

Implementing Adaptive Phased Management 2024-28

March 2024

*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 more than 20 years.

We further acknowledge that today we are working in northwestern Ontario in the traditional territory of Wabigoon Lake Ojibway Nation with the communities 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 with 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 support well-being in the communities with which we work.

Table of contents

Welcome	1
Vision, mission and values	2
Commitment to transparency	3
Introduction to the NWMO	4
Planning timelines	8
Selecting a site	9
Key components of the repository	10
Centre of Expertise	12
Reconciliation and Indigenous Knowledge	13
Cost and funding	16
Keeping abreast of the external landscape and adapting to change	18
Planning priorities	20
Sound governance and accountability	36
Glossary	39
What we heard	41
Share your thoughts	44

Welcome

Welcome to *Implementing Adaptive Phased Management 2024-28*.

This is the five-year strategic plan for the Nuclear Waste Management Organization (NWMO) as we implement Canada’s plan for the safe, long-term management of used nuclear fuel.

Vision, mission and values

In 2024, the NWMO will undertake work to refresh our vision, mission and values to reflect the evolving nature of our work as we prepare to:

- Complete the [site selection process](#) for Canada’s plan for used nuclear fuel; and
- Develop a new site selection process for Canada’s plan for [intermediate-level and non-fuel high-level radioactive waste](#).

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. The NWMO is also responsible for implementing the plan for Canada’s intermediate-level and non-fuel high-level radioactive waste.

Values

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

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 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.

This document describes the NWMO's work implementing Canada's plan for the safe, long-term management of used nuclear fuel. It also outlines next steps in developing plans for managing intermediate-level and non-fuel high-level radioactive waste, which became part of the NWMO's mandate in 2023.

We continue to work with communities, including Indigenous Knowledge Holders, to ensure our work is guided by the responsibility to protect people and the environment, including water, for generations to come.

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 7, 2024.

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 2024-28
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. 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 Canada's nuclear fuel cycle.

We are responsible for 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.

Since our inception in 2002, the Government of Canada has entrusted us with this significant responsibility. At present, Canada's used nuclear fuel is safely stored at licensed, above-ground facilities. However, this approach is temporary and inappropriate for the very long time frames the material must be contained and isolated.

Canada's plan for used nuclear fuel, which follows an approach known as Adaptive Phased Management, 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 chose Adaptive Phased Management as the nation's plan for the safe, long-term management of Canada's used nuclear fuel. Since then, we have been diligently working towards this objective.

Now, we are ready for what is next, including a significant milestone in 2024, when we anticipate selecting a site for the repository, after which we will enter the regulatory decision-making process.

Two potential siting areas remain in the process: the Wabigoon Lake Ojibway Nation-Ignace area in northwestern Ontario and the Saugeen Ojibway Nation-South Bruce area in southern Ontario. 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.

As this implementation plan demonstrates, we are preparing for this decision through ongoing community engagement and safety assessments, as well as environmental and technical studies. This will help to ensure potential host communities can make an informed and willing choice and that we are well-prepared for the regulatory decision-making process.

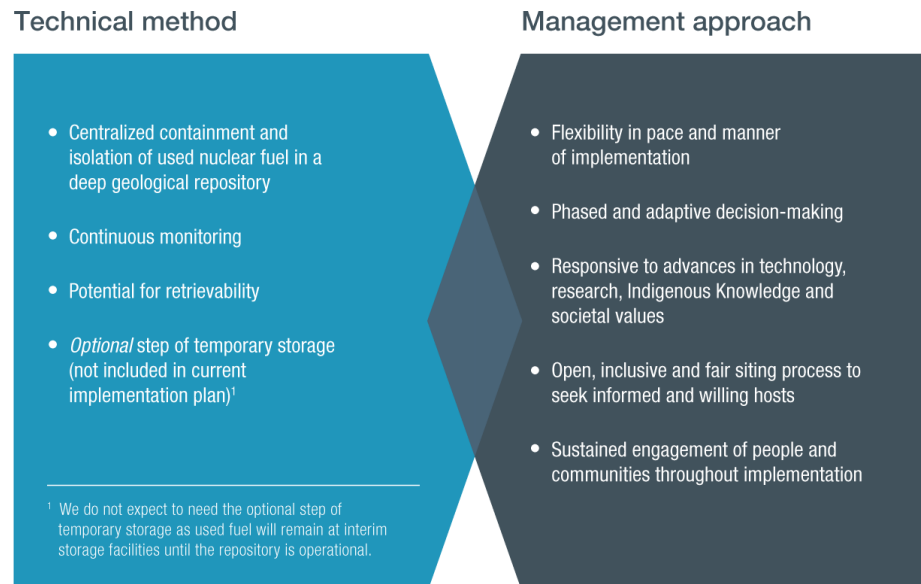
Site selection will also mark a turning point for our organization. Over the next five years, our organization will transform, including developing a plan to transition staff to the selected siting area. This will be occurring alongside further site characterization activities to ensure that the project is safe. The transition plan will also ensure that new investments contribute to community well-being and that we are ready for the regulatory decision-making process. Throughout this process, we will be focused on providing local job and contracting opportunities and continuing to invest in community well-being.

As Canada's plan advances, we will also be proudly taking on a new endeavour. In 2023, the Government of Canada endorsed the NWMO's recommendations within the Integrated Strategy for Radioactive Waste. Now, we will be responsible for the long-term management of intermediate-level and non-fuel high-level radioactive waste.

This new mandate represents an exciting new era and is a testament to both our technical expertise and experience in engaging Canadians and Indigenous peoples. Starting in 2024, we will begin developing the consent-based siting process for the deep geological repository recommended for intermediate-level and non-fuel high-level waste.

Throughout all our work, we remain dedicated to safeguarding people and the environment, including water, for generations to come. We are committed to meeting or exceeding all applicable regulatory standards and requirements as our project is regulated by the Canadian Nuclear Safety Commission in cooperation with other federal, provincial and municipal government departments and agencies.

Canada's plan for used nuclear fuel: Adaptive Phased Management



Adaptive Phased Management 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.

Canada's Integrated Strategy for Radioactive Waste

In June 2023, the NWMO submitted the Integrated Strategy for Radioactive Waste (ISRW) to the Minister of Energy and Natural Resources for consideration. The Minister then endorsed our recommendations in October.

The federal government first asked the NWMO to lend our technical and public engagement expertise towards the development of an integrated strategy in 2020. All Canada's radioactive waste, including used fuel and non-fuel waste, is safely stored today. While the vast majority of Canada's radioactive waste has long-term disposal plans, before the integrated strategy was developed, there were some gaps — particularly for low-level, intermediate-level and a small amount of non-fuel high-level waste.

The strategy — a first-of-its-kind for Canada — had two key recommendations:

- The disposal of low-level radioactive waste in multiple near-surface disposal facilities, with waste generators and waste owners managing implementation; and
- The disposal of intermediate-level and non-fuel high-level radioactive waste in a deep geological repository, to be implemented by the NWMO.

The integrated strategy was built through more than two years of engagement with Canadians, Indigenous peoples, waste generators and waste owners, as well as studies of both technical considerations and international best practices.

With the endorsement of the Minister and support of our members, the NWMO has started developing a consent-based siting process for the deep geological repository recommended for intermediate-level and non-fuel high-level radioactive waste. This planning process is expected to conclude in 2025.

The siting process will require informed, willing hosts. Communities that have participated in the siting process for the deep geological repository for used nuclear fuel may wish to participate in this new siting process. As these activities get underway, we will share updates in future editions of this implementation plan.

Planning timelines

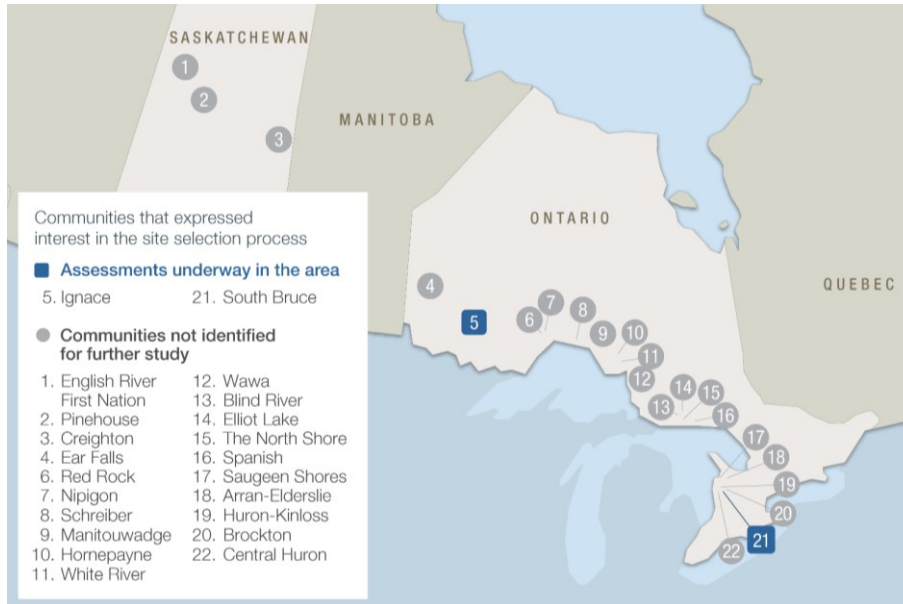
By working collaboratively with communities, universities and research institutions, regulatory bodies, international waste management organizations and the broader nuclear industry, the NWMO continued to make progress on implementing Canada’s plan for used nuclear fuel in 2023. We remain on track towards site selection in 2024 and ready for the regulatory decision-making process that will follow. The timelines that follow capture the progress to date, since the NWMO’s inception in 2002, as well as the anticipated timeline for future phases.

As we advance plans for intermediate-level and non-fuel high-level waste, we will publish timelines accordingly.

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 (via the <i>Report of the Standing Committee on Environment and Sustainable Development on Canada and Radioactive Waste Management</i>).
	2024	The potential host communities determine willingness. 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).
	2031	The Licence to Construct application is submitted to the CNSC.
	2033	The Licence to Construct is granted (estimate). 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.



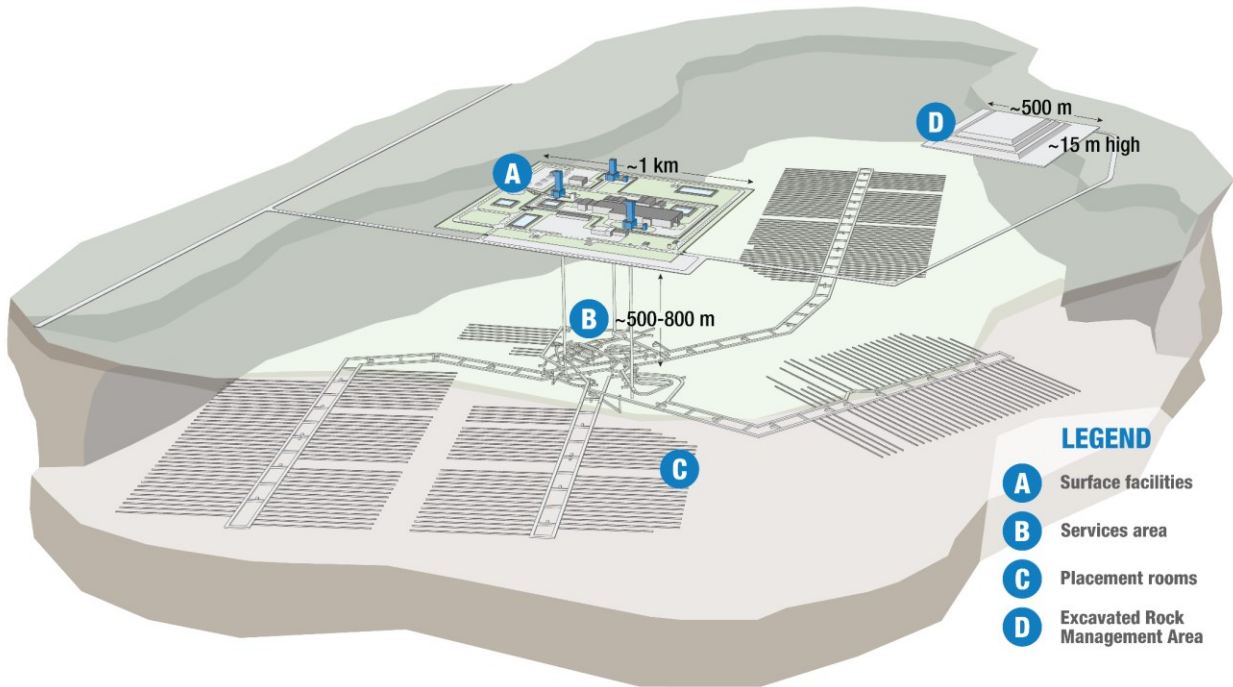
We initiated the site selection process in 2010, and over the subsequent two years, 22 municipalities and Indigenous communities voluntarily expressed interest in learning more and exploring their potential to host the project.

We gradually narrowed our focus to two potential sites. This was done through extensive social engagement to assess the potential to build supportive and resilient partnerships within the areas. We also completed technical site evaluations to assess the safety of those sites and ability to transport used nuclear fuel to them. Both potential sites are in Ontario: one in the Wabigoon Lake Ojibway Nation-Ignace area in northwestern Ontario and one in the Saugeen Ojibway Nation-South Bruce area in southern Ontario.

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 one of the repository sites under consideration. The proposed site in the Wabigoon Lake Ojibway Nation-Ignace area is located in crystalline rock, while the proposed site in the Saugeen Ojibway Nation-South Bruce area is in sedimentary rock.

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 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 a 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.

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 2031.

We will also adapt to changes in technology, experience and learnings from nuclear waste management programs in other countries, and decisions about nuclear power generation that could change the volume or type of fuel to be managed such as small modular reactors (SMRs). For more information about how the NWMO will account for future decisions about nuclear generation in Canada, please see the section [Keeping abreast of the external landscape and adapting to change](#).

As of the end of 2023, the repository design is 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. Additionally, both potential sites have the capability for expansion of the underground to accommodate additional inventory.

[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. It will highlight the NWMO's commitment to sustainability, demonstrating environmental responsibility and resource efficiency throughout its design and operation.

The centre will also 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. It 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 the selected siting area, 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.

The detailed design will begin once the site is selected in 2024, with tendering for construction to follow. The NWMO's mobilization plans, including moving staff to the selected siting area, will also support the Centre of Expertise. Communities will be engaged throughout the programming, design and other steps up to and beyond the Centre of Expertise's grand opening.

This artist rendering shows one possible design for a Centre of Expertise in the Wabigoon Lake Ojibway Nation-Ignace area, based on early community input.



This artist rendering shows one possible design for a Centre of Expertise in the Saugeen Ojibway Nation-South Bruce area, based on early community input.



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 Elders and Youth, 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.

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.

As the NWMO's Reconciliation journey evolves, we will continue to plan strategically and thoughtfully to meet and exceed our commitments to co-creating a better future. In 2023, the NWMO created a three-year Reconciliation strategy (2024-26), focused on four key areas: learning, action, relationship and healing.

The NWMO 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 use our Reconciliation assessment tool to review key NWMO documents, including policies and engagement strategies. This tool is also used outside the organization. As an example, some of our partner universities apply this lens as they expand research programs related to our work.

Interactive learning sessions, group dialogue and experiential learning opportunities are just a few of the ways that the NWMO continues to support our collective Reconciliation journey.

We also provide employees with a Reconciliation tool kit that is designed to complement existing learning sessions and encourage staff to reflect on the impacts their contributions to Reconciliation will have on co-creating a better future for all.

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.

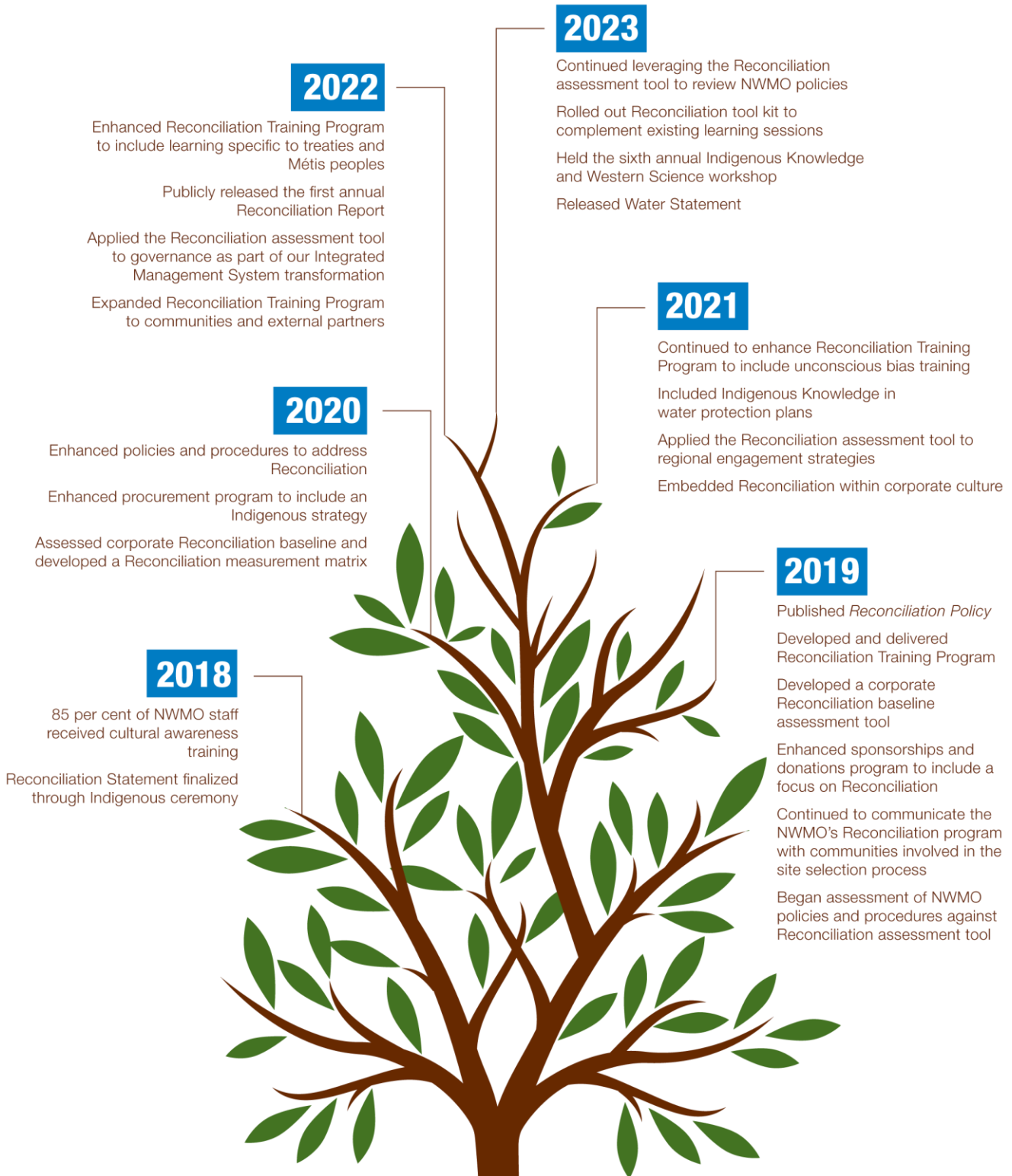
“The NWMO respects the truth that Indigenous women have a sacred and spiritual relationship with water — birth waters, fresh waters, sky waters and ocean waters — and because of that special role, their voice is integral to any work related to water protection.”

— NWMO Water Statement

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.

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.

NWMO RECONCILIATION JOURNEY



Cost and funding

Canadians 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 Annual Report 2023](#). 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 2024		
Owner	Trust fund balance (\$ million)	Deposit to trust funds (committed and future bundles) (\$ million)*
	December 2023	2024
OPG	4,867	86
NBP	207	6
HQ	183	0
AECL	76	0.4
Total	5,333	93

** Annual trust fund deposits are required to be made within 30 days of the submission of the annual report. A deposit date of April 25 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 3.3 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 updates the lifecycle cost estimate every five years and completed an update of the cost estimate for the project in 2021, with the next update planned for 2026. 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 was the anticipated volume at the end of the planned operation of Canada's existing nuclear reactors in 2020. 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 the initial investment of \$4.5 billion (in 2020 dollars) in construction costs over a 10-year period, as well as 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 advances in technical learning, international best practices, ongoing input from the public, insight from Indigenous Knowledge, changes in public policy and evolving societal expectations and values. 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 for used nuclear fuel. Both transportation planning documents were designed to advance these conversations and provide more information on how we plan to safely transport used nuclear fuel.

In addition, in Canada, the nuclear sector is actively exploring emerging nuclear technologies, including new reactors, small modular reactors (SMRs), fuel reprocessing (sometimes referred to as recycling) and other types of advanced reactors.

These emerging technologies may result in different types of used fuel. We are monitoring these developments closely and are in dialogue with multiple reactor proponents to help us prepare for decisions that could change the volume and type of used fuel we are responsible for managing.

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 in the future.

As of the end of 2023, the NWMO is aware of three SMR projects in the licensing process. Ontario Power Generation is working together with GE-Hitachi Nuclear Energy to deploy a SMR at the Darlington new nuclear site. Global First Power is working to construct a SMR at Chalk River Laboratories in Ontario, a site owned by Atomic Energy of Canada Limited and managed by Canadian Nuclear Laboratories. New Brunswick Power is working with Advanced Reactor Concepts Clean Technology Inc. to construct a SMR at its Lepreau site in New Brunswick. The first project is seeking a licence to construct. The other two projects have initiated the process for environmental or impact assessment and a licence to prepare site. Additionally, Bruce Power is planning to commence the impact assessment in 2024, for up to 4,800 MW of new nuclear generation on the existing Bruce Site.

We continue to monitor these and other potential projects. As they advance, we will make appropriate changes to our plans.

There is international scientific consensus that deep geological repositories represent the best practice for the long-term management of used nuclear fuel, including that from SMRs and 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 update an annual [watching brief on advanced fuel cycles and alternative fuel 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, transition to site, the 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.

**IDENTIFY A SINGLE,
PREFERRED SITE
FOR THE DEEP
GEOLOGICAL
REPOSITORY**

**INITIATE
REGULATORY
DECISION-MAKING
PROCESS**



ENGINEERING

- » Complete conceptual site-specific facility designs to support regulatory decision-making;
- » Initiate preliminary repository design work to support construction licence application; and
- » Continue optimization of the engineered-barrier system, based on research and international experience, to support construction and operations of the deep geological repository.



SITE ASSESSMENT

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



SAFETY

- » Continue development of 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 enhance technical confidence to support the regulatory decision-making process.

RECONCILIATION AND INDIGENOUS KNOWLEDGE



TRANSITION TO SITE

- » 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 contracting for construction of the Centre of Expertise.



**REGULATORY
DECISION-MAKING PROCESS**

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



PARTNERSHIP

- » 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.



TRANSPORTATION

- » 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.

ENGINEERING

The NWMO will:

- Complete conceptual site-specific facility designs to support regulatory decision-making;
- Initiate preliminary repository design work to support construction licence application; and
- Continue optimization of the engineered-barrier system, based on research and international experience, to support construction and operations of the deep geological repository.

The deep geological repository is an internationally recognized approach for the safe, long-term management of used nuclear fuel, based on scientific consensus. 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 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 to achieve a future construction licence application.

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

In the period from 2024 to 2028, the NWMO will also:

- Maintain a 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, Used Fuel Packaging Plant and engineered-barrier design.

SITE ASSESSMENT

The NWMO will:

- Continue geoscientific investigations and environmental baseline monitoring and analysis at both sites; and
- Begin additional geoscientific investigations and baseline data collection and analysis 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 will have been completed with suitable information to select a site.

After site selection, site characterization will continue at the selected site to support the regulatory decision-making process and inform the geoscientific, engineering, environmental and safety assessments that will be needed to apply for a construction licence.

To ensure we appropriately include Indigenous Knowledge, we will continue to 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.

Working with municipalities, First Nation and Métis communities, and others in the siting areas, we continue to 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.

In the period from 2024 to 2028, 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 regulatory process and preliminary engineering for the future construction licence application;
- Support the preparation of the initial project description and assessments needed for the regulatory process; and
- Engage communities on specific topics such as safety of people and the environment, project benefits and stewardship of the land.

SAFETY

The NWMO will:

- Continue development of 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 enhance technical confidence 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. This is reflected in our [Sustainability Statement](#) released in 2023. This foundational statement outlines our organization's commitment to sustainability, which has always been integral to our identity, and acknowledges that the actions we take to implement our mandate will have an impact on the future.

Over the next five years, we will develop and implement a comprehensive sustainability program, encouraging innovation and ensuring that recommended actions represent all our values, including Reconciliation. We will establish precise targets, thresholds and sustainability metrics, along with public reporting structures, and we will update the program to reflect commitments made during the impact assessment process.

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 and revised in 2024, provide a summary of evidence that a deep geological repository can be safely constructed at either potential site. After a site with informed and willing hosts is selected, further technical studies 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 2024 to 2028, the NWMO will also:

- Develop site-specific pre-closure and post-closure safety assessments for the selected site. Iterative updates of these assessments will be prepared to include the latest siting and design information;
- Continue testing and calibration of safety assessment codes and models;
- 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 to 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; and
- 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.

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 recognizes, acknowledges and incorporates the questions, concerns and wisdom that people bring forward. Safety from a social perspective must necessarily be rooted in multiple ways of knowing, inclusive of Indigenous Knowledge, western science and other wisdom that is brought to bear through our dialogue with communities.

There are many elements of safety from a social perspective. Adaptive Phased Management itself was founded on the concept of safety from a social perspective. 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.

Conversations were held with thousands of individuals across the country and representatives of organizations at local, provincial, national and international levels. 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 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 the [site selection process](#) we launched in 2010 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.

As identified above, safety from a social perspective is rooted in multiple ways of knowing. We demonstrate this with a particular emphasis on our Reconciliation journey by seeking alignment with Indigenous Knowledge (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, public surveys and focus groups. 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 annually publish 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:

- Developing a framework for safety from a social perspective that is rooted in the principles of trust, relying on multiple ways of knowing, supporting community well-being and achieving meaningful outcomes;
- 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;
- Supporting 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 such as 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.

The NWMO is committed to continuing our work to better understand and address safety from a social perspective through the eyes of the communities we work with, which will help to strengthen communities’ role within the project as we move into the regulatory decision-making phase.

TRANSITION TO SITE

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 contracting for construction of the Centre of Expertise.

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 evolve our team, the NWMO will continue 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 infrastructure in place to support Canada's plan.

In the period from 2024 to 2028, 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;
- Build a stronger local presence in the selected siting area, while providing local contracting opportunities for the project;
- Work with communities on housing and infrastructure needs and timing to support the transition of our 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 project; and
- Continue to strengthen our corporate culture through appropriate organizational behaviours, standards and tools, including the use of technology platforms. This includes developing a nuclear safety culture, 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 we have 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 for used nuclear fuel 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 2024 to 2028, 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;
- Use information technology tools and technology to automate processes, support strategic initiatives, and digitize information, content and records;
- Develop a commercial strategy for the labour, goods and services necessary for the next phase of work;
- Continue to strengthen our project management information system to support the execution and monitoring of our projects; and
- Apply 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. Once we complete the site selection process, we will begin the rigorous regulatory decision-making process, through which the NWMO's understanding of the safety of the repository will be independently confirmed.

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.

To ensure we are well-prepared, the NWMO monitors and adapts our activities to all regulatory changes that affect the project. For example, we will adapt our plans to meet any changes that arise from the revision of the *Impact Assessment Act*. We will also adapt to adhere to the guidance issued by the regulators, as well as best practices as developed on other projects that are in regulatory decision-making processes.

We will 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. Within the next few years, we expect the CNSC will issue additional guidance on what information it will need to independently confirm the safety of the proposed deep geological repository for used nuclear fuel.

In the period from 2024 to 2028, the NWMO will also:

- Solicit input from municipal and Indigenous communities on deliverables in support of the integrated impact assessment;
- Continue to collect information and work with communities and others to enhance our understanding of the current local and regional conditions, including collaboration with Indigenous communities to seek alignment of 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 and respond to their issues and concerns respecting the safety of the repository, including how we will mitigate risk of harm to the environment in our designs and programs;
- Support the preparation of the initial project description and assessments needed for the regulatory process;
- 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;
- Initiate the federal impact assessment and CNSC licensing process; and
- Prepare and submit the reports to achieve 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.

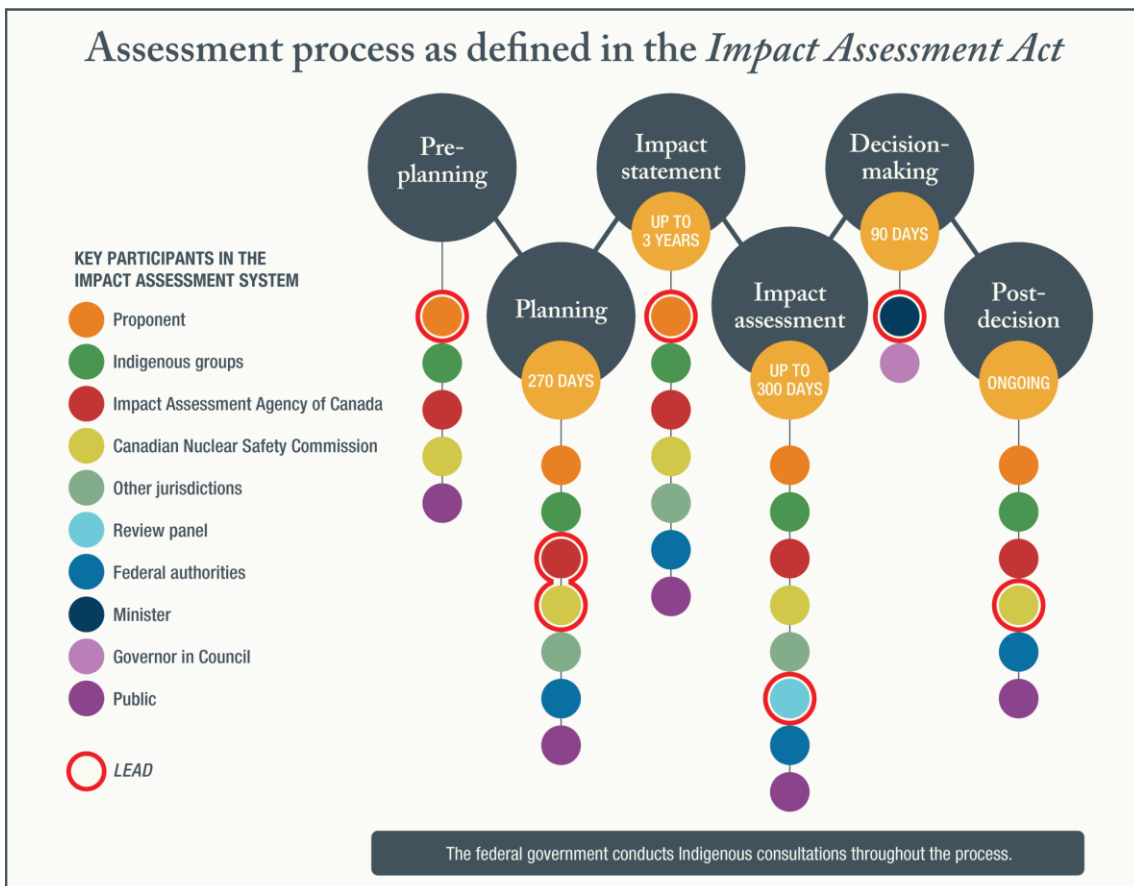
There are two integrated regulatory decision-making processes:

- 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 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 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.

In 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.

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.

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



In Ignace, the conversation around a values and principles exercise continues 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.

In the period from 2024 to 2028, the NWMO will also:

- 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;
- 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; and
- 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.

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 in Canada.

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.

For example, in 2023, the NWMO initiated studies to update the [Preliminary transportation plan](#), first published in 2021. Transportation planning and evaluations over the 2024-28 period will fully address regulatory requirements for safely transporting used nuclear fuel through different provinces.

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.

Once a site is selected, more detailed technical and social engagement planning activities will begin. 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 considering seven generations in Indigenous worldview.

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 practicable. We have heard concerns around transportation safety, transportation package performance and emergency framework. The NWMO is working to address these concerns through continued engagement activities and considering this feedback in development of the Used Fuel Transportation System design.

In the period from 2024 to 2028, 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 operational 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.

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 Energy and 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 Elders and Youth

The [Council of Elders and Youth](#) 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;
- Geoscientific Review Group;
- Environmental Review Group; and
- Site Selection Review Group.

As we move beyond our site selection milestone, we will review the role of these groups. 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 Energy and 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 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.

High-level waste includes mostly used nuclear fuel, and there is a very small amount of non-fuel high-level waste that comes from other activities such as medical isotope production. This waste generates a significant amount of heat and radioactivity and requires containment and isolation for hundreds of thousands of years in a deep geological repository.

Intermediate-level waste includes used components such as filters, resins and pumps from power plants, research reactors and medical isotope manufacturers. This waste produces minimal heat, but requires a higher level of containment and isolation for longer time periods than is needed for low-level waste.

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.

Low-level waste mostly comes from power plants, and medical, academic, industrial and other commercial uses of radioactive materials (e.g., mop heads, rags, paper towels). These items do not produce heat and contain radioactive levels that require containment and isolation for up to a few hundred years.

Safety in this document 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 2023, the NWMO published *Implementing Adaptive Phased Management 2023-27*, updating the previous five-year version of this annually updated plan. By also distributing a survey about the implementation plan digitally, we have sought to make it easy for the public to review and comment on Canada's plan for used nuclear fuel, supporting our commitment to transparency. We heard from hundreds of Canadians and Indigenous peoples, largely from northwestern and southern Ontario, including within the two remaining siting areas.

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 at informational events, through social media and other digital channels. As the survey was open to all interested parties rather than focusing on a representative sample, 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 2023 were slightly lower than in 2022. However, the total number of completed surveys increased (rather than partial survey completions). We received 632 total responses with a 37 per cent completion rate (compared to 19 per cent in 2022). Most (73 per cent) of the respondents were based in Ontario, with 15 per cent from the northwestern area and 18 per cent from the southern area.

The survey about our implementation plan 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 a range of subject-matter experts and all levels of government representatives.

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 in the implementation plan survey.

Confidence in the NWMO

Respondents to the survey expressed noticeably higher confidence in the NWMO than in previous years. Overall, more than three in five respondents (62 per cent) reported feeling confident in the NWMO after reading the implementation plan, an increase over 2022.

Confidence in southern Ontario is higher than in northwestern Ontario, although perceptions in the northwest are greatly improving.

To build on this confidence, we will continue to expand our ongoing communications efforts, including targeted outreach within the two remaining potential siting regions. This builds on work completed in 2023. In South Bruce, we designed and executed the South Bruce Doorstep Discussion Initiative — our first-ever door-to-door campaign to enhance our outreach efforts within the municipality. Over the course of the summer, we visited close to 1,000 residents, successfully increasing the NWMO’s visibility, building on existing relationships and beginning many new ones.

In the northwest, our team held 11 “Get to know the NWMO” sessions at several community venues, purposefully expanding our engagement efforts outside our own Learn More Centre. Many of these events featured third-party speakers, offering opportunities for community members to hear from experts outside the NWMO about the project and its potential benefits.

Communication within the implementation plan has been well-received, with close to three-quarters describing it as “excellent” or “good.” Respondents commonly describe the implementation plan as understandable, clear and transparent.

Indigenous Knowledge and Reconciliation

As in years past, the majority of respondents told us they share Indigenous Knowledge and Reconciliation as a priority, and they want us to communicate more about the steps in our Reconciliation journey. Among respondents, 58 per cent reported feeling confident in the NWMO’s ability to align with Indigenous Knowledge and our commitment to Reconciliation. At the same time, we continue to hear concerns about these topics.

In response, the NWMO will continue to share information about the role of Indigenous Knowledge in our work, engage with Indigenous communities and work towards building trust and meaningful partnerships. We remain committed to our ongoing Reconciliation journey, working with Indigenous peoples, learning from Indigenous Knowledge and applying these learnings to our work to successfully implement the safe, long-term management of used nuclear fuel. We also conduct mandatory staff Reconciliation training and continuous learning opportunities, informal training opportunities, staff support systems and community-driven work plans.

Safety

Safety remains a top priority for the NWMO — and it was ranked as the most important priority for survey respondents.

Understanding of safety increased since last year. In total, 83 per cent of respondents reported understanding the safety approach.

Most comments from respondents were linked to general opposition and safety concerns — such as expressing the view that the project is inherently unsafe — and that “the NWMO is unable to guarantee safety.” Respondents also shared environmental and transportation concerns.

The NWMO engages directly with residents to address questions and concerns, and uses communications campaigns to share information on safety-related topics.

The NWMO is committed to ensuring the project is safe from a conventional, social, cultural and environmental perspective.

In 2024, we plan to revise our [Confidence in safety](#) reports to reflect additional technical analyses completed after they were first released in 2022. The reports provide a summary of evidence that a deep geological repository can be constructed at either potential site. They reflect years of research and fieldwork, and provide detailed results that show why the NWMO is confident that both siting areas are suitable for the safe, long-term management of used nuclear fuel.

After a site with informed and willing 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.

Transportation

Transportation remains an important priority for the NWMO, and survey responses indicate public understanding of this priority has increased slightly since last year. In northwestern Ontario, 71 per cent of respondents reported understanding the transportation approach, while in southern Ontario, 86 per cent of respondents reported understanding it. Positive sentiment about transportation also increased over 2022.

However, there is still a persistent concern that transportation of used nuclear fuel could be dangerous. Respondents expressed concern about the safety of transportation, particularly due to traffic accidents and road conditions, especially on highways. Transportation continues to be a concern expressed, especially by respondents in the north.

The NWMO is continuing to engage with the public on transportation, hear concerns and answer questions related to safety. In 2023, we conducted a number of studies to build on the [Preliminary transportation plan](#) and the [transportation planning framework](#), released in 2021. These include confidence in Used Fuel Transportation Package performance and transportation mitigation.

Looking forward, 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, taking into consideration factors such as evolving best practices, new technologies, ongoing adaptation and continuous improvement.

Engineering

This year's survey showed most respondents understand and feel positive about the NWMO's engineering program, ranking it as one of the best understood priorities. Specifically, 83 per cent of respondents said they understand this priority, and 76 per cent expressed a positive or neutral sentiment about it.

Respondents noted the robustness of the plan as a positive, while also expressing interest for greater research, to address safety concerns.

The NWMO has continued to collaborate closely with academics, government and international organizations as we advance the repository design. In 2023, for example, we concluded pressure testing of the Used Fuel Container, a key engineered barrier in the repository design, building on the success of a full-scale demonstration completed in 2022.

Canada's use of a deep geological repository is consistent with international best practice. This approach is the culmination of decades 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

**Take the
implementation
plan survey**



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

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 7, 2024.



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 2024-28
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, ON M4T 2S3, Canada
Tel.: 416.934.9814 Toll free: 1.866.249.6966
Email: contactus@nwmocanada
Website: nwmocanada.ca

   @nwmocanada
 /company/nwmocanada

nwm○

NUCLEAR WASTE MANAGEMENT ORGANIZATION SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

© 2024 Nuclear Waste Management Organization