1,844,853	5,925,583
Less amortization into revenue	(1,681,111)	(1,584,324)
Balance, end of year	37,999,136	37,835,394

7. Pension and other post-employment benefit plans

Effective January 1, 2009, the NWMO offers benefits to certain employees and retirees. A brief overview of these benefit plans is set out below:

(a) Registered pension plan

The federally registered pension plan is a contributory defined benefit plan covering eligible employees and retirees. The registered pension plan is funded, and plan assets are managed by third parties and include pooled funds, fixed income securities, and limited partnership units in a real estate fund. The benefit costs and assets related to this plan are recorded in the NWMO's consolidated financial statements.

(b) Supplementary pension plan

The supplementary pension plan is a defined benefit plan covering certain employees and retirees. This plan is unfunded.

(c) Other post-employment benefit plans

The other post-employment benefit plans provide medical, dental and group life insurance coverage for certain groups of full-time employees who have retired from the NWMO. These plans are unfunded.

A funding valuation, which was completed for the registered pension plan as of January 1, 2022, reported an actuarial surplus of \$69.1 million and a funding ratio of 179% on a going concern basis; and an actuarial surplus of \$25.0 million and a solvency ratio of 119% on a solvency basis.

In the case of a federally registered pension plan surplus, the *ITA* prohibits the making of contributions while the plan assets exceed 125% of the current value of the plan's liabilities on a going concern basis if the pension plan is also fully funded on a solvency basis (solvency ratio in excess of 105%).

As a result, the *ITA* prohibits the plan sponsor from contributing to the pension plan after the actuarial valuation report is filed with regulators. Consequently, the NWMO has made no contribution for 2022 as supported by the actuarial funding valuation report (\$1.3 million in 2021).

The most recent actuarial valuations were performed for the registered pension plan as at January 1, 2022, for the supplementary pension plan as at December 31, 2019, and for the other post-employment benefit plans as at December 31, 2020. The liability as at December 31, 2022, is based on an extrapolation of the previous valuations.

Nuclear Waste Management Organization
Notes to the consolidated financial statements
December 31, 2022

7. Pension and other post-employment benefit plans (continued)

Information for the NWMO's pension plans and other post-employment benefit plans is as follows:

	Registered pension plan		Supplementary pension plan		Other post-employment benefit plans	
	2022	2021	2022	2021	2022	2021
	\$	\$	\$	\$	\$	\$
Changes in accrued benefit obligation						
Accrued benefit obligation, January 1	(86,312,000)	(82,841,000)	(8,863,897)	(10,142,834)	(20,892,171)	(27,355,819)
Current service cost	(3,801,000)	(2,733,000)	(629,000)	(352,000)	(1,388,000)	(1,918,000)
Interest cost	(4,695,000)	(4,456,000)	(303,000)	(280,000)	(708,000)	(757,000)
Past service cost	2,000	(45,000)	—	—	(1,709,000)	—
Employee contributions	—	(667,000)	—	—	—	—
Benefits paid	3,046,000	5,622,000	374,436	1,113,937	243,794	288,648
Net actuarial (loss) gain	(3,155,000)	(1,192,000)	2,305,000	797,000	7,803,000	8,850,000
Accrued benefit obligation, December 31	(94,915,000)	(86,312,000)	(7,116,461)	(8,863,897)	(16,650,377)	(20,892,171)
Changes in plan assets						
Fair value of plan assets, January 1	156,356,678	142,621,395	—	—	—	—
Expected return on plan assets	8,129,000	7,523,000	—	—	—	—
Benefits paid	(3,046,000)	(5,622,000)	—	—	(243,794)	(288,648)
Net actuarial (loss) gain	(25,621,000)	9,820,000	—	—	—	—
Employer contributions	—	1,302,283	—	—	243,794	288,648
Past service cost	(2,000)	45,000	—	—	—	—
Employee contributions	—	667,000	—	—	—	—
Fair value of plan assets, December 31	135,816,678	156,356,678	—	—	—	—
Funded status						
Fair value of plan assets	135,816,678	156,356,678	—	—	—	—
Accrued benefit obligation	(94,915,000)	(86,312,000)	(7,116,461)	(8,863,897)	(16,650,377)	(20,892,171)
Accrued benefit asset (liability)	40,901,678	70,044,678	(7,116,461)	(8,863,897)	(16,650,377)	(20,892,171)
Short-term portion	—	—	(350,000)	(300,000)	(300,000)	(300,000)
Long-term portion	40,901,678	70,044,678	(6,766,461)	(8,563,897)	(16,350,377)	(20,592,171)
	40,901,678	70,044,678	(7,116,461)	(8,863,897)	(16,650,377)	(20,892,171)
Components of cost recognized						
Current service cost	3,801,000	2,733,000	629,000	352,000	1,388,000	1,918,000
Interest cost on accrued benefit obligation	4,695,000	4,456,000	303,000	280,000	708,000	757,000
Expected return on plan assets	(8,129,000)	(7,523,000)	—	—	—	—
Cost (recovery) recognized	367,000	(334,000)	932,000	632,000	2,096,000	2,675,000

The short-term portion of the accrued benefits liability of \$650,000 (\$600,000 in 2021) that is included in accounts payable and accrued liabilities is part of the total \$23,766,838 (\$29,756,068 in 2021) accrued benefits liability at the end of the year for the supplementary pension and other post-employment benefit plans.

The pension and other post-employment benefit costs recognized are included in the respective expense categories in the consolidated statement of operations.

7. Pension and other post-employment benefit plans (continued)

The significant actuarial assumptions for benefit obligations and costs adopted in estimating the NWMO's accrued benefit obligations are as follows:

	Registered pension plan		Supplementary pension plan		Other post-employment benefit plans	
	2022	2021	2022	2021	2022	2021
	%	%	%	%	%	%
Discount rate at the beginning of the period	5.25	5.25	3.10	2.60	3.10	2.60
Salary escalation rate	3.00	3.00	3.00	3.00	—	—
Rate of cost of living increase	2.00	2.00	2.00	2.00	—	—
Rate of increase in health-care cost trend	—	—	—	—	5.16	5.20
Discount rate at the end of the period	5.25	5.25	5.10	3.10	5.10	3.10
Average remaining service life for employees	15 years	15 years	15 years	15 years	15 years	15 years

Sensitivity information related to the other post-employment benefit plans is as follows:

	2022	2021
	\$	\$
Effect of 1% increase in health-care cost trends on		
Accrued benefit obligation	3,437,000	4,741,000
Current service cost and interest cost	585,000	573,000
Effect of 1% decrease in health-care cost trends on		
Accrued benefit obligation	(2,566,000)	(3,477,000)
Current service cost and interest cost	(414,000)	(398,000)

The supplementary pension plan is unfunded and is secured by a Standby Letter of Credit of \$8,753,600 (\$9,725,800 in 2021) obtained on the NWMO's behalf by OPG, as approved by the members.

8. Deferred lease inducements

	2022	2021
	\$	\$
Tenant inducements	835,676	835,676
Less accumulated amortization	(459,172)	(375,505)
	376,504	460,171

9. Guarantees

In the normal course of business, the NWMO enters into agreements that meet the definition of a guarantee.

- (a) The NWMO has provided indemnities for various agreements. Under the terms of these agreements, the NWMO agrees to indemnify the counterparty for various items, including, but not limited to, all liabilities, loss, suits, and damages arising during, on or after the term of the agreement.
- (b) The NWMO indemnifies all directors, officers and employees acting on behalf of the NWMO for various items, including, but not limited to, all costs to settle suits or actions due to services provided to the NWMO, subject to certain restrictions.

The nature of these indemnification agreements prevents the NWMO from making a reasonable estimate of the maximum exposure due to the difficulties in assessing the amount of liability which stems from the unpredictability of future events and the unlimited coverage offered to counterparties. Historically, the NWMO has not made any payments under such or similar indemnification agreements, and therefore, no amount has been accrued with respect to these agreements.

The NWMO also arranged a Standby Letter of Credit issued by OPG to secure its supplementary pension plan (Note 7).

10. Operating leases

The NWMO has entered into a number of operating leases for office premises and a vehicle which expire at various dates up to June 30, 2027.

The estimated annual minimum payments over the initial term of these leases up to their expiration are as follows:

	\$
2023	1,694,088
2024	1,644,701
2025	1,362,246
2026	1,047,096
2027	523,548
	<u>6,271,679</u>

Nuclear Waste Management Organization
Notes to the consolidated financial statements
December 31, 2022

11. Segment reporting

The NWMO has three reportable segments as follows:

- Federal mandated program (APM);
- Direct services outside its mandated program include a service contract with OPG for DGR, which became effective February 1, 2011, and ended December 31, 2021; and
- ISRW, effective November 13, 2020.

Segment information is as follows:

	APM		DGR		ISRW		Total
	2022	2021	2022	2021	2022	2021	2021
	\$	\$	\$	\$	\$	\$	\$
Contribution revenue	135,160,849	141,108,888	—	2,931,510	1,440,740	2,817,716	146,858,114
Interest and other income	155,159	44,488	—	1,002	1,167	815	46,305
Total revenue	135,316,008	141,153,376	—	2,932,512	1,441,907	2,818,531	146,904,419
Amortization of capital assets	1,681,111	1,584,078	—	246	—	—	1,584,324
Operating expenses	133,634,897	139,569,298	—	2,932,266	1,441,907	2,818,531	145,320,095
Total expenses	135,316,008	141,153,376	—	2,932,512	1,441,907	2,818,531	146,904,419
Capital asset additions	1,844,853	5,925,583	—	—	—	—	5,925,583

The allocation of the common service expenses to each reportable segment above is based on direct staff hours in each segment.

12. Government remittances

Government remittances is comprised of the following:

	2022	2021
	\$	\$
Goods and Services Tax/Harmonized Sales Tax ("GST/HST") payable	(1,667,667)	(1,484,663)
GST/HST receivable	823,320	1,620,767
GST/HST (payable) receivable, net	(844,347)	136,104

The net government remittances payable balance of \$844,347 is included in accounts payable and accrued liabilities (2021 – receivable balance of \$136,104 is included in accounts receivable).

Implementing Adaptive Phased Management 2023-27

Implementing Adaptive Phased Management 2023-27

March 2023



Check out the digital version of this implementation plan for more interactive and multimedia content.

nwmo

NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES

Land acknowledgment

The Nuclear Waste Management Organization (NWMO) acknowledges that we have worked in many different Indigenous territories since the inception of the organization. We are grateful to the Indigenous and municipal communities that have worked with us over the past 20 years.

We further acknowledge that today we are working in northwestern Ontario in the traditional territory of Wabigoon Lake Ojibway Nation with the community of Wabigoon Lake Ojibway Nation and the Township of Ignace.

In southern Ontario, we are working in the traditional territory of Saugeen Ojibway Nation (SON) with the two SON communities – Chippewas of Nawash Unceded First Nation and Chippewas of Saugeen First Nation – and the Municipality of South Bruce.

We further acknowledge that in both the northwest and the south, we have the privilege of working with other First Nations and organizations, with Métis communities and the Métis Nation of Ontario, and many municipal communities that have all expressed an interest in learning about our work.

As part of our commitment to Reconciliation, we recognize both the historic and current injustices far too many Indigenous communities endure. We pledge to do our part to encourage well-being in communities with which we work.

Table of contents

Welcome	2
Vision, mission and values	3
Commitment to transparency.....	4
Introduction to the NWMO	6
Planning timelines.....	8
Selecting a site.....	9
Key components of the repository	10
Centre of Expertise	12
Reconciliation and Indigenous Knowledge	14
Cost and funding	18
Keeping abreast of the external landscape and adapting to change	20
Planning priorities	22
Developing a Canadian Integrated Strategy for Radioactive Waste	36
Sound governance and accountability.....	37
Glossary	40
What we heard.....	42
Share your thoughts.....	48

Welcome

Welcome to *Implementing Adaptive Phased Management 2023-27*.

This is the five-year strategic plan for the NWMO as we implement Canada's plan for the safe, long-term management of used nuclear fuel.

Vision, mission and values

Vision

Our vision is the long-term management of Canada's nuclear waste in a manner that safeguards people and respects the environment, now and in the future.

Mission

The purpose of the NWMO is to develop and implement, collaboratively with Canadians, a management approach for the long-term care of Canada's used nuclear fuel that is socially acceptable, technically sound, environmentally responsible and economically feasible.

Values

SAFETY We place all aspects of public and employee safety – including environmental, conventional, nuclear and radiological safety – first and foremost in everything we do.	INTEGRITY We act with openness, honesty and respect.	EXCELLENCE We use the best knowledge, understanding and innovative thinking, and seek continuous improvement in all that we do in our pursuit of excellence.
COLLABORATION We engage in a manner that is inclusive and responsive, and that supports trust, constructive dialogue and meaningful partnership.	ACCOUNTABILITY We take responsibility for our actions, including wise, prudent and efficient management of resources.	TRANSPARENCY We communicate openly and responsibly, providing information about our approach, processes and decision-making.

Commitment to transparency

At the NWMO, commitment to transparency is part of our culture. It is entrenched in everything we do.

This annual implementation plan is one way we demonstrate that commitment. This plan is a living document that evolves and grows over time. Each year, we update our plan to reflect progress in our work, input from communities and the public, advances in science and technology, insight from Indigenous Knowledge, evolving societal values and changes in public policy.

We are resilient and focused. We anticipate the ups and downs that accompany advancing Canada's plan for the safe, long-term management of used nuclear fuel, while protecting people and the environment. Canada's plan is designed to be adaptive. In 2022, we adapted.

Once again this year, we took cues from our employees and the communities we work with. Our collaborative work took place virtually and in person. We conducted a range of activities online, from environmental workshops and transportation engagement sessions in potential siting areas, to knowledge-exchange meetings with international counterparts. The lessons we learned will help guide our implementation plan should we face similar challenges in the future.

Our face-to-face time engagement with the communities with which we work continued to be affected in 2022 by provincial lockdowns associated with the COVID-19 pandemic. We have always anticipated the need to adapt over the course of the process, while keeping an eye on the long view. In reviewing progress against last year's version of this annual implementation plan, it became clear we needed to adjust the timing for selecting a preferred site for the deep geological repository. As we announced in August 2022, we now expect to identify a preferred site by fall 2024. This adjustment in timing is not expected to impact the long-term timelines for construction or the start of operations in the early 2040s.

Efforts in the potential siting area communities continue, ensuring Canada's plan respects the unique character of the future repository site. As we have always maintained, the project will only proceed in an area with informed and willing hosts, where the municipality, First Nation and Métis communities, and others in the area are working together to implement it.

In 2022, in collaboration with the potential siting area communities, we released the findings from a series of [community studies](#). These findings cover a wide range of topics, including employment and workforce growth, opportunities for businesses, infrastructure improvements and construction of a Centre of Expertise that will attract world-class academics from around the globe.

We also published the [Confidence in Safety](#) reports for each potential site, reflecting years of research and fieldwork. These reports summarize why we are confident that a deep geological repository can be safely constructed and operated at either siting area.

The NWMO successfully completed a [full-scale demonstration](#) of the engineered barriers that will safely contain and isolate Canada's used nuclear fuel in the repository. We also released our [revised transportation planning framework and Preliminary transportation plan](#) that are designed to advance conversations and provide more details on how we plan to safely transport used nuclear fuel.

The momentum at the NWMO is palpable and will undoubtedly continue into the next phase of implementing Canada's plan.

Your feedback is essential to the implementation of Canada's plan. Every year, we ask Canadians and Indigenous peoples for their input on our implementation plan to inform and guide our work. We invite you to share your thoughts until June 9, 2023.

Other ways to provide feedback (you may indicate that you wish for your response to remain anonymous):

- Email us at learnmore@nwmo.ca
- Send us a letter (with your name and mailing address) to:
Lisa Frizzell
Vice-President of Communications, NWMO
RE: Implementation Plan 2023-27
22 St. Clair Avenue East, Fourth Floor
Toronto, ON M4T 2S3
Canada

Take the
implementation
plan survey



Introduction to the NWMO

Canada has been using nuclear energy as a reliable, low-carbon power source for our homes and businesses for nearly 60 years. Now, as worldwide energy demand grows and the need to address climate change intensifies, nuclear power has become an increasingly important part of the conversation. The Nuclear Waste Management Organization (NWMO) plays a vital role by closing the fuel cycle.

We are entrusted with implementing Canada's plan for the safe, long-term management of used nuclear fuel inside a deep geological repository, in a manner that protects people and the environment for generations to come.

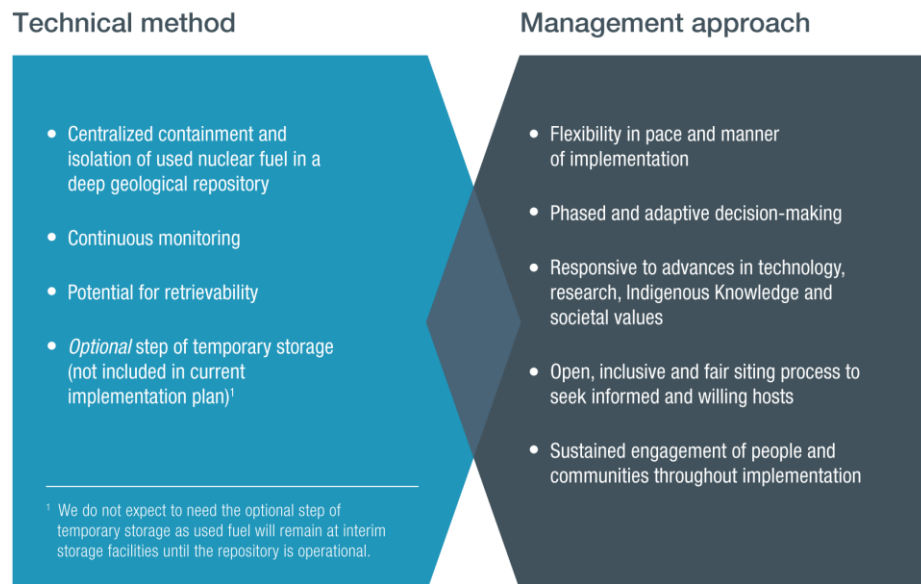
In 2002, the Government of Canada mandated the establishment of the NWMO through the *Nuclear Fuel Waste Act*. Following the "polluter pays" principle, we are an independent, non-profit organization that is funded by the waste owners in Canada: Ontario Power Generation, New Brunswick Power, Hydro-Québec and Atomic Energy of Canada Limited.

Currently, Canada's used nuclear fuel is stored at licensed, above-ground facilities. While this approach is safe, it is temporary and widely recognized as inappropriate over the long term. Canadians and Indigenous peoples have clearly told us they recognize the importance of taking action on a long-term approach today and not leaving used nuclear fuel as a burden for future generations to manage.

Canada's plan for used nuclear fuel, which follows an approach known as Adaptive Phased Management (APM), emerged through a three-year dialogue with Canadians and Indigenous peoples, including specialists and the public. It is based on the values and objectives they identified as important. In 2007, the Government of Canada selected APM as the country's plan for the safe, long-term management of Canada's used nuclear fuel.

A significant milestone is now on the horizon as we expect to select the site for the repository in 2024. Getting to site selection will require building on all the work we have done for the past 20 years. With a project of such complexity and generational scope, we must always stay focused on reaching our upcoming milestones, while also keeping an eye on the long view.

Canada's plan: Adaptive Phased Management (APM)



APM is both a technical method (what we plan to build) and management approach (how we will work with people to get it done). The technical method involves building a deep geological repository in a suitable rock formation to safely contain and isolate used nuclear fuel. The management approach involves phased and adaptive decision-making, supported by public engagement and continuous learning.

A safe and secure transportation system will be developed to transport used nuclear fuel to the repository site from the facilities where it is currently stored on an interim basis.

The project also includes plans for a Centre of Expertise, which will be established at or near the site. Initially, it will support multi-year testing and assessment of the site, with a focus on safety and community well-being. Eventually, it will become a hub for knowledge sharing across Canada and internationally.

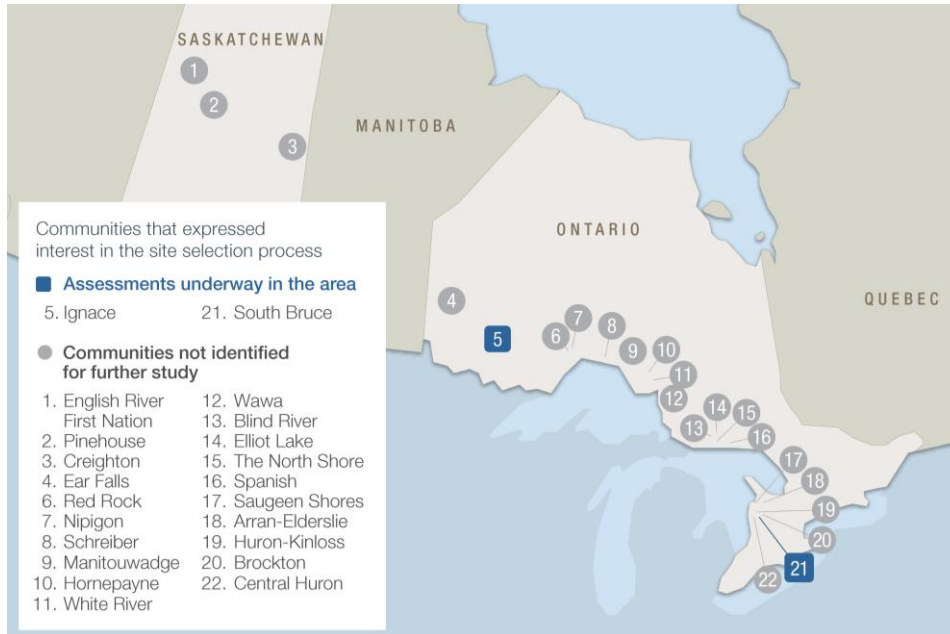
Planning timelines

Great strides were taken in 2022, despite continued unknowns created by the pandemic. The NWMO's work moved forward and adapted. Like all organizations and businesses, several provincial lockdowns associated with the pandemic impacted our work. The lockdowns led to a significant loss of time for the face-to-face interactions that are critical to the engagement process, especially in the communities exploring their potential to host the project. In reviewing our rolling five-year implementation plan and considering the impacts of the pandemic, we made the decision to shift the timing for site selection. Although we decided to adjust the timing for site selection by one year, we remain on track to meet our construction and operations timelines.

Developing Canada's plan	2002	The NWMO is created.
	2005	As required by the <i>Nuclear Fuel Waste Act</i> , the NWMO completes <i>Choosing a way forward</i> , a three-year study of the alternatives for the safe, long-term management of Canada's used nuclear fuel. The study involved interested individuals, leading scientists and other experts, Indigenous peoples and the Canadian public.
	2007	Government of Canada selects Adaptive Phased Management (APM) and mandates the NWMO to begin implementation.
Developing the siting process	2008-09	Work takes place with citizens to design a process for selecting a central, preferred site for the deep geological repository and Centre of Expertise.
Identifying a site using the siting process	2010	The siting process is initiated.
	2010-15	Twenty-two communities initially express interest. In collaboration with interested communities, the NWMO conducts initial screenings, followed by preliminary assessment desktop studies and community engagement. Areas with less potential to meet project requirements are eliminated from further consideration.
	2015-24	The NWMO expands assessment to include field investigations. Areas with less potential are eliminated from further consideration as the narrowing down process continues.
	2022	The Government of Canada reaffirms that a deep geological repository is the best solution for Canada's used nuclear fuel.
	2024	A single, preferred site is identified.
Towards construction	2025	Additional site characterization activities are initiated at selected site. The NWMO begins the federal impact assessment process and the Canadian Nuclear Safety Commission's (CNSC) regulatory decision-making process. An updated transportation planning framework is issued (updated every three years).
	2028	Impact assessment studies are submitted as part of the regulatory decision-making process.
	2030	The grand opening of the Centre of Expertise is held. The impact assessment is approved (estimate). The Licence to Prepare Site is granted (estimate).
	2032	The Licence to Construct application is submitted to the CNSC.
	2033	The Licence to Construct is granted (estimate).
	2033	Construction begins.
Beginning operations	2040-45	Operations of the deep geological repository begin. Transportation of used nuclear fuel to the repository begins.
Extended monitoring	Post-operations	Decades of monitoring are initiated.

Selecting a site

The NWMO has been engaged in a multi-year, community-driven process to identify a site that will safely contain and isolate Canada's used nuclear fuel in a deep geological repository.



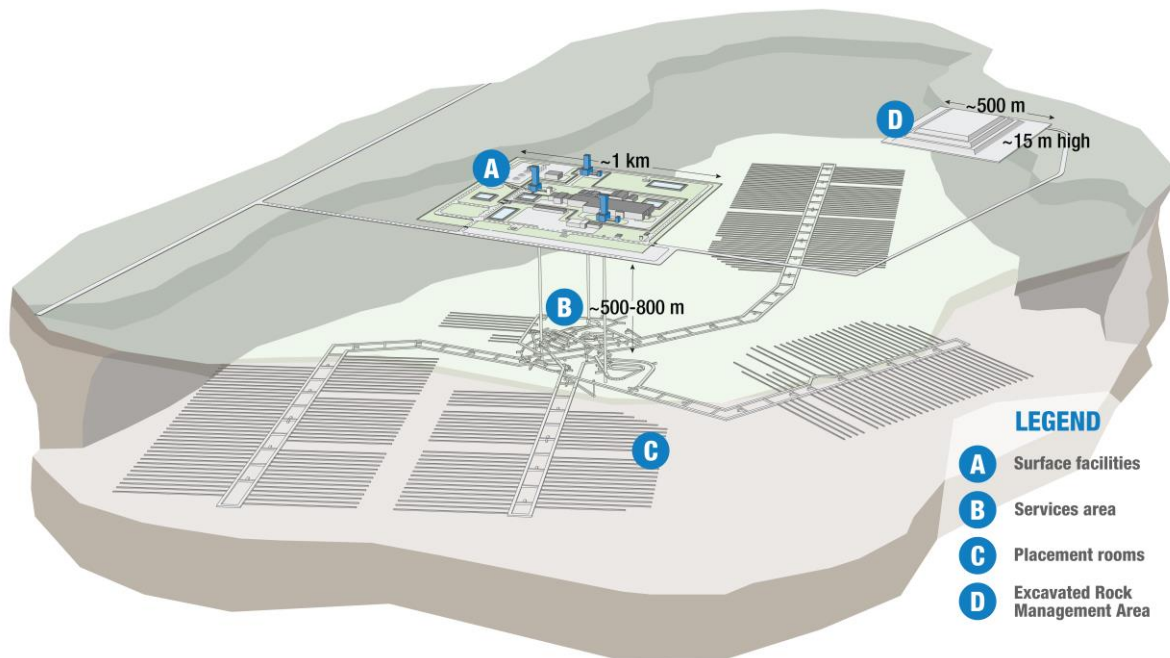
We initiated the site selection process in 2010. Over the following two years, 22 municipalities and Indigenous communities voluntarily expressed interest in learning more and exploring their potential to host the project. We gradually narrowed our focus to two potential sites through extensive social engagement and technical site evaluations to assess the safety of those sites and transportation of used nuclear fuel to them, and the potential to build supportive and resilient partnerships. Both potential sites are in Ontario – one in the Wabigoon Lake Ojibway Nation (WLON)-Ignace area in northwestern Ontario and one in the Saugeen Ojibway Nation (SON)-South Bruce area in southern Ontario.

Throughout 2022, we implemented more detailed technical evaluations at both potential sites and engaged in meaningful discussions with communities around partnerships and community well-being investments.

As we advance the siting process, we maintain the fundamental principle that the project will only proceed in an area with informed and willing hosts, where the municipality, First Nation and Métis communities, and others in the area are working together to implement it.

[Learn more about the site selection process.](#)

Key components of the repository



This diagram shows a conceptual layout for the surface facilities, as well as an approximate area of 1,500 acres (600 hectares) for the underground services area and placement rooms in the deep geological repository, at the proposed site with crystalline rock.

This design will continue to evolve as the project progresses and will adapt to changes in technology and future decisions about nuclear power generation that may change the volume or type of fuel to be managed.

For example, in Canada, there is an active research sector exploring new technologies such as small modular reactors (SMRs), fuel reprocessing and other types of advanced reactors. New nuclear technologies may result in different types of used fuel. However, there is international consensus that deep geological repositories represent the best practice for the long-term management of used nuclear fuel resulting from SMRs as well, including any high-level waste from reprocessing.

The repository design is currently sized to account for the existing inventory of used fuel, as well as projected inventories from planned reactor life extensions and refurbishments of operating reactors. Both potential sites have the capability for expansion of the underground to accommodate additional inventory. For more information about how the NWMO will account for the potential for used fuel created by SMRs, please see the section [Keeping abreast of the external landscape and adapting to change](#).

The deep geological repository uses a multiple-barrier system designed to safely contain and isolate used nuclear fuel over the very long term. Constructed more than 500 metres below ground, the repository will consist of a network of placement rooms that will store the used nuclear fuel. This approach aligns with international best practices.

At the surface, there will be facilities where the used fuel is received, inspected and repackaged into purpose-built containers encased in a buffer box of bentonite clay before being transferred to the main shaft for underground placement. Work is underway on the design of the repository surface facilities, including the Used Fuel Packaging Plant.

The repository underground will be accessed through three shafts, which will be located within a single centralized and secure services area. This services area will also include an underground demonstration facility for initial testing of the future engineered barrier emplacement equipment. The layout also includes multiple access tunnels that enable the placement rooms to be situated in areas with the most suitable host rock. The buffer boxes, with the used fuel containers inside, will be arranged in the horizontal placement rooms, and any spaces left over will be backfilled with granular bentonite pellets or chips.

In 2022, we successfully completed a full-scale demonstration of the engineered barriers that will safely contain and isolate Canada's used nuclear fuel in a deep geological repository. This important safety and technical achievement was the culmination of more than eight years of preparation, including the design and fabrication of specialized prototype equipment and components by the NWMO's team of leading technical specialists and engineering partners.

Work has started on site-specific conceptual designs of the repository layout based on information from geoscience assessments and borehole drilling in the potential siting areas. The NWMO will be completing assessments of site-specific transportation systems and developing the preliminary design of the Used Fuel Transportation System. We will continue to evolve the design of the repository using the site-specific information we obtain from additional site characterization after site selection, with an objective to develop the updated repository design for the construction licence around 2030. The proposed site in the WLON-Ignace area would be located in crystalline rock, while the proposed site in the SON-South Bruce area would be in sedimentary rock.

[Learn more about the project.](#)

Centre of Expertise

A Centre of Expertise will be established at or near the repository location, after the site is selected. The specific location will be determined in collaboration with the host communities.

The centre will become a hub for knowledge sharing across Canada and internationally and a focal point for those living in the area to learn about the project through public viewing galleries and interactive displays. The centre may also serve as a hub for sharing Indigenous Knowledge, culture, history and traditions.

The design and use of the centre will be developed collaboratively with those living in the area, including First Nation and Métis communities. In 2022, the NWMO began working with local communities to develop a vision for the centre in a manner that aligns with their requirements and aspirations. This visioning process and continued dialogue around community interests for the facility will continue in both siting regions in the coming years, supporting ongoing dialogue and the unique opportunities the centre could provide.

For the NWMO's needs, the centre will initially be used to support the continued site characterization work related to technical safety, ongoing education and dialogue, and community well-being. It will be home to active technical and social research, as well as technological demonstration programs, with contributions from scientists and other experts in a wide variety of disciplines from both the NWMO and around the world.

An engineering test facility will be located within the Centre of Expertise to continue the development of materials and equipment to be used in the repository, and to support the construction and operation of the facility in the future.

Once both community and the NWMO's requirements are finalized, the project will begin.



This artist rendering shows one possible design for a Centre of Expertise in the Wabigoon Lake Ojibway Nation-Ignace area.



This artist rendering shows one possible design for a Centre of Expertise in the Saugeen Ojibway Nation-South Bruce area.

Reconciliation and Indigenous Knowledge

The NWMO is committed to understanding, honouring and aligning with Indigenous Knowledge in our work. This commitment is reflected in many ways – through oversight by our Indigenous Relations team, advice from the NWMO’s Council of Knowledge Holders, Indigenous representation in our organization (including in our executive team and Board of Directors), meaningful policies to guide our work and regular engagement with First Nation and Métis communities. In all areas that we operate, this commitment is an essential part of doing good work and maintaining positive relations.

Over the next five years and into the future, the NWMO will continue to implement our [Reconciliation Policy](#) (2019), measure progress and align Indigenous Knowledge with our work. Measured annually and reported publicly, this work affirms our commitment to acting on the Truth and Reconciliation Commission’s call to action #92, which calls upon the corporate sector to build respectful relationships with Indigenous peoples and provide valuable learning opportunities for staff on the history of Indigenous peoples.

In 2022, the NWMO published our first [Reconciliation Report](#) (2021), which provides an evaluation of the NWMO’s *Reconciliation Policy*’s impacts since its formalization in 2019. Activities tracked have included mandatory staff Reconciliation training or continuous learning opportunities, informal training opportunities, staff support systems and community-driven work plans.

Reconciliation

Reconciliation matters. For Canadians, it ensures that we learn from and address historic and ongoing wrongs, and that we work together to co-create a better future. The NWMO is committed to our Reconciliation journey. As we move forward, we ensure Reconciliation is considered in all our work.

Our *Reconciliation Policy* was released in 2019 as part of establishing a solid foundation for working with Indigenous peoples. In step with our policy, the NWMO continues to engage meaningfully with First Nation, Métis and municipal communities and organizations as we work together to implement Canada’s plan.

The NWMO recognizes the truth of the historic wrongs and the challenges we have today and seeks opportunities to co-create a better future. Our policy requires that the NWMO build relationships with First Nation and Métis communities on a foundation of respect for languages and customs, culture and institutions.

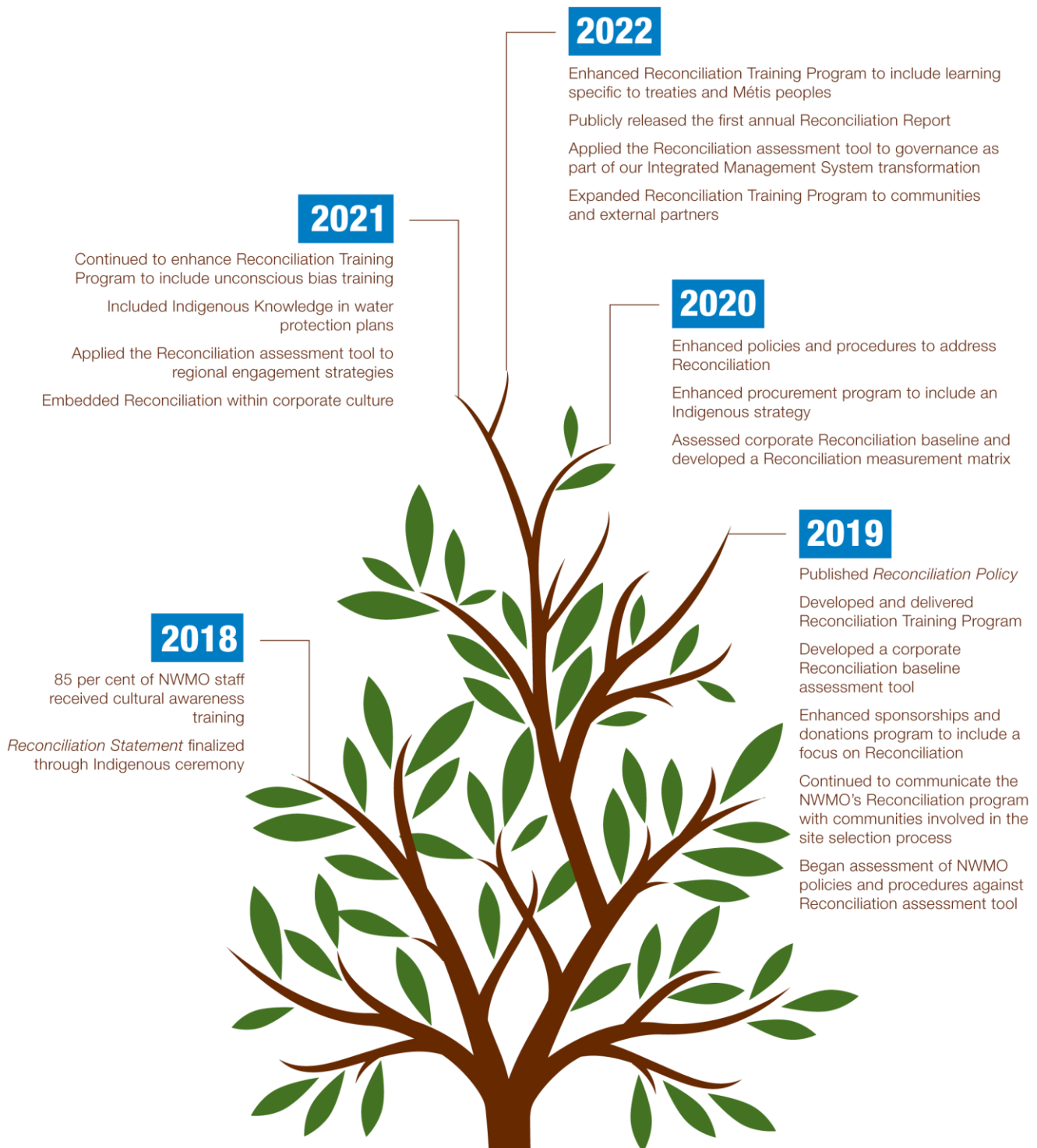
The NWMO's Indigenous Relations team works with Reciprocal Consulting – an Indigenous-owned firm specializing in Indigenous evaluation and monitoring – to publish our annual Reconciliation report. It evaluates the NWMO against the Reconciliation baseline to ensure we are meeting the commitments outlined in the *Reconciliation Policy* (2019). The Reconciliation baseline is used to evaluate our contributions to Reconciliation, identify gaps and determine how we should move forward as an organization. Measuring our progress helps instill Reconciliation as a core value, which is reflected in how we act as an organization.

We continue to apply our Reconciliation assessment tool to key documents. We have completed 18 Reconciliation assessments of the NWMO's policies, as well as applied the tool to both regional engagement strategies and the draft Integrated Strategy for Radioactive Waste. We have also taken the assessment tool outside the organization, using it with some of our partner universities to apply this lens as they expand research programs related to our work.

Cultural awareness training is one way the NWMO supports our learning. To date, more than 80 per cent of the NWMO's staff have completed the first two Reconciliation training modules, which include space for learning circles and Indigenous-led dialogue. Part three of our Reconciliation training program was rolled out in fall 2021, with a focus on historic and contemporary understandings of treaties, as our Reconciliation continuous learning stream continues to evolve. In 2022, we introduced a new Métis awareness training module.

As the NWMO implements the *Reconciliation Policy* (2019), we demonstrate our contribution to this important movement towards change.

NWMO RECONCILIATION STRATEGY



Indigenous Knowledge

The NWMO's commitment to aligning with Indigenous Knowledge and the important teachings from Indigenous Knowledge Holders guide our work. These teachings include the role and significance of spirit and ceremony, understanding natural laws, respecting Mother Earth and creating space for Indigenous voices.

Internal workshop discussions explore the sacred relationship and stewardship role Indigenous Knowledge Holders have with water and the commonalities that exist within western science perspectives. Participants at these workshops include Indigenous Knowledge Holders, Elders, scientists, industry professionals and NWMO employees. Together, we explore how water is a life force that sustains us, flows between and within us, and shapes the land.

"Water is a unifying and transformational being that brings us all together. It is also a great teacher, with a voice and a story to tell."

– Elder Diane Longboat

It is our duty and responsibility to listen to and learn from water so that we always respect, protect and nurture it. That is why protecting water, people and the environment is so important to us. It is at the core of what we do and a commonality we share with Canadians and Indigenous peoples because we all have a personal relationship with water.

Understanding the water, its quality, its memory and where it is flowing is essential for us to be able to make good decisions as we assess the geology and other environmental features in our potential siting communities, conducting environmental and geological studies.

Through collaboration with Indigenous Knowledge Holders, Elders, scientists, industry professionals, conservation authorities, youth and others, we continue to learn about water and can share our knowledge with one another and others around the world.

Several communities in our site selection process asked us to provide more information about how our work will protect water. Since 2017, we have engaged with communities through our "Journey of water" presentation series. We align with Indigenous Knowledge in these presentations about water, a subject of vital importance to all people. Developed collaboratively with the Council of Knowledge Holders, Wabigoon Lake Ojibway Nation Women's Circle and Indigenous community groups, this series helps tell the story of water and how it interacts with materials proposed to be used in the multiple-barrier system. The NWMO continues to seek opportunities to present these vital teachings in the future.

In the next five years, our commitment will endure, as we seek to align with Indigenous Knowledge in everything we do, creating space to learn from ceremony and applying pertinent learnings to how decisions are made at the NWMO.

Cost and funding

Canadians and Indigenous peoples expect that the money necessary to pay for the long-term management of used nuclear fuel will be available when needed. This expectation is being met.

Consistent with the “polluter pays” principle, Canada’s plan for used nuclear fuel is funded by the waste owners in Canada: Ontario Power Generation (OPG), New Brunswick Power (NBP), Hydro-Québec (HQ) and Atomic Energy of Canada Limited (AECL). The *Nuclear Fuel Waste Act* requires each of these four companies to establish independently managed trust funds and make annual deposits to ensure the money to fund this project will be available when needed.

Each company pays into the trust fund based on the number of fuel bundles it has and continues to create. The amounts cover estimated fixed costs for the NWMO to construct, operate, monitor and decommission a deep geological repository, as well as variable costs associated with managing each fuel bundle. This process is designed to ensure Canada’s plan is funded over the long term.

For more information on trust fund deposits, please refer to the [NWMO Triennial Report 2020-22](#). In addition to these trust fund contributions, waste owners are also responsible for funding the NWMO’s annual operating budget.

Total trust fund deposits: Year 2023		
Owner	Trust fund balance (\$ million)	Deposit to trust funds (committed and future bundles) (\$ million)*
	December 2022	2023
OPG	4,404	93
NBP	187	6
HQ	174	0
AECL	72	0.4
Total	4,837	99

** Annual trust fund deposits are required to be made within 30 days of the submission of the annual report. A deposit date of April 27 is assumed for illustrative purposes.*

The NWMO is responsible for determining what costs can reasonably be expected to arise over the life of the project, along with a contingency for unexpected events. We maintain a system to estimate funding requirements and communicate with waste owners to ensure they provide the required deposits to the trust funds.

Many factors will affect the long-term cost of Canada's plan: the volume of used nuclear fuel to be managed, the location of the facility, the surrounding infrastructure, rock type and characteristics, the design of the repository, and the length of time allocated to monitoring the site following fuel placement. The existing inventory of used nuclear fuel in Canada is approximately 3.2 million bundles, and more bundles are produced each year as nuclear reactors continue to generate electricity. Future decisions about nuclear generation in Canada may change the volume and type of fuel to be managed.

The NWMO regularly updates the lifecycle cost estimate and completed a full update of the cost estimate for the project in 2021. These estimates provide the basis for financial planning and trust fund deposits for future years. For planning purposes, our 2021 cost estimate is based on an expected volume of about 5.5 million fuel bundles, which is the anticipated volume at the end of the planned operation of Canada's existing nuclear reactors. With this expected volume, the total lifecycle cost of the project – from the launch of the site selection process in 2010 to the completion of the project about 175 years later – is approximately \$26 billion (in 2020 dollars). This figure covers many decades of lifecycle activity, stretching well into the next century.

Keeping abreast of the external landscape and adapting to change

The NWMO is committed to staying abreast of local, national and international developments that may change the landscape in which we operate or impact the project directly. We continue to monitor advances in the energy sector, innovations in nuclear waste management, changes in energy and environmental policies, potential developments involving new nuclear reactor units, changes in society's expectations, values and insights, and developments with other Canadian nuclear waste initiatives.

A core principle of Adaptive Phased Management is a commitment to adapt plans in response to input obtained through engagement activities. For example, our transportation planning framework and *Preliminary transportation plan* are both based on what we heard from communities and people interested in Canada's plan. Both transportation planning documents were designed to advance conversations and provide more information on how we plan to safely transport used nuclear fuel.

Beginning in 2020, we shared the draft of the framework publicly for broader engagement, and in 2022, we published both documents. We have committed to updating these documents every three years, based on feedback from Canadians and Indigenous peoples, as well as new developments in best practice, technologies, ongoing adaptation and continuous improvement.

We have also adapted our plans for the regulatory decision-making process in response to changes in the *Impact Assessment Act* passed in 2019. More information about the regulatory decision-making plan can be found in the section [Regulatory decision-making process](#).

As advancements in small modular reactor (SMR) technology continue to progress in Canada, we have been working with SMR developers to identify the types of used nuclear fuel that may result, as the NWMO will be responsible for managing it. This information will help us optimize how to handle the used nuclear fuel for long-term management, how to handle the potential impacts to the repository design and how our funding formulas can be adapted to include new entrants. It will also help us better inform the potential host communities about the total scope of the project.

The NWMO is currently aware of two SMR projects in the licensing process – Ontario Power Generation is working together with GE-Hitachi Nuclear Energy to deploy an SMR at the Darlington new nuclear site, and Global First Power is working to construct an SMR at Chalk River Laboratories in Ontario. While we are aware of other SMR proposals and as these advance, we will make appropriate changes to our plans. As more SMR projects advance towards licensing, the NWMO will be prepared to adapt and identify any potential efficiencies in managing the used fuel they produce.

There is international consensus that deep geological repositories represent the best practice for the long-term management of used nuclear fuel resulting from SMRs, including any high-level waste from reprocessing. Canada's plan is designed to adapt to changes in technology, and we can build flexibility into repository designs so we can be ready for future decisions.

We further regularly update a [watching brief on advanced fuel cycles and alternative waste management technology](#). We also monitor and report on [potential inventories of used nuclear fuel quantities](#) for implications to the repository design.

Planning priorities

At the NWMO, we structure our work plans around seven priorities: engineering, site assessment, safety, mobilization, regulatory decision-making process, partnership and transportation. In this section, we outline our plans within these seven work streams.

Our commitment to Reconciliation and aligning with Indigenous Knowledge guides our efforts in all priority areas.

Over the next five years, we will transition from the site selection process to the regulatory decision-making process. These planning priorities reflect the many activities required during this transitional period.



ENGINEERING

The NWMO will:

- Complete conceptual site-specific facility designs to support regulatory decision-making;
- Initiate preliminary repository design work to complete a future construction licence application; and
- Continue optimization of engineered-barrier system for construction and operations.

The deep geological repository is an internationally recognized approach, based on scientific consensus, for the safe, long-term management of used nuclear fuel. Multiple engineered barriers will be emplaced in a stable rock formation to contain and isolate the used nuclear fuel deep underground.

As we move through the siting process and into the regulatory decision-making process, we will develop site-specific repository designs using data collected through borehole drilling and preliminary environmental baseline investigations. This work will support the site selection decision. Once a site has been selected, we will begin preliminary engineering at the selected site to support the preparation of regulatory submissions and assessments and achieve a future construction licence application.

We will continue to optimize our processes and techniques to enhance confidence in the strength of the engineered-barrier system design. We will also integrate the latest information from our ongoing research and development activities into our designs through interdisciplinary reviews, as part of our Technical Research Review Committee.

In the period from 2023 to 2027, the NWMO will also:

- Maintain a prototype test and demonstration facility for engineered-barrier evaluations;
- Continue to update cost estimate information for the project as required;
- Support the preparation of the initial project description and assessments needed for the regulatory process;
- Begin preliminary engineering for the selected site to support the future construction licence application; and
- Arrange independent peer reviews of specific aspects and features of the repository and engineered-barrier design.

SITE ASSESSMENT

The NWMO will:

- Continue geoscientific investigations and environmental baseline monitoring at both sites; and
- Begin additional geoscientific investigations and baseline data collection at the selected site.

The NWMO anticipates identifying a single, preferred site by fall 2024 and then moving into the regulatory decision-making process in 2025. At this point, initial site assessment activities have been completed with suitable information to inform site selection. After site selection, site characterization will continue at the selected site to support the regulatory decision-making process and inform geoscientific, engineering, environmental and safety assessments work that will be needed to apply for a construction licence.

To ensure we appropriately include Indigenous Knowledge, we seek guidance from local Knowledge Holders to incorporate applicable learnings into our planning and the execution of our studies. Local Indigenous experts ensure Indigenous protocols guide our field activities. To date, these activities have included cultural verification studies of potentially affected areas, including ceremony, and cultural awareness training for staff and contractors working in the field.

Our work with people in interested municipalities, First Nation and Métis communities, and others in the area continues. We encourage consideration of the potential environmental, social, cultural and economic effects of hosting the deep geological repository. Involving people in the broader siting areas ensures a wide range of potential benefits and impacts are considered as we move beyond site selection.

Canada's plan is constantly being adapted to reflect the priorities of siting communities. While our timeline for identifying a site has shifted, the geoscience fieldwork activities have continued in both siting areas.

In the period from 2023 to 2027, the NWMO will also:

- Continue field studies, including additional borehole drilling at the selected site, and consideration of factors identified by Indigenous Knowledge Holders to inform geoscientific, engineering, environmental and safety assessments;
- Continue geoscientific studies to support the process to select a suitable site for hosting the deep geological repository in a safe location;
- Engage communities on specific topics such as safety of people and the environment, project benefits and stewardship of the land; and
- Provide support for regulatory decision-making and initiate additional site characterization studies to confirm the site is technically suitable for hosting the deep geological repository.

SAFETY

The NWMO will:

- Continue development of preliminary site-specific safety assessments;
- Maintain our commitment to considering safety from a social perspective;
- Develop updated safety assessment models for the selected site that will be the basis for the regulatory decision-making process; and
- Continue research to support the safety case and build expertise to support the regulatory decision-making process.

The NWMO is committed to keeping people and the environment safe for generations to come. The safety of the public and our employees comes first in everything we do, including environmental, conventional, nuclear and radiological safety.

As we continue to improve our knowledge of the two potential sites, we share our understanding of safety with communities through presentations, on our digital platforms and by making the NWMO's specialists available.

The deep geological repository will be placed in a rock formation that supports the safe, long-term containment and isolation of used nuclear fuel. Repository performance in this site must be shown to meet or exceed the regulatory expectations of the Canadian Nuclear Safety Commission as part of the future licensing process.

As we look to identify a preferred site by fall 2024, the [Confidence in Safety](#) reports released in 2022 provide a summary of evidence that a deep geological repository can be constructed at either potential site. After a site with willing and informed hosts is selected, further technical studies will be undertaken at the selected site. These will provide even greater clarity for the repository design and formal safety case that will be submitted to regulators.

The safety of a proposed site will be confirmed through a rigorous regulatory review of the repository design and safety case.

In the period from 2023 to 2027, the NWMO will also:

- Continue to conduct joint research projects with international organizations and counterparts in other countries – including Sweden, Switzerland, Finland, France, Korea, Japan and the United Kingdom – to learn from and contribute to the experience of other countries, while keeping abreast of the state-of-science in geoscience and safety cases for various host rock formations;
- Engage universities in research partnerships that ensure our technical work is scientifically rigorous and develop young engineers and scientists knowledgeable in waste management. This will include continuing to host an annual Geoscience Seminar and an Engineered-Barrier Science Workshop to bring together researchers from academia and industry;
- Increase awareness of the important role of Indigenous Knowledge in our work, in part by offering training and sponsoring workshops on Indigenous Knowledge and western science for our research partners; and
- Continue building a strong safety culture among employees as we prepare for the regulatory decision-making process, by creating and sustaining an environment where employees take proactive responsibility for their safety and that of their colleagues and the public in all activities.

Focus on safety from a social perspective

While the deep geological repository represents an important environmental infrastructure project for Canada, just as core to our work is protecting people. Key to that commitment is our focus on implementing the project in a way that makes people feel safe. The NWMO considers safety as seen from a social perspective at three levels – societal, community and personal.

The NWMO considers safety from a social perspective at the societal level by ensuring we seek broad acceptance for the project. When the NWMO was founded in 2002, we began a three-year study designed to assess possible approaches and alternatives for the safe, long-term management of Canada's used nuclear fuel, so that the public could understand the options and make considered choices.

Face-to-face conversations were held with thousands of individuals and representatives of organizations at local, provincial, national and international levels. These included representatives of Indigenous organizations, nuclear power plant workers, youth, residents of nuclear power plant communities, environmental groups, industry experts, faith communities, government agencies and parliamentarians. Canada's plan emerged from this dialogue and was based on the values and priorities that Canadians and Indigenous peoples identified.

We also engaged the public in order to develop and design our site selection process. Voluntary participation, shared decision-making, openness and fairness formed the basis of that process, which we detailed in our [2010 site selection process](#) and continue to follow today.

Our site selection process has been voluntary from the outset, with 22 communities initially expressing interest in learning more and exploring their potential to host the project. As we have continued to move forward in our site selection process, narrowing down to the two remaining siting areas, safety from a social perspective has been built into the foundation of our engagement efforts and the site selection process.

We have maintained our commitment that Canada's plan will only proceed in an area with informed and willing hosts, where the municipality, First Nation and Métis communities, and others in the area are working together to implement it.

We have also demonstrated our commitment to safety from a social perspective at the community level by aligning with Indigenous Knowledge and working towards Reconciliation (for more information, please see the section [Reconciliation and Indigenous Knowledge](#)).

To ensure we address safety from a social perspective at the personal level, the NWMO regularly solicits individual feedback on our work through our on-the-ground engagement efforts, social media and public surveys. We listen to communities, residents, community leadership and those expressing a diversity of views about our work. Through this process, we seek to understand and address the concerns people raise.

Since transparency is a core value of our organization, we also publish annually the results of these engagement efforts through a series of “What we heard” reports that summarize the questions and themes we are hearing.

Our ongoing efforts to ensure that the project considers safety from a social perspective include:

- Using the feedback we receive to understand the issues of importance to Canadians and Indigenous peoples, adjusting our work to address those concerns if needed, and highlighting those concerns in our public reporting;
- Actively and willingly participating in public panels featuring different perspectives on the project;
- Using common themes from the feedback we receive to guide the design of the repository and respond to that feedback in our reporting, as we have done on topics such as the importance of protecting water;
- Providing capacity to communities engaged in the site selection process so they can develop their own processes for determining if they are willing to host the project;
- Affirming our commitment to Indigenous communities that a site will not be selected without their consent;
- Following a collaborative approach to developing partnership and hosting agreements;
- Extending our engagement to regional and neighbouring communities, beyond the potential host communities;
- Involving communities in the development of community studies and the discussion of results considering a range of socio-economic factors, to explore the potential for partnership and ensure the project can be implemented in a way that fosters well-being in the area;
- Including communities in participatory environmental monitoring programs;
- Considering realistic lifestyles in our safety assessments – how and where people in the area live;
- Making safety assessment experts available to the public on a drop-in basis in the siting areas; and
- Creating opportunities for our staff to directly engage community members in the siting areas to discuss the safety of the program and learn about concerns they may have.

MOBILIZATION

The NWMO will:

- Implement a human resources strategy, and ensure the information technology security and platforms required for the organization and regulatory decision-making process are available; and
- Begin planning, design and tendering for construction of the Centre of Expertise.

With a project of such complexity and generational scope, we have always anticipated the need to adapt over the course of the process, while also keeping an eye on the long view.

Site selection is a critical milestone, marking the beginning of a new series of activities. After the site is selected, there will be increased activity in the local and regional area. It will also mark the beginning of a multi-phase organizational transformation for the NWMO.

As we look to expand our team, the NWMO will seek to build an equitable, diverse and inclusive workforce, maximize job opportunities in the siting area – the municipality and surrounding region, including First Nation and Métis communities – and develop capacity in communities through investments in training and education.

With site selection drawing closer, we are preparing to move our operations to be based in the location selected for the repository. We are also making plans to increase resources within the region, ensure we have the technology in place to support Canada's plan, and secure land for our facilities, including the Centre of Expertise.

Internally, we are preparing for this increased activity by putting in place the resources needed to undertake continued site characterization, engineering designs, regulatory submissions, and construction and operation of the deep geological repository.

In the period from 2023 to 2027, the NWMO will also:

- Assess resource requirements to advance and support continued site characterization, environmental assessments, engineering designs and safety case development for the selected siting area in support of the licensing application;
- Continue to build a strong local presence in potential siting areas and provide local contracting opportunities for the project;
- Work with communities to understand the housing and infrastructure needs that will be required to support the transition of the NWMO workforce to the selected site;
- Invest in building up the skills and capacity of youth and community members in the municipalities and First Nation and Métis communities engaged in the site selection process, to help them secure jobs related to the plan; and
- Continue to strengthen our corporate culture through appropriate organizational behaviours, standards and tools, including the use of technology platforms. This includes striving for excellence in project management, achieving meaningful partnerships, embracing diversity and inclusion, committing to Reconciliation, and aligning with Indigenous Knowledge and practices in all our work.

The operational readiness plan

To ensure we are ready to move into the next phase of the project, the NWMO is developing an operational readiness plan that will include:

- Developing and implementing the systems, processes and tools required for the next phase of the project, including care and control of the project site in the selected community; and
- Ensuring the NWMO has the project, contract management, and commercial processes and tools to execute large, complex projects and multi-year contracts.

To align with the planning priorities, the NWMO is developing organizational capabilities and competencies for the regulatory decision-making process and preparing for construction. This includes further developing the processes, systems and tools that will be required to implement Canada's plan on time and on budget, including our management system, commercial strategy, business and information technology infrastructure, and information management systems.

The NWMO will also be delivering more complex aspects of the project in the next phase of work, with increased risk for impacts to the cost and schedule. Our ability to manage and report on these projects and contracts will require the right resources to be in place by the time we select a site, so that we can transition effectively into the next phase of work.

In the period from 2023 to 2027, the NWMO will also:

- Continue the transformation of our management system to be consistent with the requirements of CSA N286-12, *Management System Requirements for Nuclear Facilities*, as it applies to our activities;
- Continue to use information technology tools and technology to automate processes, support strategic initiatives, and digitize information, content and records;
- Use artificial intelligence, business intelligence and data analytics to drive operational efficiencies and aid in critical decision-making;
- Develop a commercial strategy for the labour, goods and services necessary for the next phase of work;
- Implement the Project Management Information System to support the execution and monitoring of the NWMO's projects; and
- Apply the project management and commercial strategy governance to our work.

REGULATORY DECISION-MAKING PROCESS

The NWMO will:

- Prepare with community input the submissions to start the regulatory decision-making process; and
- Start the regulatory decision-making process with partner communities.

Protecting people and the environment for generations to come remains at the heart of all our work. As we head towards site selection and beyond, it will become even more important to demonstrate that Canada's plan meets strict regulatory requirements to protect the health, safety and security of people and the environment, while also respecting Canada's international commitments.

We expect to formally notify the regulators that we will be starting the regulatory decision-making process shortly after site selection and target our initial submissions for 2025.

Our site investigations and associated technical studies, in advance of this process and once it is underway, must follow all relevant municipal, provincial and federal requirements. To ensure we achieve this, the NWMO monitors and adapts our activities to all regulatory changes that affect the project. For example, we adapted our plans to conduct studies that are consistent with the *Impact Assessment Act* that came into force in 2019.

We also continue to engage with the Canadian Nuclear Safety Commission (CNSC) in preparation for the eventual submission of a licence application, consistent with the terms of a special project arrangement already in place.

In the period from 2023 to 2027, the NWMO will also:

- Develop impact assessment methodologies in collaboration with municipal and Indigenous siting area communities in preparation for formally launching the regulatory decision-making process;
- Work with communities and others to identify opportunities to enhance our understanding of the current local and regional conditions, including collaboration with Indigenous communities to align Indigenous Knowledge with this understanding as a foundation for the environmental, social, health and economic assessments;
- Building on the work completed on safety from a social perspective up to site selection, continue to work with community members to understand their issues and concerns, and address them in our designs and studies;
- Establish environmental monitoring programs in potential siting areas in close collaboration with community members and Indigenous Knowledge Holders;
- Work with potential host communities to define their role in the regulatory decision-making process and then facilitate their participation;
- Obtain from the Impact Assessment Agency of Canada (IAAC), the CNSC and other regulatory authorities clarity regarding the requirements of the *Impact Assessment Act* and implementation under the act;
- Prepare and submit materials required to initiate the federal impact assessment and CNSC licensing; and
- Begin the integrated impact assessment and licensing process, and prepare the necessary reports after we have received the Site-Specific Impact Assessment Guidelines and Permitting Plan from the IAAC.

The regulatory decision-making plan

Once a site has been selected in 2024, the NWMO will shift our focus to the regulatory decision-making process that will allow construction of the deep geological repository to move forward if approvals are granted.

All regulatory decisions will involve independent review by federal and provincial regulators and an appointed review panel. The process will be open and transparent and involve members of the public who choose to participate.

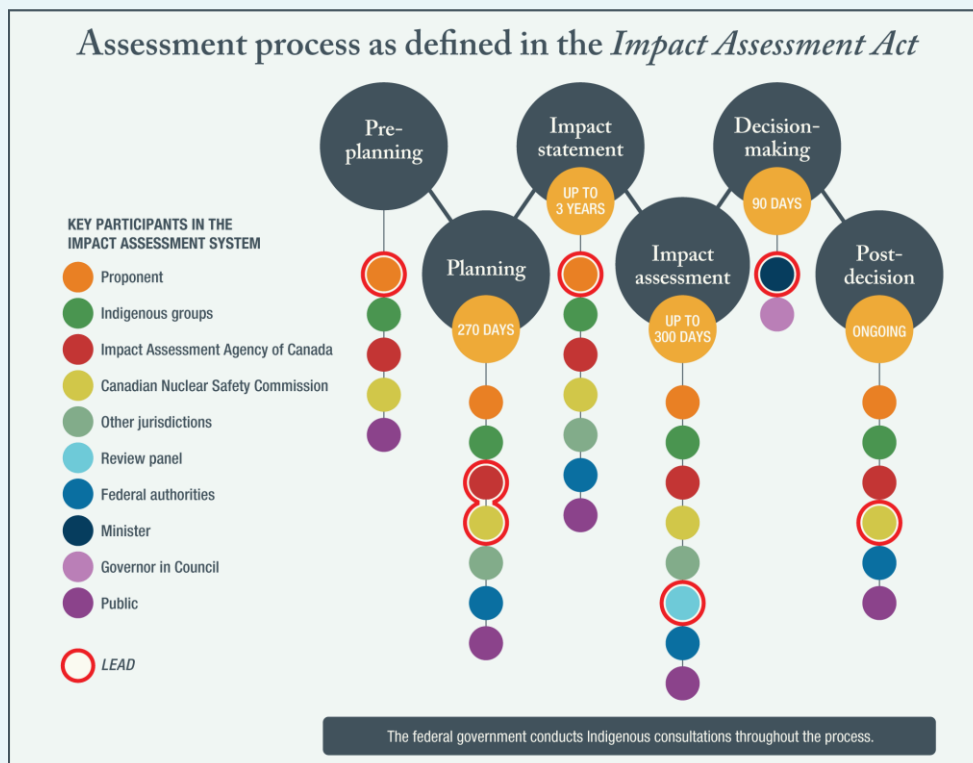
There are two integrated regulatory decision-making processes:

- An impact assessment under the *Impact Assessment Act*; and
- Licensing under the *Nuclear Safety and Control Act*.

Together, these processes will help the federal government assess various aspects of the project, including safety, sustainability, adverse effects, national security and whether it is in the public interest.

The NWMO and host communities for the project will undertake a substantial work program, studying the potential impacts of the project, including cumulative effects, and identifying any necessary mitigations. Overall, our target is to have received the necessary regulatory regulatory approvals to transition to site preparation by 2030.

[Learn more about the regulatory decision-making process.](#)



PARTNERSHIP

The NWMO will:

- Build supportive and resilient partnerships with communities leading to mutually agreeable partnership agreements; and
- Select the preferred site for the deep geological repository in an area with informed and willing hosts.

The NWMO is committed to supporting community well-being by allocating funding to each potential host community to advance community-led projects. These funds are intended to support the community's continuing efforts to build community sustainability and well-being, to support capacity-building to participate in discussions to explore partnership with the NWMO, and to host the project in the future through the development of transferable skills. Municipalities in the siting process continue to express interest in enhancing relationships with their Indigenous neighbours, which we are working to facilitate through our engagement efforts.

In 2023 and 2024, we will continue to work with municipal and Indigenous communities in each siting area to explore the potential for partnership. We follow a partnership road map outlining a sequence of partnership-building topics to examine alongside the communities.



In Ignace, the conversation around a values and principles exercise continues with the newly elected municipal government, with the potential for additional work to be initiated based on those discussions. In South Bruce, the municipality established 36 guiding principles that reflect the community's priorities and expectations. Each topic in our partnership road map builds on the values and principles the communities identify to guide our discussions, ensuring the project is implemented in a manner that enhances community well-being.

After a site is identified in 2024, our work will shift from building awareness, understanding the potential to support well-being and gaining confidence in the safety of the project, including safety from a social perspective, to implementation and governance of the partnership agreements. Youth engagement will remain a priority, given the intergenerational nature of the project and the need for intergenerational transfer of knowledge to support implementation of the project.

In the period from 2023 to 2027, the NWMO will also:

- Continue engaging municipalities, First Nation and Métis communities in the siting areas, and surrounding communities to build awareness of the project and develop and sustain relationships, taking into account traditional laws, practices and use of land;
- Work with the siting communities to continue to build awareness of the project in the region;
- Engage communities within the siting areas to understand how safety from a social perspective can be supported, including aspects such as community cohesion and well-being;
- Identify other potential partners and build supportive and resilient relationships;
- Ensure communities engaged in the siting process have the resources and information they need to fully participate in siting activities and make an informed decision;
- Develop mutually agreeable hosting agreements in each siting area, and after a site is selected, begin implementing the agreements in the siting area that is continuing into the regulatory decision-making process; and
- Ensure through partnership that communities have sufficient resources to actively participate in the regulatory decision-making process.

TRANSPORTATION

The NWMO will:

- Demonstrate the potential for a socially acceptable transportation plan through dialogue on the transportation planning framework;
- Continue to work with Indigenous peoples to understand how the NWMO can align our transportation planning with Indigenous Knowledge;
- Continue refinement of the Used Fuel Transportation System; and
- Begin implementing the transportation planning framework, which will be updated every three years.

Transportation of used nuclear fuel occurs on a daily basis worldwide. In almost 60 years, there has never been an accident resulting in human or environmental harm as a result of radioactive release.

The NWMO is developing safe, secure and socially acceptable plans for transporting used nuclear fuel from the current interim storage sites to the deep geological repository. However, we recognize the need to explain this good safety track record and answer peoples' questions about how the NWMO will uphold this standard.

In 2021, we released a [Preliminary transportation plan](#) that describes, conceptually, how the NWMO plans to safely transport used nuclear fuel to the deep geological repository, as well as the [transportation planning framework](#), which describes peoples' values, objectives and priorities associated with the safe transportation of used nuclear fuel.

Transportation planning and evaluations will fully address regulatory requirements for safely transporting used nuclear fuel through different provinces. Site-specific technical and social engagement planning activities will continue after site selection in 2024. We plan to start transporting used fuel to the deep geological repository site in the 2040s, once the repository is operational.

In addition to the technical requirements, social considerations are important to our planning process. We understand that the transportation of used nuclear fuel is an important topic to Canadians and Indigenous peoples, and we are taking a collaborative approach that includes shared decision-making. More specifically, we have designed an iterative approach to transportation planning that will incorporate future generations' inputs into the planning process, acknowledging the importance of seven generations in Indigenous worldview.

The framework will be updated and reissued every three years. As identified earlier, it is our responsibility to ensure that people with a broad range of interests are included in our planning discussions and that we address their questions and concerns.

As part of the site selection process, an acceptable transportation route must have the potential to be developed. The NWMO continues to conduct technical assessments to help define potential routes.

We have heard many questions about safety over the past year and have begun several work programs to address concerns people have expressed:

- **Safety risk assessment** looks at national and provincial accident data. The objective is to understand the causes, patterns and trends associated with conventional, dangerous goods and used fuel accident data so that we can identify ways to prevent and mitigate accidents in our current and future planning. This program will also consider safety from a social perspective;
- **Transportation package performance review** provides insight into key aspects of the regulations governing transport of radioactive materials and how those aspects are designed to prevent radiological consequences of transport accidents; and
- **Emergency Response Framework** outlines emergency response requirements and best practices for transportation of used nuclear fuel.

In the period from 2023 to 2027, the NWMO will also:

- Continue transportation planning that is reflective of citizens' values, principles and objectives, including an emphasis on safety from a social perspective;
- Undertake transportation logistics studies and risk assessments;
- Seek from the Canadian Nuclear Safety Commission design approval certificates for road and rail transport packages as appropriate;
- Research and establish key requirements for emergency management and transportation security for future planning purposes;
- Continue to expand engagement to include municipalities and Indigenous communities along potential transportation routes, as well as interested individuals and groups; and
- Brief Canada's nuclear host communities about our progress, including planning for eventual transportation of used nuclear fuel from their communities to the deep geological repository.

Developing a Canadian Integrated Strategy for Radioactive Waste

In 2020, the NWMO was asked by the Minister of Natural Resources to lead the development of an [Integrated Strategy for Radioactive Waste](#) (ISRW) to ensure that all Canada's radioactive waste has long-term management approaches.

A team from the NWMO led the strategy development, in part to leverage our 20 years of recognized expertise in the engagement of Canadians and Indigenous peoples on plans for the safe, long-term management of used nuclear fuel. The focus of this work is on low- and intermediate-level waste for which there are no long-term plans in place.

All Canada's radioactive waste is safely managed today in interim storage. An integrated strategy will ensure these materials continue to be managed in accordance with international best practices over the long term. Building on previous work, this strategy represents a next step to identify and address any gaps in radioactive waste management planning, while looking further into the future.

Through the engagement process, we heard from communities across Canada, Indigenous peoples, youth, academics, civil society organizations and technical experts to help inform practical recommendations to the Government of Canada on a more comprehensive radioactive waste management strategy.

Following the engagement process reflecting on the values and interests of the public, a draft strategy was released in summer 2022 for public comment. This strategy has been informed by what we heard from Canadians and Indigenous peoples who participated in surveys or in one of more than 70 engagement sessions since March 2021. Canadians and Indigenous peoples were able to share their perspectives on the draft strategy via the [website](#) and email.

These perspectives are currently being reviewed to further inform the final ISRW recommendations. The strategy and recommendations will only be issued after an updated policy release by Natural Resources Canada (NRCan), which is expected in the first quarter of 2023, to ensure we are consistent with the updated policy.

If the ISRW recommendations are accepted by NRCan, the NWMO would be responsible for the planning and management of intermediate-level waste. We would then develop a detailed plan on how best to integrate this work into our existing program for the safe, long-term management of intermediate-level waste. We are anticipating that NRCan will make this decision in 2023.

Sound governance and accountability

The NWMO maintains an accountable governance structure intended to provide confidence to the Canadian public in the conduct of our work. Our governance structure comprises the member organizations, Board of Directors and Advisory Council. The NWMO is subject to the requirements of the *Nuclear Fuel Waste Act (NFWA)* and oversight by the Minister of Natural Resources.

Members

Ontario Power Generation, New Brunswick Power Corporation and Hydro-Québec are the founding members of the NWMO. The Membership Agreement and bylaws set out member roles and responsibilities in supporting the objectives of the *NFWA* and the NWMO's implementation mandate. The NWMO regularly briefs our member organizations.

Board of Directors

The [Board of Directors](#) is responsible for oversight and taking a leadership role in developing the corporation's strategic direction. The member organizations elect the Board of Directors. There are currently nine directors on the Board, representing a range of perspectives from both within and outside the nuclear industry, including capabilities in Indigenous culture and financial management.

Advisory Council

The *NFWA* requires that the Board of Directors appoint an [Advisory Council](#) to review and comment on the NWMO's work. The council meets regularly with the NWMO's senior management, closely following the organization's plans and activities, and providing ongoing counsel and advice.

Advisory Council members represent a broad range of expertise, including engineering, community engagement, public affairs, environment, law, sustainable development, Indigenous relations, Indigenous Knowledge and community-based research. Members of the council are knowledgeable in a range of topics, including nuclear waste management issues, and experienced in working with citizens and communities on a range of public policy issues.

Council of Knowledge Holders (formerly the Council of Elders and Youth)

The [Council of Knowledge Holders](#) is an independent advisory body made up of First Nation and Métis Elders and youth. It meets regularly throughout the year and provides counsel to the NWMO on how to align with Indigenous Knowledge in implementing the Adaptive Phased Management project. Additionally, the council provides advice on issues that could enhance the development and maintenance of good relations with First Nation and Métis communities and organizations.

Integrated management system

The NWMO uses an integrated management system for activities supporting the safe, long-term management of used nuclear fuel. The NWMO maintains our management system to be compliant with Canadian and international standards for quality, environment, and health and safety.

The NWMO management system also satisfies the CSA N286-12, *Management System Requirements for Nuclear Facilities*, which includes nuclear waste facilities and builds on international standards.

The NWMO's integrated management system ensures the organization has a strong foundation for implementing our mission and values. The focus on protecting people and the environment for generations to come fully aligns with the CSA N286-12 management principle that safety is the paramount consideration guiding our decisions and actions.

Independent reviews

Consistent with recommendations from our Advisory Council, the NWMO will continue to seek external expert review of and comment on our technical program. As the program continues to move from research into design, fabrication and demonstration, the reviews are increasingly focused on specific design aspects and features. These reviews ensure the science is sound, contribute to the design and overall program quality, and help enhance public confidence in the NWMO's implementation plan and decision-making. A number of external committees have been established to review the NWMO's work:

- Municipal Forum;
- Geoscience Review Group;
- Environmental Review Group; and
- Site Selection Review Group.

In addition to these formal peer-review groups, the NWMO has also created advisory groups and community forums on an as-needed basis to receive external input, guidance and expertise for the project. Peer review is also often incorporated directly in third-party technical work scopes and managed as part of the contracted work. Independent review is further achieved by regularly publishing technical research and results in scientific journals and at conferences.

Reporting

The NWMO maintains high standards for reporting to demonstrate safety, integrity, excellence, collaboration, accountability and transparency in the implementation of the project. We report regularly on our progress, especially in response to the advice of Canadians and Indigenous peoples, and the evolving environment.

The *NFWA* requires us to issue annual and triennial reports. In each case, reports must be submitted to the Minister of Natural Resources and to the public at the same time. The minister tables each report in Parliament and issues a statement on it.

Transparency

The NWMO is committed to being open and transparent in our processes, communications and decision-making, so that the approach we are implementing is clear to Canadians and Indigenous peoples. To demonstrate this commitment, we maintain a [Transparency Policy](#) (2020). Sharing information and encouraging an exchange of perspectives are fundamental to our mandate, and we strive to ensure our practices are aligned with the spirit of the NWMO [Reconciliation Policy](#) (2019), as well as all relevant freedom of information, access to information and privacy legislation.

Glossary

Deep geological repository is a facility for the placement of used nuclear fuel deep underground where both natural and engineered barriers contain and isolate it from people and the environment for generations to come. There is the potential for retrieving the used nuclear fuel.

Fuel bundle for CANDU nuclear reactors is manufactured by sintering uranium oxide powder into pellets. The pellets are loaded into Zircaloy (a corrosion-resistant alloy of the metal zirconium) tubes, which are then welded into a bundle of tubes – a fuel bundle. Each bundle contains about 1,000 uranium oxide pellets.

Long-term management of used nuclear fuel involves containment and isolation of the radioactive material. The radioactivity decreases substantially with time, due primarily to the decay of short-lived radionuclides. The radioactivity of used nuclear fuel decreases to about one per cent of its initial value after one year, decreases to about 0.1 per cent after 10 years, and decreases to about 0.01 per cent after 100 years. After approximately one million years, the radioactivity in used nuclear fuel approaches that of natural uranium.

Optional shallow underground storage facility would involve building a shallow rock cavern storage facility at the chosen site for the deep geological repository. This is not included in the implementation plan as used fuel will remain at interim storage facilities until the repository is operational.

Retrievability is the ability to remove the used nuclear fuel from where it has been placed. Retrievability is an important component of Adaptive Phased Management and was included on the direction of Canadians and Indigenous peoples. It is part of a risk management approach to allow corrective action to be taken if the repository does not perform as expected, or if new technologies emerge in the future that could significantly improve the safety of used nuclear fuel long-term management. While used nuclear fuel will be retrievable as part of the project, the process will become progressively more demanding as the used nuclear fuel containers are sealed in the placement rooms, and then years later when access tunnels and shafts are eventually backfilled and sealed.

Safety in this report refers to the protection of people and the environment from the harmful or dangerous effects of used nuclear fuel, now and in the future.

Small modular reactors (SMRs) provide an alternative to large-scale nuclear reactors. SMRs can be purchased and constructed in a modular way. The NWMO would be responsible for the long-term management of used nuclear fuel created through new or emerging technology such as SMRs, if it is implemented in Canada.

Used nuclear fuel is the irradiated fuel removed from a commercial or research nuclear fission reactor. Used nuclear fuel is classified as a high-level radioactive waste.

Willingness is fundamental to the siting process. From the very beginning, the NWMO outlined a number of principles regarding willingness. These include a commitment to only site the project in an area with informed and willing hosts, time and resources for communities to learn about the project before making a decision, and a compelling demonstration of community willingness.

Beyond the demonstration from the communities, the NWMO also needs to ensure the other requirements and commitments outlined in the siting process can be met in order to implement the project in an area.

Note about terminology: In this document, we use the terms Indigenous, First Nation and Métis. Our intention in the writing is to honour and respect peoples, nations and communities, as well as historical and contemporary understandings.

What we heard

In March 2022, the NWMO published *Implementing Adaptive Phased Management 2022 to 2026*, updating the previous five-year version of this annually updated plan. By also publishing our survey about the implementation plan digitally, we have made it easier for the public to review and comment on Canada's plan, supporting our commitment to transparency. We heard from hundreds of individuals from the two remaining siting areas, as well as Canadians and Indigenous peoples living outside those areas.

However, this document and the survey about it is only one way that we gather input that informs our work. The NWMO also solicits feedback through activities such as on-the-ground and digital engagement efforts, community liaison committees, educational events, advisory groups, publishing in peer-reviewed journals, attending conferences and meeting with all levels of government representatives.

The survey offers a snapshot of respondents' thinking and provides insight into confidence in our ability to implement Canada's plan, as well as identifying areas of opportunity for the NWMO. The survey was designed to solicit broad feedback from interested individuals, and it was disseminated through social media and other digital channels. As the survey was open to all interested parties, the results should not be viewed as statistically reliable. Instead, these results should be interpreted as qualitative and indicative of broader trends.

Overall participation numbers in 2022 were slightly greater than in 2021. We received 757 partial and completed surveys in 2022, versus 729 partial and completed surveys in 2021. However, we noted an imbalance in responses across regions, with more than twice as many responses coming from southern Ontario than northwestern Ontario (191 and 86 respectively). In response to this imbalance, we will step up efforts to promote the survey for the 2023-27 implementation plan in northwestern Ontario, by increasing public engagement on its promotion and using targeted digital communications.

This type of public input informs and guides our work, and comments received have helped us update this plan year after year. This is a summary of what we heard.

Confidence in the NWMO

Overall, more than half of respondents said they were “confident” or “very confident” in the NWMO after reading the plan. A strong majority said they found the NWMO plan understandable, clear and transparent. On the other hand, less than a third of respondents found the plan unclear, too technical or not understandable.

Overall, perceptions of the NWMO were more positive in southern Ontario than in northwestern Ontario. On the question of whether they had confidence in Canada’s plan, more than three-quarters of respondents in southern Ontario said they were confident, compared to just over half in northwestern Ontario.

This regional difference prompted the NWMO to consider how we are communicating with people living in each area. In 2022, the NWMO continued ongoing communications efforts, as we sought to diversify and extend our outreach to Canadians and Indigenous peoples across the country, and also targeted outreach within the two remaining potential siting regions. The NWMO launched campaigns to share fact-based information regarding the technical aspects of Canada’s plan, our commitment to water stewardship, as well as the tangible benefits associated with hosting the repository.

As part of our ongoing communications efforts, we will continue to diversify and extend our outreach through the revamped NWMO office in the Wabigoon Lake Ojibway Nation-Ignace area and more visits from our Mobile Learn More Centre, our rolling exhibit designed to travel across the country to share Canada’s plan. In 2022, we increased both the length of time our Mobile Learn More Centre was on the road visiting communities and the number of stops we made, with a total of 61 events compared to 48 in 2021. We also opened new offices in Dryden and Teeswater and renovated our existing Teeswater office to support engagement efforts in the siting areas.

Reconciliation

As in years past, the majority of respondents told us they share Reconciliation as a priority, and they want us to communicate more about the steps in our Reconciliation journey.

Our commitment has always been to publicly report our progress on Reconciliation. In 2022, we reached an important milestone in our ongoing Reconciliation journey. Our first [Reconciliation Report \(2021\)](#) was published, providing an evaluation of the NWMO's [Reconciliation Policy](#)'s impacts since its formalization in 2019. Activities tracked have included mandatory staff Reconciliation training and continuous learning opportunities, informal training opportunities, staff support systems and community-driven work plans.

We are committed to an ongoing Reconciliation journey. The NWMO was one of the first North American organizations with a formal Reconciliation policy, aligning with other corporations that are dedicated to taking concrete action in terms of meeting the Truth and Reconciliation Commission's calls to action (released in 2015). We are committed to contribute to Reconciliation in all our work by co-creating a shared future built on rights, equity and well-being.

Again this year, we heard Indigenous peoples must be engaged in the work we are doing to implement Canada's plan. We know, however, engagement is not enough. Working with Indigenous peoples, learning from Indigenous Knowledge and applying learnings to our work are critical to successfully implementing the safe, long-term management of used nuclear fuel. These are serious commitments and important values in our organization.

Transportation

Several comments expressed concern about the safety of transporting used nuclear fuel or the outright belief that transportation is dangerous. Some respondents, particularly those in northwestern Ontario, said they were worried about the possibility of traffic collisions and inadequate transportation infrastructure in the community selected.

Used nuclear fuel will need to be moved from interim storage facilities near reactor sites across Canada to the deep geological repository site. The transportation approach of Canada's plan will be subject to ongoing review and public reporting, with the transportation program expected to begin in the 2040s, once the repository is operational.

The NWMO released two planning documents in the last year addressing the wide range of priorities, questions and concerns heard to date from Canadians and Indigenous peoples about the transportation of used nuclear fuel. The [transportation planning framework](#) and the [Preliminary transportation plan](#) were designed to give clarity and advance conversations about how we plan to safely transport used nuclear fuel.

The NWMO's transportation approach will continue to undergo review and public reporting. Every three years, the transportation planning framework will be reviewed and revised as necessary. This will take into consideration factors such as evolving best practice, new technologies, ongoing adaptation and continuous improvement.

Safety

When asked “what priorities are most important to you?”, safety remained in the top spot. It was identified by 42 per cent of survey respondents as their most important priority, with a further 32 per cent ranking it as their second highest. Protecting people and the environment for generations to come underscores everything we do and every decision we make as we work to implement Canada’s plan.

We are constantly testing and evaluating our design and assumptions. In June 2022, we published the [Confidence in Safety](#) reports for each potential site. These reports reflect years of research and fieldwork. They provide detailed results that show why we are confident that both siting areas, where communities are considering hosting the project, are suitable for the safe, long-term management of used nuclear fuel.

The lifting of pandemic restrictions this year allowed the NWMO to get specialists back into communities. When it was safe to do so, we were able to engage directly with residents, giving them an opportunity to address questions and concerns. Through our campaigns and our people, we also increased our communications around safety-related topics.

We are also committed to ensuring the project is safe from a social and cultural perspective. We support this commitment by listening to the feedback we receive at the societal, community and personal levels and adjusting our work accordingly. That is also why all our work is supported by the wisdom of our Council of Knowledge Holders. This independent advisory body is comprised of Indigenous Elders and youth that help shape the NWMO’s work by guiding us on how to respectfully align with Indigenous Knowledge, inspiring new outlooks and perspectives, and helping our organization walk a path towards Reconciliation.

Trust in engineering

This year's survey showed most respondents understand and feel positive about the NWMO's engineering, ranking it as the highest understood priority. Specifically, 86 per cent of respondents said they understand this priority, and 75 per cent expressed a positive or neutral sentiment about it. The NWMO's geotechnical expertise and robust engineering approach and Canada's engineering leadership were cited in respondents' comments as some of the reasons for their confidence and positive sentiments.

As of 2022, the NWMO has successfully completed the full-scale demonstration of the engineered barriers that will safely contain and isolate Canada's used nuclear fuel in a deep geological repository. This important safety and technical achievement was the culmination of more than eight years of preparation, including the design and fabrication of specialized prototype equipment and components by the NWMO's team of leading technical specialists and engineering partners.

Canada's use of a deep geological repository is consistent with international best practice. This approach is the culmination of more than 30 years of research, development and demonstration of technologies and techniques. There is also consensus among major nuclear regulatory and monitoring organizations that deep geological repositories are the responsible way forward.

Share your thoughts

Your feedback is essential to the implementation of Canada's plan for the safe, long-term management of used nuclear fuel.

Take the
implementation
plan survey



Every year, we ask Canadians and Indigenous peoples for their input on our implementation plan to inform and guide our work. We then take that feedback into account in our planning activities, and in each year's implementation plan, we report on what we heard from the public about the previous year's plan. We invite you to share your thoughts until June 9, 2023.

Other ways to provide feedback (you may indicate that you wish for your response to remain anonymous):

- Email us at learnmore@nwmo.ca
- Send us a letter (with your name and mailing address) to:
Lisa Frizzell
Vice-President of Communications, NWMO
RE: Implementation Plan 2023-27
22 St. Clair Avenue East, Fourth Floor
Toronto, ON M4T 2S3
Canada

**For more information,
please contact:**

Nuclear Waste Management Organization
22 St. Clair Avenue East, Fourth Floor
Toronto, Ontario M4T 2S3, Canada
Tel.: 416.934.9814 Toll free: 1.866.249.6966
Email: contactus@nwmocanada
Website: www.nwmocanada

   @nwmocanada
 /company/nwmocanada



NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

© 2023 Nuclear Waste Management Organization

Report of the Advisory Council 2020-22

The Honourable Jonathan Wilkinson
Minister, Natural Resources Canada
Ottawa, ON K1A 0A6

March 2023

Dear Minister,

On behalf of the Advisory Council to the Nuclear Waste Management Organization (NWMO), I am pleased to submit our three-year review, included in the NWMO's Triennial Report 2020-22.

This is our fifth independent review of the NWMO's progress in implementing Adaptive Phased Management (APM), Canada's plan for the safe and secure, long-term management of used nuclear fuel. The Advisory Council comments are submitted as required under Sections 8 and 18 of the [Nuclear Fuel Waste Act](#).

The first section of our report provides an overview of our mandate, approach and framework for evaluating the NWMO's work. This is followed by a summary of the Advisory Council's activities over the past three years and our comments on the work of the NWMO from 2020 to 2022. The third section includes a review of the NWMO's five-year implementation plan, *Implementing Adaptive Phased Management 2023-27*, with comments and suggestions. In the final section, we provide our reflections on planning for long-term nuclear waste management in Canada.

Overall, we find that the NWMO is fulfilling its obligations with respect to the *Nuclear Fuel Waste Act*. In our last triennial report, Council stressed that the success of APM relies on the continuing and steadfast commitment of the Government of Canada to this technical and management approach. We note that on June 23, 2022, the Government reaffirmed its 2007 commitment to APM in its [response](#) to the NWMO's 2021 Annual Report. Your government's continuing support remains critical.

As the NWMO moves into the next major phase of its work, the Advisory Council is of the view that the Government of Canada needs to ensure there is increased clarity and coherence of government policy and regulatory expectations relevant to the project.

There are two major regulatory processes governing the APM project. The Canadian Nuclear Safety Commission is responsible for licensing of the APM project under the [Nuclear Safety and Control Act](#), while the Impact Assessment Agency of Canada is responsible for assessing the environmental, economic, social and health effects of the project, as well as its impact on Indigenous groups and their rights, under the [Impact Assessment Act](#). Policy and procedural coherence within and between these two regulatory processes, currently absent, is fundamentally important in order for the NWMO to carry out its mandate successfully.

Another key piece of federal government legislation, one that attempts to define Indigenous consent, is the [United Nations Declaration on the Rights of Indigenous Peoples Act](#), which became law in Canada in June 2021. This is yet a third piece of relevant federal government legislation that requires further clarity. The Advisory Council is looking forward to the federal government's action plan due by June 2023, which we hope will clarify the process for implementing this legislation and how it will affect the NWMO's future implementation of site selection and regulatory processes.

In summary, both the continuing and steadfast commitment of the Government of Canada to APM and the increased clarity and coherence of government policy and regulatory expectations will be crucial to supporting the NWMO in achieving the safe and responsible, long-term management of Canada's nuclear waste.

It is our hope that you and your government find this report helpful, and that it provides useful guidance to the NWMO as it implements the next phase of APM.

Sincerely, on behalf of the members of the Advisory Council,

A handwritten signature in black ink that reads "David Cameron". The signature is written in a cursive, slightly slanted style.

Dr. David R. Cameron
Advisory Council Chair

Copy: NWMO Advisory Council
Mr. Joseph Cavalancia
Dr. Monica Gattinger
Dr. Dean Jacobs
Ms. Diane M. Kelly
Dr. Dougal McCreath
Mr. Donald Obonsawin, Vice-Chair
Dr. Stella Swanson
Ms. Linda Thompson

Mr. Glenn Jager
Chair of the Board of Directors
Nuclear Waste Management Organization
22 St. Clair Avenue East, 4th Floor
Toronto, ON M4T 2S3

March 2023

Dear Mr. Jager,

On behalf of the Advisory Council to the Nuclear Waste Management Organization (NWMO), I am pleased to submit our comments for inclusion in the NWMO's Triennial Report 2020-22.

We provide comments as required of the Advisory Council under Sections 8 and 18 of the *Nuclear Fuel Waste Act*.

Respectfully submitted on behalf of the members of the Advisory Council,

A handwritten signature in black ink that reads "David Cameron". The signature is written in a cursive, flowing style.

Dr. David R. Cameron
Advisory Council Chair

Copy: NWMO Advisory Council
Mr. Joseph Cavalancia
Dr. Monica Gattinger
Dr. Dean Jacobs
Ms. Diane M. Kelly
Dr. Dougal McCreath
Mr. Donald Obonsawin, Vice-Chair
Dr. Stella Swanson
Ms. Linda Thompson

Table of contents

1	Introduction and background	2
1.1	NUCLEAR FUEL WASTE ACT REQUIREMENTS	2
1.2	RELATIONSHIP WITH THE NWMO.....	3
1.3	EVALUATION FRAMEWORK	4
2	Activities and comments: 2020-22	6
2.1	OVERVIEW OF ADVISORY COUNCIL ACTIVITIES	6
2.2	DISCUSSIONS AND COMMENTS ON THE NWMO'S ACTIVITIES: 2020-22.....	8
2.2.1	<i>Emerging strategic imperative: Ensuring the integrity, fairness and comprehensiveness of the site selection process</i>	<i>8</i>
2.2.2	<i>Emerging strategic imperative: Implementing the Reconciliation Policy</i>	<i>9</i>
2.2.3	<i>Emerging strategic imperative: Preparing for regulatory and political processes.....</i>	<i>10</i>
2.2.4	<i>Emerging strategic imperative: Preparing the NWMO itself and communities for upcoming transitions</i>	<i>12</i>
2.2.5	<i>Continuing item of importance: Safety</i>	<i>13</i>
2.2.6	<i>Continuing item of importance: Social willingness.....</i>	<i>13</i>
2.2.7	<i>Continuing item of importance: Transportation</i>	<i>14</i>
2.2.8	<i>Other significant subjects of discussion.....</i>	<i>15</i>
2.2.9	<i>Conclusion</i>	<i>18</i>
3	Implementing Adaptive Phased Management 2023-27	19
3.1	REFLECTIONS ON THE PLANNING PERIOD	19
3.2	STRATEGIC IMPERATIVES.....	19
3.2.1	<i>Deepening trust with host communities as the site selection process draws to a close and partnerships develop</i>	<i>19</i>
3.2.2	<i>Engaging with interested parties beyond the potential host communities</i>	<i>20</i>
3.2.3	<i>Meeting regulatory requirements</i>	<i>21</i>
3.2.4	<i>Enhancing resilience and strength of the NWMO itself and host communities</i>	<i>22</i>
3.2.5	<i>Defining safety from technical and social perspectives</i>	<i>23</i>
3.2.6	<i>Achieving willingness</i>	<i>24</i>
3.2.7	<i>Working towards Indigenous consent</i>	<i>24</i>
3.2.8	<i>Planning for transportation</i>	<i>25</i>
3.3	BUDGET FORECAST	25
4	Reflections on planning for long-term nuclear waste management in Canada.....	26

1 Introduction and background

This Advisory Council (Council) report fulfils the requirement in the [Nuclear Fuel Waste Act \(NFWA\)](#) that the Council comment every three years on the process and findings of the Nuclear Waste Management Organization (NWMO).

Section 1 provides an overview of the mandate, approach and framework that we developed for the purpose of evaluating the NWMO's work. Section 2 provides a summary of our activities over the past three years and our evaluation of the work the NWMO has undertaken during that period. Section 3 includes comments and recommendations on the NWMO's plans for future work as described in its implementation plan, *Implementing Adaptive Phased Management 2023-27*. Finally, in Section 4, we provide our reflections on planning for long-term nuclear waste management in Canada.

1.1 NUCLEAR FUEL WASTE ACT REQUIREMENTS

As required by the *NFWA*, the NWMO Board of Directors established the Advisory Council in 2002. The *NFWA* specifies that the membership of the Council should reflect a broad range of scientific and technical disciplines related to the management of nuclear fuel waste, as well as expertise in public affairs, social sciences and Indigenous Knowledge. Council members are profiled on the NWMO's [website](#).

The Council is required by the *NFWA* to comment every three years on the previous three years of NWMO activity. In addition, the Council is obliged to comment on the organization's five-year strategic plans and budget forecasts. These comments on the NWMO's work are published in the NWMO's triennial reports; they are submitted to Canada's Minister of Natural Resources and made public at the same time.

Advisory Council – Current members

David R. Cameron, Chair	2002-ongoing
Joseph Cavalancia	2015-ongoing
Monica Gattinger	2018-ongoing
Dean Jacobs	2015-ongoing
Diane M. Kelly	2015-ongoing
Dougal McCreath	2008-ongoing
Donald Obonsawin, Vice-Chair	2002-ongoing
Stella Swanson	2020-ongoing
Linda Thompson	2015-ongoing

Advisory Council – Former members

Marlyn A. Cook	2008-15
Helen Cooper	2002-08
Wesley Cragg	2012-15
Gordon Cressy	2002-08
David Crombie (past Chair)	2002-17
Frederick Gilbert	2002-15
Rudyard Griffiths	2008-11
Sue Hartwig	2018-21
Eva Ligeti	2002-17
Derek Lister	2002-22
Michel R. Rhéaume	2010-15
Daniel Rozon	2002-09

1.2 RELATIONSHIP WITH THE NWMO

The Council follows the development of the NWMO's plans and activities closely, and provides ongoing counsel and advice. We generally meet four times a year. The Chair works with staff to set the agenda. At our meetings, staff members make presentations on the NWMO's work, and members of the Council ask questions, request more information, raise issues, consider the NWMO's work, and provide advice. We hold an in-camera session at the end of most of our meetings, during which we deliberate without the presence of NWMO management or staff. The Council Chair provides a report to NWMO Board meetings to ensure a comprehensive exchange of information. Council members and the NWMO Board of Directors meet annually for an exchange of views, and in recent years, a focused discussion on one or two strategic issues.

In order to fulfil our legislated reporting requirements, the Council provides written comments on the NWMO's work. Previous comments were provided in the following documents:

- The NWMO's Final Study Report, *Choosing a Way Forward – The Future Management of Canada's Used Nuclear Fuel* (2005)
- The NWMO's Triennial Report 2008 to 2010, *Moving Forward Together* (2011)
- The NWMO's Triennial Report 2011 to 2013, *Learning More Together* (2014)
- The NWMO's Triennial Report 2014 to 2016, *Progress Through Collaboration* (2017)
- The NWMO's Triennial Report 2017 to 2019, *Moving towards partnership* (2020)

In addition, several Council members have participated in activities related to the NWMO's work or the context in which it occurs.

On Nov. 21-22, 2020, David Cameron chaired the Canada/U.K. Colloquium on Nuclear Energy. The Colloquium is in its 50th year; it was set up by Paul Martin Sr. when he was high commissioner to the U.K. Each year, a different topic is chosen, and a representative group from each of the two countries come together to discuss it; in 2020, the event was hosted by the Munk School of Global Affairs & Public Policy at the University of Toronto. Council members Stella Swanson and Derek Lister, as well as NWMO CEO Laurie Swami, also attended.

In November 2020, Dean Jacobs attended the NWMO's annual Indigenous Knowledge and Western Science Workshop, held online. He also attended the workshops in 2021 and 2022.

In April 2021, Monica Gattinger chaired a panel session for the NWMO's Canadian Radioactive Waste Summit.

On Aug. 19, 2021, Derek Lister gave a seminar in the Engineering Faculty at the University of New Brunswick in Fredericton: "Canada's Policy for the Management of Used Nuclear Fuel: NWMO's APM."

Derek Lister became a Member of the Order of Canada on Nov. 22, 2019, and at his investiture on May 13, 2022, the citation noted his membership on the Advisory Council to the NWMO.

The Council's activities are summarized on a yearly basis for inclusion in the NWMO annual report. The NWMO also documents the actions taken by the organization in response to our advice. They are recorded in tracking matrices, which are posted on the NWMO's website, in the [Advisory Council section](#).

1.3 EVALUATION FRAMEWORK

In order to fulfil our obligations to provide an independent review of the NWMO's work, we developed criteria for evaluation. In developing these criteria, we considered the mandate and mission of the NWMO, which are described earlier in the NWMO's triennial report. We paid particular attention to the organization's [Ethical and Social Framework](#), and to the experience and recommendations of the Seaborn Panel, a Canadian Environmental Assessment Agency panel chaired by Blair Seaborn between 1989 and 1998. The panel examined the disposal concept for used nuclear fuel management proposed by Atomic Energy of Canada Limited (AECL) – placement in a deep geological repository. A major finding in the panel's report, entitled [Report of the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel](#), was that while the concept was technically sound, it did not have sufficient public support to allow the government to proceed.

Advisory Council evaluation criteria/principles

In 2005, the Council developed a statement – [How the Advisory Council of the Nuclear Waste Management Organization Intends to Fulfill its Mandate](#). The statement included four evaluation criteria (comprehensiveness, fairness and balance, integrity, and transparency) to provide a basis for our assessment of the NWMO's work.

In 2010, 2013, 2016 and 2019, we updated these criteria. Just as one of the cornerstones of Adaptive Phased Management (APM) is adaptability, the evaluation criteria are also slightly modified over time to reflect the evolution of the NWMO's work. In 2021 and 2022, we reviewed the criteria and concluded they stand, along with the NWMO's Ethical and Social Framework, as solid principles by which to evaluate the NWMO's work over the last three years, and to look ahead.

Advisory Council evaluation criteria/principles:

1. **Comprehensiveness.** Is the NWMO effectively evaluating and taking into account all reasonable alternative approaches and experiences of other organizations and jurisdictions? Is the NWMO comprehensively planning for all aspects of the project, including siting, transportation, and moving staff to the host community? Is the organization appropriately assessing the consequences to the community of the arrival of a major project? Is the organization itself evolving and changing to keep pace with the growing and emerging needs of the project? Is the NWMO identifying and proactively mitigating political, policy, regulatory and legal risks associated with project approval and construction? Is the organization appropriately incorporating Indigenous Knowledge? In addition to answering these questions, we evaluate how effectively the NWMO has integrated the guidance and knowledge it acquired from the [APM Geoscientific Review Group](#) (APM-GRG), the [Council of Knowledge Holders](#) (formerly named the Council of Elders and Youth) and the [Municipal Forum](#) into its work.
2. **Fairness and balance.** Is there fairness and balance in the siting process as the NWMO seeks to ensure there is a compelling demonstration of willingness on the part of the communities at the site selected? Is adequate consideration being given to diverse points of view and representativeness in the voices sought out and considered? Is due consideration being given to fairness and balance in the treatment of communities that are not retained in the site selection process, of communities on transportation routes, and of NWMO staff as the organization plans its human resources requirements in the host community?

3. **Integrity.** Is the NWMO fulfilling its mandate with integrity, honesty and consistency? In seeking partnerships with communities, including Indigenous communities, is it respectfully undertaking meaningful deliberation and shared decision-making with those communities?
4. **Transparency and accountability.** Is the NWMO at all times transparent and accountable to the public, communities, government and stakeholders? Are decisions and activities clearly communicated? Is the NWMO appropriately involving communities in defining safety issues of societal concern?
5. **Technical and societal strength.** Does the NWMO have the human resources required to address the engineering and scientific dimensions of site characterization, repository design and safety assessment? Equally, does the NWMO have the human resources necessary to ensure the accurate understanding of the societal and Indigenous dimensions of the site selection process, as well as the delineation and evaluation of alternative transportation corridors? Is adequate provision being made to build capacity in the communities remaining in the site selection process, and once a site is selected, having in place, through retention, development and recruitment, the highly skilled people needed at the site?
6. **Financial capacity.** Does the funding formula adequately reflect the costs of the APM approach to dealing with Canada's nuclear fuel waste? Are cost estimates being kept up-to-date, and are financial contributions being adjusted to reflect these estimates?
7. **Culture of learning.** Is the NWMO actively pursuing new ideas and perspectives, and applying its learning – regarding science, technology, Indigenous Knowledge, history, ethics, sociology and culture – in an effective way? Is new knowledge being absorbed by its own staff, shared adequately with its partner organizations, and reflected adequately in all aspects of the work and activities of the organization?

In this triennial report, we provide our assessment of how effectively the NWMO is carrying out its mandate when viewed in light of these criteria/principles. This report focuses on the critical “pivot point” of planned site selection in 2024 (amended in 2022 from 2023) and the associated strategic imperatives we outlined in our Triennial Report 2017-19. Thus, Section 2 is structured according to those imperatives rather than following the organization of Section 2 in our previous reports, which listed specific activities.

2 Activities and comments: 2020-22

This section provides the Council's comments on the work of the NWMO during the years 2020-22. We provide an overview of our process and activities during the time period (2.1). Then we provide details of our discussions and comments on the NWMO's work (2.2).

2.1 OVERVIEW OF ADVISORY COUNCIL ACTIVITIES

During 2020, 2021 and 2022, the Council held, as usual, four formal meetings each year. Unlike the previous three-year reporting periods of Advisory Council, this one was defined by the COVID-19 pandemic and related lockdowns. Consequently, most of our meetings in this time period were held virtually. As in previous years, we were kept informed by the NWMO about significant activities and events between meetings. Council meetings included progress reports from the NWMO, discussions about current activities and plans, as well as updates on developments in other jurisdictions.

At our request, formal records of our meetings, our annual tracking matrix and copies of conference papers by Council members are posted on the NWMO [website](#). Summaries of our work are published regularly in the NWMO's [annual reports](#).

We viewed and discussed correspondence received from outside parties. At the Council's request, the NWMO staff provided regular updates and assessments of potential risks to the NWMO's work that might result from internal or external socio-political, economic, technical and organizational factors.

In the three-year period 2020-22, as the targeted end date of the site selection process came into sharp focus and the pandemic continued, the Council took a more proactive approach to setting the agenda for its meetings with the NWMO and providing the NWMO with counsel between meetings. The Council asked for increased frequency of updates from the NWMO on the following topics:

- Implementing the *Reconciliation Policy*: Increase to twice per year.
- Preparing for regulatory and political decision-making processes: Increase to four times per year, to become a standing item on the agenda.
- Safety – Implementation of a participatory and social approach to safety: Increase to twice per year.

Council also asked for and received from the NWMO regular briefings on risk-based planning with respect to the timing of site selection.

In order to prepare this triennial report, Council held a number of member-only meetings. This began in early 2021 and continued until January 2023.

Advisory Council meetings

2020

May 8
June 8
Sept. 21
Dec. 8
(included strategic issues discussions with Board of Directors)

2021

Jan. 7*
Feb. 2*
March 22
June 14
Sept. 20
Dec. 7
(included strategic issues discussions with Board of Directors)

2022

March 21
March 22*
May 16*
June 13
June 14*
June 24*
Sept. 19
Sept. 20*
Nov. 15*
Dec. 5
(included strategic issues discussions with Board of Directors)
Dec. 6*

2023

Jan. 6*

* Working sessions to prepare Triennial Report

The Council's activities include participation on other advisory groups to the NWMO. We have a principal representative on each of the Municipal Forum and the Council of Knowledge Holders, as well as an alternative representative for both groups. These representatives provide regular verbal reports and updates to the Council on the activities of these groups.

Guests

During the three-year period, the Council welcomed several guests to attend our meetings.

On March 22, 2021, two representatives from the Government of Canada attended the Advisory Council meeting. One was Shawn Tupper, who was at the time Associate Deputy Minister, Natural Resources Canada. The other was Jim Delaney, Director, Natural Resources Canada. Mr. Tupper and Mr. Delaney provided to the Advisory Council an update on the Government of Canada's nuclear file.

In March 2022, Pat Beauchamp, Vice-President, Data + Analytics at Hill+Knowlton Strategies, was invited to participate in an update to the Council of the NWMO's visibility and communications strategy.

The Council met with Tom Isaacs, the chair of the external Site Selection Review Group (SSRG), on Dec. 7, 2021. We asked to meet again with the SSRG in 2022 to receive an update on how the group is addressing some of the many complexities associated with site selection. This update was provided on Sept. 19, 2022.

On June 13, 2022, the Council received a presentation on the Great Earth Law by Indigenous Elder Fred Kelly. Elder Kelly is a consultant, spiritual advisor and citizen of the Ojibways of Onigaming, a community of the Anishinaabe Nation in Treaty 3.

On Dec. 5, 2022, the Council met with Mollie Johnson, Associate Deputy Minister, Natural Resources Canada, for an informal exchange of views.

Responding to Triennial Report 2017-19 recommendations

One of the Council's activities in 2020-22 was reviewing with the NWMO how the organization was addressing the Council's recommendations and suggestions from the Triennial Report 2017-19. The manner in which these recommendations were dispositioned is discussed in this chapter and is available on the NWMO [website](#).

2.2 DISCUSSIONS AND COMMENTS ON THE NWMO'S ACTIVITIES: 2020-22

Our discussions on the NWMO's activities from 2020 to 2022 were wide-ranging, covering all aspects of the organization's work.

We followed, in particular, how the NWMO was addressing the Council's recommendations and suggestions from the Triennial Report 2017-19. In that report, in Section 3, we noted four emerging strategic imperatives for the organization's attention. They were:

1. Ensuring the integrity, fairness and comprehensiveness of the site selection process;
2. Implementing the *Reconciliation Policy*;
3. Preparing for regulatory and political processes; and
4. Preparing the NWMO itself and communities for upcoming transitions.

We also identified three continuing items of importance. They were:

5. Safety;
6. Social willingness; and
7. Transportation.

The comments below refer first to these seven items and then to other items that the Council reviewed.

2.2.1 *Emerging strategic imperative: Ensuring the integrity, fairness and comprehensiveness of the site selection process*

For more than 10 years, the NWMO has been engaged in a multi-year, collaborative process to identify a site that will safely contain and isolate Canada's used nuclear fuel in a deep geological repository. The site selection process was initiated in 2010, and over the next two years, 22 municipalities and Indigenous communities voluntarily expressed interest in learning more and exploring their potential to host the project. Over time, the NWMO gradually narrowed its focus to two potential sites, through extensive social engagement and technical site evaluations to assess the safety of the repository and transportation, and the potential to build supportive and resilient partnerships.

Siting activities reviewed by the Council in 2020, 2021 and 2022 were focused on two remaining areas, both located in Ontario – the Wabigoon Lake Ojibway Nation (WLON)-Ignace area in the northwest and the Saugeen Ojibway Nation (SON)-South Bruce area in the south.

Addressing our recommendations and suggestions from the Triennial Report 2017-19 (Section 3.2.1)

We reviewed with the NWMO how it was addressing our recommendations and suggestions from Section 3.2.1 of our Triennial Report 2017-19. In that report, we noted that as the site selection process draws to a close, it would be necessary for the NWMO to ensure that the process used to select the preferred site is sound and defensible. The organization would need to stay true to the values that have served it well over the last many years. It would also need to demonstrate that it has continued to work very closely and collaboratively with communities, including Indigenous communities, in defining social willingness, ensuring community well-being, and building long-term resilience and capacity.

The Council noted it was vital that all decisions be clearly justified, the process be comprehensive, the rights of all parties be respected, and communications be effective.

In the years 2020, 2021 and 2022, the NWMO reported to the Council that it agreed with this advice and continued to keep these points at the forefront of planning and managing the site selection process.

We were assured that expert third parties are involved at each critical decision point, and we regard this as a key strength of the NWMO's site selection process. In the geoscientific realm, assessments are conducted using external contractors, and the [Geoscientific Review Group](#) (GRG) reviews that work. In the environmental realm, assessments are conducted using external contractors, and the [Environmental Review Group](#) reviews that work. In terms of partnership and willingness, assessments are conducted through external contractors, and the [Site Selection Review Group](#) (SSRG) reviews that work. In the three-year period 2020-22, the Council received a briefing and several updates from the SSRG and a briefing from the GRG.

Periodic updates were provided to the Council on how the NWMO was moving forward in terms of partnership and willingness. We discuss this in more detail in Section 3.

Discussions and comments 2020-22

Much of the Council's advice and guidance on site selection in these three years took into consideration that this time frame was contiguous with 2023, the year the NWMO had long said the comprehensive site selection process would draw to a close. The organization would select either the WLON-Ignace area in northwestern Ontario or the SON-South Bruce area in southern Ontario.

Unlike the previous years of the site selection process, this three-year period was defined by the coronavirus (COVID-19) pandemic's various waves and subsequent lockdowns. Because of the impact of the pandemic, and in particular the impossibility during much of the pandemic period of working face-to-face with the communities in developing confidence and mutual understanding, Council members discussed amongst ourselves and with the NWMO whether consideration should be given to delaying the final site selection until full confidence in the depth and strength of the relationships could be achieved. We told the NWMO we considered it a high priority that the organization undertake an early decision-making protocol and communication strategy regarding any potential change. Concerns related to this matter drove our requests for more frequent updates on risk-based assessments.

In August 2022, the NWMO announced that the timing for the site selection milestone was delayed by a year. It is now planned for 2024 rather than 2023. The Council supported this decision because it appropriately aims at striking a balance between continuing to move the project forward while providing the time to get it right.

2.2.2 *Emerging strategic imperative: Implementing the Reconciliation Policy*

In 2019, the NWMO released its [Reconciliation Policy](#) to apply to all its activities. This arose from the long-standing presence and guidance of the NWMO's Council of Knowledge Holders. Reconciliation, as defined by the [Truth and Reconciliation Commission of Canada](#), is an ongoing process of establishing and maintaining respectful relationships with First Nation, Métis and Inuit peoples. In addition to the policy, the NWMO has issued a Reconciliation assessment tool, an important and novel instrument in determining the effectiveness of its policies and procedures.

Addressing our recommendations and suggestions from the Triennial Report 2017-19 (Section 3.2.2)

In our previous report on 2017-19, the Council congratulated the NWMO for embracing the principles outlined in the *Reconciliation Policy* and for continuing to follow guidance from the Council of Knowledge Holders.

The Council noted that making the *Reconciliation Policy* and assessment tool increasingly central to activities was an opportunity and a challenge – to keep the policy alive and continuously weave Reconciliation into the fabric of the organization. We suggested the NWMO ask itself: Is engagement with Indigenous communities deep enough? Is it correcting its course where necessary? Is it continuously looking at its relationships and initiatives through a Reconciliation lens?

The NWMO reported to the Council it is continuing the process of applying the Reconciliation assessment tool to policies, procedures and standards. It stated that its Indigenous Relations team worked with an Indigenous-owned firm specializing in Indigenous evaluation and monitoring to create its annual Reconciliation report and Indigenous Relations dashboard, which will be evaluated against its Reconciliation baseline measurement to ensure it is meeting the commitments outlined in the *Reconciliation Policy*.

The NWMO further reported that it identified areas of improvement for the Reconciliation assessment tool and revised it to be more user-friendly, provide more clarity and ensure it is more accessible to facilitate deeper dialogue.

Discussions and comments 2020-22

Over the years 2020-22, the NWMO provided regular updates on Reconciliation to the Council.

The Council heard that in 2021, a large majority of the NWMO's staff had completed Indigenous cultural awareness training, as well as more advanced Reconciliation training.

Over the three-year period, the Council provided input on factors for the NWMO to consider in broadening and deepening Reconciliation efforts. We discuss this in more detail in Section 3.2.7.

2.2.3 *Emerging strategic imperative: Preparing for regulatory and political processes*

Addressing our recommendations and suggestions from the Triennial Report 2017-19 (Section 3.2.3)

In 2019, the Government of Canada put in place new impact assessment legislation, the [Impact Assessment Act](#).

In our Triennial Report 2017-19 (Section 3.2.3), we recommended that the NWMO work closely with the federal government to understand the evolving regulatory landscape, and that, equally, the federal government help to provide clarity and certainty with regards to what was necessary within the new regulatory parameters. The Council noted the NWMO needs to ensure decision-makers are made aware of the robust processes by which Adaptive Phased Management (APM) was designed and is being implemented.

On the regulatory side, we suggested it would be necessary for the NWMO to obtain a high degree of confidence that it is going to meet the regulatory requirements to move forward for both the selected

repository site and transportation of used nuclear fuel to the site. This would include preparing for formal impact assessment submission to the extent possible for both potential siting areas so long as they remain in the siting process.

At the time, the Council stressed the importance of clear communications when talking about this aspect of the NWMO's work. We suggested the organization aim very high in this regard, performing at the highest international standard on its technical, social and engagement communications work, as part of planning for the regulatory phase.

On the political side, we noted the NWMO would need to work closely with all provincial and federal governments involved, as well as opposition parties, not only to clarify the regulatory processes required to assess the project, but also to seek and receive from them clarity on their expectations and concerns. We encouraged the NWMO to start working more regularly with central agencies of the federal government, in particular the Privy Council Office, in addition to individual departments. We advised the NWMO and pertinent government bodies to work together to ensure there was a mutual and continual exchange of information.

Discussions and comments 2020-22

In the years 2020-22, the NWMO reported to the Council that it agreed with this advice. It continued to assure us that its overriding objective in implementing Canada's plan is protecting people and the environment for generations to come. The organization understands it will have to demonstrate that the project meets or exceeds strict regulatory requirements to protect the health, safety and security of people and the environment, while also respecting Canada's international commitments.

Over the three-year period, the Council was updated on the preparations being made by the NWMO for the impact assessment process and licensing by the Canadian Nuclear Safety Commission (CNSC). The NWMO intends to launch these processes in 2025 for the selected siting area, and we noted it was critical to start planning immediately.

In keeping with our advice, the NWMO continued to maintain and expand federal government outreach, with a particular focus on Natural Resources Canada and across other departments that will be involved in the impact assessment. The NWMO undertook to invite senior representatives from Natural Resources Canada to meet with the Council, which we found helpful. The Council asked the NWMO to confirm it has been interacting regularly with the Impact Assessment Agency of Canada (IAAC) and suggested that it might be appropriate in future for the Council, together with the NWMO, to meet with representatives from the IAAC and perhaps also Environment and Climate Change Canada.

We suggested the NWMO keep a watching brief on other projects that are making their way through regulatory processes for impact assessment and licensing, and the NWMO has followed this advice. This includes monitoring developments on existing projects, as well as processes for Indigenous-led assessments.

The Council asked for further discussion at our September 2022 meeting on the subject of preparing for the regulatory decision-making process. The purpose of this discussion was to gain a better understanding of issues that might arise, as well as the plans of the NWMO, particularly in relation to the adjusted timetable for site selection and the nature and extent of Indigenous involvement in impact assessments per the *Impact Assessment Act*. We discuss this topic in more depth in Section 3.2.3.

2.2.4 Emerging strategic imperative: Preparing the NWMO itself and communities for upcoming transitions

Addressing our recommendations and suggestions from the Triennial Report 2017-19 (Section 3.2.4)

In our Triennial Report 2017-19 (Section 3.2.4), the Council noted that the period 2020-24 would have a major impact on the NWMO itself.

The organization would undergo a transition in the nature of its work, from having a site selection focus to having a project implementation emphasis. Internally, the NWMO would need to ensure it has the human, organizational and information resources in place to proceed with implementing Canada's plan for the long-term management of used nuclear fuel.

We suggested the organization prepare for a major upheaval in moving resources from its current location in downtown Toronto to the selected site, either the WLON-Ignace area in northwestern Ontario or the SON-South Bruce area in southern Ontario. The Council suggested it was critical that the NWMO prepare immediately for this transition and continue to retain and recruit the highly skilled people it needs to carry out its mandate. We recommended the NWMO outline the impact that a major move from Toronto to a small community would have on the organization and on the community.

Simultaneously, we suggested the organization would need to support the selected site with capacity-building and other initiatives. The APM project represents a large social, economic and technical project for communities in the selected region, including Indigenous communities and neighbouring municipalities. We felt it was crucial for the NWMO to attend to both its own transition priorities and the transition-related and infrastructure-related needs of these communities.

The organization assures us it is exploring the needs of communities pertaining to the upcoming transition through its ongoing partnership road map discussions, as well as work it is doing to develop multi-year funding agreements and near-term investments.

Among initiatives the NWMO is undertaking with communities to envisage the project in their area, implementation plans have begun to lay out dates for key activities, register associated human resources requirements and make other preparations.

Discussions and comments 2020-22

Three years into this five-year time frame, the Council has been assured the NWMO is continuing to advance its staffing plan in preparation for mobilization to the selected siting area. We note there were senior staff changes in the organization to prepare for next steps and emerging needs. Workforce projections are being completed in each of the two remaining siting areas.

The extension of the site selection timeline to 2024 will delay but not lessen the impact of the upheaval on the organization. The NWMO provided the Council with information on the age distribution of current staff members, statistics that may indicate there will be major staff departures due to retirement in the next several years. The Council advised the NWMO to confer with other industries that have had to recruit and retain staff in less populated areas and identify relevant strategies and tactics that can be implemented before and at site selection.

2.2.5 ***Continuing item of importance: Safety***

A concept for the deep geological disposal of nuclear waste that was developed by Atomic Energy of Canada Limited (AECL) was reviewed by a federal environmental assessment panel (the Seaborn Panel) over a period of 10 years, from 1988 to 1998. Two of the key panel conclusions from the [Seaborn Report](#) were:

- “Safety is a key part, but only one part, of acceptability. Safety must be viewed from two complementary perspectives: technical and social.”
- “From a technical perspective, safety of the AECL concept has been on balance adequately demonstrated for a conceptual stage of development, but from a social perspective, it has not.”

Over many years, the Council has emphasized that these dual components of safety, i.e., both the technical and the social perspectives, must be fully incorporated into NWMO safety analyses.

Addressing our recommendations and suggestions from the Triennial Report 2017-19 (Section 3.3.1)

Six years ago, in our Triennial Report 2014-16 (Section 3.5.4), we recommended that the NWMO develop a participatory approach to engage the public and potential host communities in identifying, analyzing and addressing safety concerns. Three years later, in our Triennial Report 2017-19 (Section 2.2.1), we reported that we were pleased to see the continued prominence of safety in the NWMO’s work, and acknowledged that specific steps were being taken to define what safety means from a social perspective.

Discussions and comments 2020-22

In the period 2020-22, the NWMO continued to assure the Council that it recognizes the importance of taking a participatory approach to understanding and addressing the safety concerns expressed by potential host communities, and provided the Council with periodic updates on the specific steps being taken in this regard.

The NWMO shared with the Council documentation it is developing on the social definition of safety, which includes background on how this has been incorporated in the site selection process from the beginning and how it continues to be incorporated into the program going forward. We discuss this topic in more depth in Section 3.2.5.

2.2.6 ***Continuing item of importance: Social willingness***

The technical end point of APM, as stated by the NWMO, is the centralized containment and isolation of Canada’s used nuclear fuel in a deep geological repository located at a safe site in an area with informed and willing hosts.

The Council continues to focus a great deal of attention on the subject of willingness. Six years ago, in our Triennial Report 2014-16 (Section 3.8), we recommended that the NWMO explain, in its communications with the public and communities in the siting study areas, how its understanding of the willing host concept has been enhanced to include supportive and inclusive partnerships.

Addressing our recommendations and suggestions from the Triennial Report 2017-19 (Section 3.3.2)

We noted in our Triennial Report 2017-19 (Section 2.2.1) that the NWMO has shared with us how the willing host concept is evolving to include supportive and inclusive partnerships, based on mutual trust. We expressed satisfaction with the NWMO's approach to this critical area and noted that the organization has a number of excellent policies and plans in place that continue to guide its work, including the Ethical and Social Framework and the *Reconciliation Policy*. We have been assured the willing host concept will: be jointly defined, reflect mutual trust and working together, take into consideration multiple indicators, and be clearly communicated to communities and the public.

We cited social willingness as a continuing item of importance (Section 3.3.2). The Council stated that defining "social willingness" would be one of the most challenging and innovative activities in the next phase of the NWMO's work.

We suggested that as the number of potential siting areas is narrowed from two to one, it would be important for the NWMO to provide clarity and transparency on how it, in collaboration with communities, defines willingness. Then, beyond site selection, partnerships must be based on dynamic and resilient relationships to sustain willingness into the future.

We recommended that as the organization seeks to advance partnership discussions, it continues to engage with the Indigenous communities directly involved, as well as surrounding Indigenous communities and organizations as appropriate.

Throughout the years 2020, 2021 and 2022, the Council received regular updates on how the NWMO is advancing siting engagement, including Indigenous engagement through the lens of Reconciliation. It also received regular updates on the NWMO's partnership road map, which is focused on attaining social willingness, as well as developing mutually agreeable draft hosting agreements.

Discussions and comments 2020-22

The Council had discussions with the NWMO about hosting agreements and the different forms they might take for the potential host communities. We provided ongoing advice with respect to their development. The Council also provided advice about the importance of Indigenous laws, treaty agreements and consent mechanisms in discussions about willingness. The Council asked the NWMO about planning milestones and timelines for hosting agreements and secondary agreements. In 2022, discussions on potential partnership agreements were in the early stages.

2.2.7 Continuing item of importance: Transportation

The NWMO has responsibility for establishing safe, secure and socially acceptable plans for transporting used nuclear fuel from the current interim storage sites to the used fuel repository.

Addressing our recommendations and suggestions from the Triennial Report 2017-19 (Section 3.3.3)

In our Triennial Report 2017-19 (Section 3.3.3), the Council stressed that engagement with respect to transportation must remain a very high priority for the NWMO. We recommended the organization develop a deep and thorough understanding of what safe transportation means to communities along the transportation corridors, and demonstrate it is able to transport used nuclear fuel safely to the two remaining sites in a manner that addresses public concerns.

Discussions and comments 2020-22

In the years 2020-22, the Council was provided with updates on transportation engagement. We also received for review and comment the NWMO's transportation planning framework and *Preliminary Transportation Plan*. We heard that both documents are living documents to be updated regularly based on public feedback and as planning evolves.

The Council was pleased to see the progression of the transportation work. We discussed how Indigenous Knowledge was being drawn upon in the transportation plans and asked the NWMO to consider how to incorporate it in upcoming transportation work.

We understand the NWMO will continue to lead dialogue with municipalities, Indigenous communities, municipal associations, governments, first responders and Indigenous organizations, regarding transportation plans. This dialogue is intended to raise awareness and understanding of the technical basis for confidence in safety, and to invite discussion of social expectations and requirements. The NWMO has reported it will also continue to develop materials that are accessible to all interested parties and address the public's questions and concerns on this important topic.

2.2.8 *Other significant subjects of discussion*

In addition to discussing in depth the emerging strategic imperatives and continuing items of importance identified in our last report, over the three-year period, the Council also focused attention on other activities.

Building sustainable relationships

We kept close track of how the NWMO continues to build sustainable relationships with the potential host communities, paying particular attention to how the Ethical and Social Framework is being applied to this work. We noted how the NWMO is working collaboratively with municipal and Indigenous governments with respect to methods of assessing willingness and developing hosting agreements. We were updated regularly on the range of engagement activities used with communities in each siting area, as well as the NWMO's adaptive responses to feedback from communities with respect to that engagement.

In addition, the NWMO reported on its efforts to expand its relationships and raise the profile of the project across Canada, given increasing interest and scrutiny as the siting decision approaches. We were informed of a broad range of the NWMO's activities designed to gauge perceptions and raise awareness of the project among elected officials, NGOs, the nuclear industry and the general public in order to track progress and identify risks.

These activities included hearing from critical voices at public events, conducting focus groups and polls, interviewing members of Parliament and political staff, participating in industry groups, tracking media and social media landscapes, and monitoring recent progress with international nuclear waste management facility siting decisions (all of which are for deep geological repositories).

The Council also noted the NWMO's work monitoring and responding to critical political voices among elected officials in Great Lakes states. The Council asked for and received assurance that the NWMO is adequately resourcing the growing requirement for communications, engagement and relationship-building beyond the potential host communities.

Technical program

We were updated regularly on the NWMO's technical program, including developments on used fuel containers, copper-coating systems, closure welding, serial manufacturing, the transportation package system, bentonite clay buffer boxes, borehole drilling, and the safety cases that will be analyzed for the preferred site. We have consistently emphasized the critical importance of communicating the technical aspects of APM in plain language to all communities involved. We provided our input on how the NWMO is enhancing public discussions about the future on-site process of preparing fuel bundles for underground storage.

The Council received updates on corrosion aspects of the copper-coated containers in their emplaced environments and the extensive research that is being done to ensure adequate protection of the used fuel for the required millennia.

We were also apprised of work regarding the process of geosynthesis, which integrates all the information gathered regarding the geosphere (for example, geophysical surveys, surface mapping, deep core drilling, borehole testing), which is underway for both potential sites. The Council has asked to be kept informed on progress and results.

The NWMO shared with the Council that it published *Confidence in Safety* reports for both potential siting areas, reflecting years of research and field work by its science and engineering teams. We suggested these reports form the basis for lay-language materials to be released widely in the coming years.

The reports form the basis for the NWMO's confidence that a deep geological repository can be constructed at either potential site – from the characteristics of the geology to the sites' capabilities to support the safe construction, operation and closure of the repository.

After a site with willing and informed hosts is selected, further technical and social studies, along with more work on Reconciliation, will be undertaken at the selected site. These efforts will provide additional rigour to the already comprehensive repository design and formal safety case that will be submitted for regulatory review through the federal impact assessment process and licensing by the CNSC.

Financial surety and new cost estimate

The *Nuclear Fuel Waste Act* Section 16(2)(b) requires the NWMO to address the cost and funding of the long-term management of used nuclear fuel. The Council asked for and received appropriate briefings on the NWMO's budget forecast for the next five fiscal years to implement the strategic plan.

We also reviewed the new cost estimate the NWMO issued in 2021, updating its cost estimate from 2016. These estimates provide the basis for financial planning and trust fund deposits for future years, based on an expected volume of fuel bundles. The total lifecycle cost of the project covers many decades of activity – from the beginning of site selection in 2010 to the completion of the project about 175 years later.

Knowledge management and risk assessment

We were kept apprised of how the NWMO is managing knowledge. The NWMO also described how its *Reconciliation Policy* and associated processes provide mechanisms for identification and respectful use of Indigenous Knowledge held by Indigenous communities. We were pleased to be provided with the

NWMO's business risk assessments, including risk mitigation measures. This was especially important in a changing and evolving organizational environment.

New reactor technologies

A fast-developing issue that will no doubt have implications for APM in the near-to-medium term is the development and possible deployment of different reactor technologies, and consequently, different forms, volumes and radioactivity levels of used nuclear fuel. This includes small modular reactors. Whatever reactor types may be developed in Canada, there will be a need for used fuel to be managed by the NWMO through the APM project. The Council and the NWMO continue to monitor developments and discuss implications.

Low- and intermediate-level waste repository

Early in the three-year time frame of this report (in 2020), Ontario Power Generation (OPG) withdrew from the environmental assessment process for its deep geologic repository (DGR) project for low- and intermediate-level waste (L&ILW) to be located near Kincardine, Ont.

This decision was made after almost 20 years of work involving: extensive interactions with communities; detailed scientific and technical studies; referral of the project to a Joint Review Panel (JRP); preparation of an Environmental Impact Statement and Preliminary Safety Report; public hearings; submission of the JRP Report to the Minister of Environment and Climate Change; a request from the Minister for OPG to provide further information and/or additional studies on alternate locations for the repository; cumulative effects and mitigation commitments; and a vote by the members of SON to reject the proposed project.

Many of the issues raised during assessment of the OPG DGR project are the same or similar to the emerging and continuing strategic imperatives identified in this report. For example, many submissions to the DGR JRP emphasized that "social safety," as well as technical safety, must be demonstrated and argued that social safety had not been sufficiently demonstrated. There was a strong connection between social safety and the issue of evidence required to establish that communities were willing hosts for the DGR.

The DGR JRP received a substantial amount of information about how OPG's public engagement program could be improved in order to achieve, in the words of one participant, a greater level of trust and legitimacy. The JRP noted that while OPG went to considerable lengths to disseminate accessible information about the project, a more dialogue-based engagement model was recommended.

OPG withdrew the DGR project after the vote by SON. This decision reflected a publicly announced agreement between SON and OPG in 2013. The agreement stated that "OPG will work with the SON community to reach SON support for the underground storage facility before OPG proceeds with construction." The work committed to by both parties to the agreement failed to produce the support needed.

The NWMO's strong focus on establishing that host communities are, indeed, willing, as well as its commitment to taking the time to build sustainable relationships with Indigenous communities in accordance with its *Reconciliation Policy*, are consistent with the lessons learned from the DGR project. The Council provides further comments on these and other strategic imperatives in Section 3.

2.2.9 *Conclusion*

The Council notes that the NWMO has followed up on the recommendations we made in our last triennial report. We congratulate the NWMO for implementing an innovative, collaborative and comprehensive approach to advancing Canada's APM plan for used nuclear fuel. In Section 3, we have identified some continuing items for special attention as the organization prepares for a major shift during the upcoming planning period.

3 Implementing Adaptive Phased Management 2023-27

In this section of the report, we review the NWMO's draft five-year strategic plan, *Implementing Adaptive Phased Management 2023-27*, and provide comments and recommendations regarding upcoming work.

3.1 REFLECTIONS ON THE PLANNING PERIOD

While the NWMO's implementation plan appropriately outlines the organization's planning priorities over the next five years, its business-as-usual tone may belie the challenges ahead.

The Council notes the NWMO is entering a period that includes, in 2024, the planned selection of a single site for the deep geological repository. The announcement will draw greater attention and no doubt increased opposition to the work of the NWMO, as with any project connected to nuclear power.

Reaching this milestone after more than 20 years will fundamentally alter the organization's work, location and strategic focus. The NWMO's sight lines will shift to the next stated milestones: embarking on regulatory and political decision-making processes, which are by no means clearcut, and moving much of its workforce to the selected site.

All this is unfolding in a public environment of marked complexity and uncertainty.

Progress on the climate change agenda is proving difficult domestically and globally as issues like energy security, affordability and food security grow in salience. The global economic context is complex, with the return of high inflation, a possible recession and supply chain challenges. And the Russia-Ukraine war, which began in February 2022, is resulting in many geopolitical transformations and has raised questions about the safety of nuclear facilities in conflict zones. At the same time, there is growing awareness, as well as debate, about the potential contribution of nuclear power to meeting global net-zero commitments.

Here, in Section 3, we have identified seven strategic imperatives for careful attention as the NWMO implements its five-year plan.

3.2 STRATEGIC IMPERATIVES

3.2.1 Deepening trust with host communities as the site selection process draws to a close and partnerships develop

As the five-year planning period begins, there are two potential siting areas remaining in the site selection process. They are the Wabigoon Lake Ojibway Nation (WLO)-Ignace area in northwestern Ontario and the Saugeen Ojibway Nation (SON)-South Bruce area in southern Ontario. These two areas, having remained in the site selection process throughout, have been the subject of many years of social engagement and technical site evaluations as the NWMO has explored the potential to build supportive and resilient partnerships and assessed the safety of the repository in those locations.

In 2024, the NWMO plans to select one of these areas as the preferred site. It is imperative that this decision is based on a solid foundation of trust.

Gaining, strengthening and sustaining trust among the Indigenous and non-Indigenous communities that are involved, their neighbours, the media and the local public is no small feat. Current external forces could make it more challenging to foster trust. Controversies surrounding COVID-19 public health measures and vaccines have taught us that a percentage of the population lacks trust in scientific approaches to managing risks. The Russia-Ukraine war may negatively affect public perceptions of the risks associated with nuclear power. Such perceptions are important components of addressing safety from a social perspective. Adding to this, in Indigenous communities, trust is often entwined with legacy issues such as residential schools and the impact of previous industrial activities.

The Council believes selecting one site for the deep geological repository will require a continuation and intensification of social engagement with potential host communities to build trusted relationships. This is critical to the success of the whole enterprise and will be needed by host communities to withstand negative attention on the project that may arise.

We laud the NWMO for the respectful manner with which it has developed and maintained relationships.

We recommend that the organization continue to increase the depth and breadth of relationships with potential host communities in order to build trust and sharpen its understanding of the views of people in local municipalities, Indigenous communities and neighbouring communities.

3.2.2 *Engaging with interested parties beyond the potential host communities*

As the Adaptive Phased Management (APM) project gets closer to final site selection, interest in the project will grow rapidly beyond the potential host communities. Once a site is announced in 2024, there will be many new eyes on the project, both nationally and internationally. Multiple and diverse interested parties will emerge in the coming months, ranging from NGOs/civil society organizations in Canada and abroad, to provincial and municipal governments beyond the host communities, to international actors and the public. Many will be interested in learning more about the project. Others will be opposed or critical. Indeed, the emergence of new critical voices has already begun to take place with, for example, opposition to the project in the U.S. Great Lakes region.

Increasingly, the NWMO will need to engage, develop relationships, and communicate with new and diverse actors beyond the host communities. Success of the APM project in the upcoming planning period will hinge in large measure on proactively developing effective engagement and communications strategies. As noted in section 3.2.1 above, it will likely be challenging to build trust and support for the project in the current external landscape, where trust in scientific approaches to managing risk can be elusive and public perceptions of nuclear power may be negatively impacted by the Russia-Ukraine war. At the same time, there is growing recognition – and debate – about the potential role of nuclear energy in mitigating climate change.

Crucially, the logic and approaches for these interactions will often be different from the relationship-building activities the organization has undertaken to date with municipalities, Indigenous communities and local citizens in potential host communities. Some interactions may require the development of trusted relationships with, for example, provincial, municipal and Indigenous governments and organizations beyond the host communities. Others may require more traditional communications vehicles, as with communications to the public about the project. Interactions beyond Canada's borders may require a combination of communications, engagement and relationship-building, and may involve government-to-government diplomacy.

The Council observes with satisfaction that the NWMO is keeping abreast of the external landscape, and as noted in Section 3.2.1, the organization has been working effectively to raise the profile of the project across Canada and gauge opinion about it on an ongoing basis. It has likewise responded well to opposition to the project in the U.S.

Once the final project site is selected, the Council believes these monitoring and engagement activities will become increasingly important – for the NWMO, for the host communities and for the Government of Canada – in support of their commitment to APM in the face of opposition and critique.

In the upcoming planning period, we recommend that the organization continue to increase the depth and breadth of such monitoring, that it proactively engage with and communicate with interested parties in Canada and abroad using leading-edge practices, and that it adequately resource these crucial activities.

3.2.3 *Meeting regulatory requirements*

The Council stays informed of the NWMO's preparations for the regulatory decision-making process. Ultimately, the NWMO will have to demonstrate that the project meets or exceeds strict regulatory requirements to protect the health, safety and security of people and the environment, while also respecting Canada's international commitments.

There are two major regulatory processes governing the APM project. The Canadian Nuclear Safety Commission (CNSC) is responsible for licensing of the APM project under the [Nuclear Safety and Control Act](#), while the Impact Assessment Agency of Canada (IAAC) is responsible for conducting the impact assessment of the project under the [Impact Assessment Act](#). Policy and procedural coherence between and within these processes, currently absent, is fundamentally important in order for the NWMO to carry out its mandate.

Prior to passage of the *Impact Assessment Act* in 2019, the CNSC conducted environmental assessments for nuclear projects. Now that the IAAC is responsible for the impact assessment of the APM project, the specific role of the CNSC in the impact assessment process, and the timing of that role, is unclear.

The IAAC has recently published guidance regarding implementation of the *Impact Assessment Act*, but there remain several questions that require answers. They include: What are the expectations and intentions for Indigenous engagement? What are the plans and processes for collaboration and co-ordination between the IAAC and Indigenous jurisdictions, including the requirement for free, prior and informed consent under [United Nations Declaration on the Rights of Indigenous Peoples Act](#), which became law in Canada in June 2021? How will Indigenous-led impact assessment and Indigenous law align with federal impact assessment and legislative requirements for project approvals? How can proponents such as the NWMO contribute to the IAAC's improved understanding and management of cumulative effects on a regional scale?

Without timely guidance addressing these questions, we recommend the NWMO proactively develop its own rigorous and robust approaches to each of these questions while continuing to engage with the Government of Canada regarding obtaining the guidance needed.

3.2.4 *Enhancing resilience and strength of the NWMO itself and host communities*

As we noted in Section 2.2.4, the NWMO is about to undergo a transition in the nature and location of its work. The substance of its work will change from selecting a site to undertaking regulatory processes and implementing the APM project.

The location of the NWMO's offices will move from Toronto to either the WLON-Ignace area or the SON-South Bruce area. We recognize the organization's work to manage its human resources needs during and after this challenging transition, to maximize job opportunities in the siting area, including Indigenous communities, and to develop capacity in communities through investments in training and education.

With many senior staff nearing retirement age, an appropriate succession plan will need to be in place. The organization will need to recruit and retain personnel with the required skills and expertise, given the move from Toronto to a rural area.

In addition, enhancing the resilience and strength of the host communities, after the site selection process is completed, will be a continuous challenge, requiring sustained efforts from both the NWMO and the communities themselves. Initiatives will need to reflect the individual needs of the respective communities as they manage their way through the different phases of the project. The Centre of Expertise (described in the next section) can play an important role in this exercise. The strength of the communities will not only depend on the resources that they have to manage the project, but also on the communications and shared values that they continue to develop in future phases of the project.

One of the objectives of the process should be to ensure the communities' autonomous capacity to explain and defend the project and their decision to accept it in their region.

We recommend the NWMO develop an integrated strategy to address both the needs of the organization itself as it prepares to mobilize and the needs of the host region to manage the different phases of the project. The strategy should incorporate lessons learned from other organizations of a similar size and scale that have undertaken a major move to a rural location.

A note on the Centre of Expertise

As part of the APM plan, a Centre of Expertise is being planned on the surface at, or near, the repository site. The Council has been receiving briefings on the vision for the centre, which has been described by the NWMO as the future home to a technical and social research program and a technology demonstration program. It will represent a multi-million-dollar investment in the selected area.

The Council supports the NWMO's plan to use the Centre of Expertise to foster inter-community collaboration, as well as to build strong working relationships between the NWMO and its partners. Locating, naming and identifying the mission of the centre could all be processes explicitly designed to bring the area Indigenous and municipal communities together and to build trust and partnership among them. We recommend that the NWMO move forward as expeditiously as possible in developing an Indigenous/municipal joint visioning exercise to encourage that sort of integrated thinking.

An additional mandate: To develop Canada's Integrated Strategy for Radioactive Waste

The NWMO has been given an additional mandate by the Government of Canada: to develop Canada's Integrated Strategy for Radioactive Waste, which will include low- and intermediate-level waste; this is in addition to its mandate to manage Canada's plan for high-level waste. The new mandate is part of the government's [Radioactive Waste Policy Review](#), which recognizes the NWMO's 20 years of expertise in

the engagement of Canadians and Indigenous peoples on plans for the safe, long-term management of used nuclear fuel.

We acknowledge this is an important show of confidence in the NWMO by the government. Since the public does not necessarily distinguish between nuclear projects, particularly if they are implemented by a single organization, the additional mandate could present challenges to the NWMO in terms of the trust, integrity and transparency it is building around APM. Despite assurances from the NWMO that the additional mandate will not put the APM project at risk, we remain concerned it could have a negative impact.

We urge the Government of Canada, which plans to release its modernized radioactive waste policy in early 2023, to work with the NWMO to ensure that such impacts are minimized, especially in the run-up to final site selection planned for 2024.

3.2.5 *Defining safety from technical and social perspectives*

As we noted in Section 2.2.5, defining and addressing safety from both technical and social perspectives is a critical component of success for this project. History tells us that demonstrating the project is safe from a technical perspective is necessary, but not sufficient; it must be considered safe from a social perspective as well (i.e., in the eyes of citizens).

From a technical perspective, the NWMO will continue to develop the site-specific safety assessments required to demonstrate that the project meets or exceeds all regulatory requirements.

Lack of public trust in purely technical safety analyses led to the Seaborn Panel's call for inclusion of safety from a social perspective, as we discuss in section 3.2.1. Trust can be increased not only through the provision of technical information, but also through the continual building of the NWMO's understanding of what safety means to people.

Translating technical analyses (such as how baseline environmental data were formed, how scenarios that were used in modelling of repository performance were selected and how cumulative effects can be defined) into plain language is necessary to achieve a high level of social input and participation. This is fundamental to developing the long-term partnerships and trust that are needed to implement the project. So is listening to the safety concerns of people.

It is essential that the NWMO continue to work closely with all communities involved to identify and address issues that comprise safety from a social perspective. The Council observes with satisfaction that the NWMO is committed to documenting and tracking the progress of that work. We note the organization is developing an overarching framework using established principles underpinning safety from a social perspective. Issues may include such concerns as cultural protection and economic protection, confidence that all accident and malfunction scenarios of social concern have been addressed, and protection of water and cherished landscapes, among many others.

We note that defining safety from a social perspective may be distinctly different in Indigenous communities from non-Indigenous communities and also different from community to community.

We recommend the NWMO complete development of the overarching framework for understanding safety from a social perspective as soon as possible and use the framework to bring together all activities in this realm.

3.2.6 *Achieving willingness*

The NWMO has always maintained a fundamental commitment that the APM project will only proceed in an area with informed and willing hosts, where the municipalities, Indigenous communities and others in the area are working together to implement it.

As site selection approaches, the mutual confidence of the NWMO and partnership communities in the depth and resilience of willingness will be put to the test. We recognize that the NWMO is taking an adaptive and collaborative approach to defining willingness, working with the involved communities. A key part of this work will be to accommodate disparate approaches and schedules.

3.2.7 *Working towards Indigenous consent*

The Council notes the NWMO continues to demonstrate leadership in its effort to seek Indigenous engagement and understand, honour and act on Indigenous perspectives.

As we noted in Section 2.2.2, the NWMO developed a [Reconciliation Policy](#) in 2019 to apply to all its activities. In its detail, discipline and approach, this is an NWMO innovation. In the policy, the NWMO commits to meaningful engagement, including consultation as required, building respectful relationships, and seeking the free, prior and informed consent of impacted Indigenous peoples before proceeding with development of a deep geological repository. Further, the NWMO commits to building relationships with Indigenous communities and municipalities, groups and peoples on a foundation of respect for languages and customs, cultural protocols, and political, social, economic and cultural institutions.

The Council commends the NWMO for its continuing development and implementation of the *Reconciliation Policy*.

We share with the NWMO the understanding that relationships and partnerships must be based on mutual benefits and respect. This takes time. Agreements will need to be living documents, flexible and adaptable over time.

The Council also discusses factors that contribute to the larger context in which Indigenous consent is being sought.

One of the key pieces of federal government legislation that attempts to define Indigenous consent is the [United Nations Declaration on the Rights of Indigenous Peoples Act](#), which became law in Canada in June 2021. This is another example of federal government legislation that requires further clarity. The federal government announced that it is working in partnership with Indigenous peoples on measures to ensure that the laws of Canada are consistent with the act, and on an action plan to achieve its objectives. It has further committed to present an action plan based on the priorities identified by Indigenous peoples and a whole-of-government collaboration by June 2023.

The Council is looking forward to the action plan to clarify what the process will look like to implement the *United Nations Declaration on the Rights of Indigenous Peoples Act* and how it will affect the NWMO's future implementation of site selection and regulatory processes. We are particularly interested in understanding how federal regulatory law and Indigenous regulatory law will work together. Co-ordination in this area is of tremendous importance to ensure clear and consistent expectations of all involved parties.

The NWMO is well positioned to achieve a high level of trust with Indigenous communities and to take an enabling, facilitating and supportive role in seeking free, prior and informed consent. In parallel, where there is a high level of trust, it has been noted by the Council that Indigenous communities can play a role as champions of the project, to deal with issues that arise. The NWMO can likewise support collaboration among Indigenous communities.

While recognizing the NWMO's leadership in Indigenous engagement, the Council recommends the organization critically assess whether engagement is deep enough for the organization to fully understand opinions and perspectives in Indigenous communities.

3.2.8 *Planning for transportation*

As the site selection process draws to a close, the NWMO will need to demonstrate that it is able to transport used nuclear fuel safely to the selected site in a manner that addresses public concerns. As noted in Section 2.2.7, public concerns about transportation will include both technical and social issues.

We note the NWMO is continuing to lead dialogue with municipalities, municipal associations, Indigenous communities and Indigenous organizations regarding transportation plans. The Council anticipates some of those conversations could be marked by strong opposition.

In December 2021, the NWMO released its revised transportation planning framework and the *Preliminary Transportation Plan*. The framework is a socially driven document describing the public's priorities for transportation planning. The NWMO considers 2023 a "pivot" year for transportation as it is preparing for how conversations about transportation will evolve after a site is selected and the project moves into the regulatory decision-making process. The NWMO's work in this area has been well executed and comprehensive.

3.3 BUDGET FORECAST

The Council receives regular briefings on revisions to the NWMO's budget. In 2022, the NWMO presented to the Council the assumptions it used to prepare its budget forecast to implement the five-year strategic plan. We were satisfied with the discussions and reviews, and concluded the budget was appropriate.

4 Reflections on planning for long-term nuclear waste management in Canada

This report has provided an overview of our mandate, our approach and the framework we have used for evaluating the NWMO's work; a summary of our activities over the past three years; comments on the work of the NWMO from 2020 to 2022; and a review of the NWMO's five-year implementation plan.

In this section, we provide our reflections at this critical time in the project.

History leading to the selection of Adaptive Phased Management

Used nuclear fuel has been accumulating in Canada for nearly 60 years, and the amount continues to grow by about 90,000 spent fuel bundles per year. Currently, the country's used nuclear fuel is stored at interim above-ground facilities.

This is not a permanent solution. The work to identify a method of safely managing Canada's used nuclear fuel over the long term spans many decades. Over the last 45 years, a number of studies and reviews have consistently concluded that the management of Canada's fuel wastes should be addressed through the construction of a deep geological repository, a conclusion that aligns squarely with international practice.

Examples of Canadian studies that concluded construction of a deep geological repository is, from an engineering and technical perspective, the appropriate way to manage used nuclear fuel in the very long term include:

- In 1977, *The management of Canada's nuclear wastes* (F.K. Hare, Chairman, A.M. Aitken, J.M. Harrison) – a study prepared under contract for the Minister of Energy, Mines and Resources Canada – (Report EP776. 1977); and
- In 1998, the Seaborn Panel's report, which concluded that from a technical perspective, safety of Atomic Energy of Canada Limited's concept for deep geological disposal was, on balance, adequately demonstrated for a conceptual stage of development. It qualified its findings significantly, however, by stating that safety from a social perspective had not been demonstrated. (*Report of the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel*, Seaborn Panel.)

APM: Selected by government, developed through public engagement

In 2002, the Government of Canada created the *Nuclear Fuel Waste Act* and established the NWMO. As required under the act, a number of alternatives for the management of used fuel waste were studied.

The organization's work over the ensuing five years, involving engagement with communities and individuals across Canada, culminated in 2007 in the Government of Canada selecting Adaptive Phased Management (APM) as the preferred and responsible approach for the management of used nuclear fuel in the long term. APM is both a technical method (what will be built) and a management approach (how it will get it done). The NWMO is mandated to implement APM.

The technical method involves building a deep geological repository in a suitable rock formation to safely contain and isolate used nuclear fuel. It is consistent with the approach to the long-term management of

used nuclear fuel adopted by other countries with nuclear power programs such as Finland, France, Sweden, Switzerland and the United Kingdom.

The management approach involves phased and adaptive decision-making. We emphasize the importance of the A in APM: adaptive. APM is designed to incorporate adaptability in the pace and manner of implementation.

Do not leave the problem for future generations

Used nuclear fuel continues to accumulate in Canada. Canadians and Indigenous peoples told the NWMO during the multi-year engagement process leading up to 2007 that it is important to take action on the long-term management of the country's used nuclear fuel and not to leave the problem to be dealt with by future generations. At this juncture, the NWMO is close to announcing a single site, which will result in increased visibility of the project, and likely vocal opposition. Failure to proceed with APM would in all likelihood lead to the passing of many years before the issue is taken up again. When it is, the same policy option will present itself to the country as the most sensible, if the universal experience of other countries addressing this matter is any guide.

A sound process

The Council continues to hold the view that APM, having been developed in collaboration with Canadians and Indigenous peoples, and in operation since 2007, is a sound process to manage the fuel that has been used and will be produced in the future. It is an adaptable process. It was developed in collaboration with Canadians and Indigenous peoples and is mandated by the Government of Canada. The full costs of its implementation are borne by the waste owners. And APM plays a pivotal role in the sustainability of current and possible future nuclear energy projects, including small modular reactors.

Critical juncture: Selecting one site

As the Council writes this report, the NWMO is on the cusp of selecting a single site for the deep geological repository. This moment represents the apex of a long (approximately 15 years) site selection process that has reduced the number of potentially interested and appropriate communities from 22 to two, a process that has been conducted with exemplary engagement, fairness and transparency.

Taking the final step – selecting a single site – will be a hinge moment in the life of the organization. It will be the culmination of years of consultation and examination, and it will result in a major shift for the NWMO into a qualitatively different phase of its operations – implementation.

To succeed in this transition, the partnership agreements the NWMO develops with the selected site communities – Indigenous and non-Indigenous – must be robust, reflecting a deep commitment and a resilience that are the product of strong mutual trust. A critical underpinning of this trust will be the demonstration by the NWMO that the plan it has developed for dealing with used nuclear fuel is safe from all technical and social perspectives, and is recognized as such by participating communities.

What is needed: Clarity and coherence of policy and regulatory expectations by the Government of Canada

In our last report, the Council stressed that the success of APM relies on the continuing and steadfast commitment of the Government of Canada to this technical and management approach. We note that the government reaffirmed its 2007 commitment to APM on June 23, 2022, in its [response](#) to the NWMO's 2021 Annual Report. We continue to regard this continuing commitment as essential to success.

The government has stated that nuclear power will play a significant role in helping Canada meet its commitment of net-zero emissions by 2050. APM is integral to not only managing the nuclear fuel that has already been used, but also to conversations about Canada's green energy future.

As the NWMO moves into the next phase of its work and selects a single site for the repository, the Council feels compelled to strongly advise the Government of Canada to provide increased clarity and coherence of government policy and regulatory expectations, as outlined in Sections 3.2.3 and 3.2.7, as well as its continuing, visible support for APM.

Both will be crucial to achieve the safe and responsible, long-term management of Canada's nuclear waste.

**For more information,
please contact:** Nuclear Waste Management Organization
22 St. Clair Avenue East, Fourth Floor
Toronto, Ontario M4T 2S3, Canada
Tel.: 416.934.9814 Toll free: 1.866.249.6966
Email: contactus@nwmo.ca
Website: www.nwmo.ca

   @nwmocanada
 /company/nwmocanada



NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

© 2023 Nuclear Waste Management Organization