

NUCLEAR WASTE SOCIÉTÉ DE GESTION DES DÉCHETS

IMPLEMENTING ADAPTIVE PHASED MANAGEMENT 2022 TO 2026

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 many 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 Wabigoon Lake Ojibway Nation traditional territory with Wabigoon and the Township of Ignace.

In southern Ontario, we are working in the Saugeen Ojibway Nation (SON) traditional territory 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 and pledge to do our part to encourage wellbeing in communities with which we work.

1

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	11
Reconciliation and Indigenous Knowledge	12
Cost and funding	15
Keeping abreast of the external landscape and adapting to change	17
Planning priorities	18
Developing a Canadian Integrated Strategy for Radioactive Waste	30
Sound governance and accountability	31
Glossary	33
What we heard	35
Share your thoughts	39

Welcome to Implementing Adaptive Phased Management 2022 to 2026.

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.



3

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

The NWMO is committed to transparency.

In fact, it is one of our core values. This annual implementation plan is one way we demonstrate that commitment. These plans are living documents. They evolve and grow over time. Each year, we update our plans 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.

Despite the COVID-19 pandemic that endured through 2021, the NWMO has remained focused on advancing Canada's plan for the safe, long-term management of used nuclear fuel, while also protecting both our employees and the public. The pandemic continued to challenge us to adapt to evolving circumstances. Canada's plan is designed to be adaptive; this principle is woven into the fabric of our organization, and we found innovative ways in 2021 to maintain our momentum.

At times throughout the year, we pivoted between in-person and virtual collaboration, based on the latest public health guidance. When necessary, our collaborative work happened virtually, to protect health and safety of both the communities we work with and our staff. 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 learned will help guide our implementation plan in the future should we face similar challenges.

As we look towards the future, we will continue to expand the ways people interested in Canada's plan can engage with us. Building on what we learned during the pandemic, we are better equipped than ever to engage audiences at a distance.

Innovation during the pandemic extended beyond our virtual work. For example, early in the pandemic, working together with key partners and vendors, we determined how to resume manufacturing and inspecting physical prototypes of the containers and equipment we are developing, using virtual and remote processes. As the pandemic progressed, we were able to put in place appropriate health and safety measures to resume in-person collaboration where it was needed.

Flexibility supports our progress. In spite of the challenges of the pandemic, we continued to maintain momentum – in spring 2021, borehole drilling work restarted in the Wabigoon-Ignace area and began in the SON-South Bruce area. Before the end of the year, drilling was completed in the Wabigoon-Ignace area. Testing and analysis of core samples from both areas is now well underway.

We remain on track to meet our expected site selection date of 2023 – an important milestone in Canada's plan. Challenges due to the pandemic were addressed, and long-term timelines for construction and the start of operations also remain unchanged.

Late in 2020, the Minister of Natural Resources Canada asked us to lead a separate engagement process with Canadians and Indigenous peoples to develop an Integrated Strategy for Radioactive Waste. The focus of this work is on low- and intermediate-level waste for which there are no long-term plans in place. In 2021, we heard from communities across Canada, Indigenous peoples, academics, a wide range of interest groups and technical experts. Their input will inform practical recommendations to the Canadian government on a comprehensive radioactive waste management strategy.

Throughout this report, you can read how the NWMO is working with communities to ensure Canada's plan respects the unique character of the future repository site. 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. 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. Our feedback form for the implementation plan can be found online.

We invite you to visit www.nwmo.ca/implementationplan and share your thoughts until June 10, 2022.

You may also email us at learnmore@nwmo.ca or send us a letter. Please include your name, mailing address and contact information in any written response.

Your response should be addressed to:

Lisa Frizzell Vice-President of Communications, NWMO Re.: Implementation Plan 2022-26 22 St. Clair Avenue East, Fourth Floor Toronto, ON M4T 2S3 Canada

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*. 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 solution today and not leaving it for future generations.

Canada's plan for used nuclear fuel, 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 2023. Getting to site selection will require building on all the work we have done for nearly 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)

Technical method

- Centralized containment and isolation of used nuclear fuel in a deep geological repository
- Continuous monitoring
- Potential for retrievability
- Optional step of temporary storage (not included in current implementation plan)¹

We do not expect to need the optional step of temporary storage as used fuel will remain at interim storage facilities until the repository is operational.

Management system

- Flexibility in pace and manner of implementation
- Phased and adaptive decision-making
- Responsive to advances in technology, research, Indigenous Knowledge, and societal values
- Open, inclusive and fair siting process to seek informed and willing hosts
- Sustained engagement of people and communities throughout implementation

APM is both a technical method (what we plan to build) and management system (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 system involves phased and adaptive decision-making, supported by public engagement and continuous learning.

A safe and secure transportation system will also 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

Despite the enduring COVID-19 pandemic, the NWMO's work moved forward in 2021, successfully recovering the schedule for site assessment activities that were delayed in 2020 due to work shutdowns. We remain on track to meet our expected site selection date of 2023. Timelines for construction and the start of operations also remain unchanged.

Developing 20 Canada's plan		The NWMO is created.	
	2005	The NWMO completes three-year study with interested individuals, including specialists, 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 to 2009	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	2010	The siting process is initiated, with a program to provide information, answer questions and build awareness.	
siting process 2010 to 2015		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 to 2023	The NWMO expands assessment to include field investigations. Areas with less potential are eliminated from further consideration as the narrowing down process continues.	
	2023	A single, preferred site is identified.	
Towards construction	2023 2024	A single, preferred site is identified. Detailed site characterization begins. The project description is submitted, triggering the federal impact assessment. The Licence to Prepare Site application is submitted to the Canadian Nuclear Safety Commission (CNSC). An updated transportation planning framework is issued (updated every three years).	
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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 next two years, 22 municipalities and Indigenous communities voluntarily expressed interest in learning more and exploring their potential to host the project. Over time, we gradually narrowed our 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.

Today, our siting activities are focused on two remaining areas, both located in Ontario – the Wabigoon-Ignace area in the northwest and the SON-South Bruce area in the south. Throughout 2021, we implemented more detailed technical evaluations at both sites. We advanced meaningful discussions with communities around partnerships and explored how the project can be implemented in a manner that will enhance community well-being. We remain on track to identify a single, preferred site by 2023.

As we advance the siting process, we maintain a fundamental commitment 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.

More information about the site selection process is available at www.nwmo.ca/sitingprocess.

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.

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.

The repository will include a centralized services area, which allows for ventilation underground through three shafts located within a single, secure area. The layout also includes multiple access tunnels that enable the placement rooms to be situated in areas with the most suitable 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 bentonite pellets.

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 Wabigoon-Ignace area would be located in crystalline rock, and in the SON-South Bruce area, it would be in sedimentary rock.

For a more comprehensive description of the project, please see *Description of a Deep Geological Repository and Centre of Expertise for Canada's Used Nuclear Fuel* at www.nwmo.ca/backgrounders.

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 become a hub for knowledge sharing across Canada and internationally, and will provide engagement opportunities for learning 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. The NWMO will work with local communities to develop a vision for the Centre of Expertise, in a manner that aligns with their requirements and aspirations.

The centre will initially be used to support the multi-year testing and assessment of the site in terms of technical safety 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 develop materials and equipment to be used in the repository, and to support the construction and operation of the facility.

An artist's rendering portrays one example of how the Centre of Expertise could look. The final design will be developed collaboratively with those living in the area.



Reconciliation and Indigenous Knowledge

The NWMO continues our commitment to understand, honour and interweave Indigenous Knowledge into all 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. This commitment is important not only to build good relations, but it is also an important demonstration of doing good and meaningful work in all the areas that we operate.

Over the next five years, the NWMO will continue to implement our *Reconciliation Policy* (2019) (www.nwmo.ca/reconciliationpolicy), measure our progress and interweave Indigenous Knowledge into our work. 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 education and management for staff on the history of Indigenous peoples.

Reconciliation

At the NWMO, we recognize the importance of building good relations with the Indigenous peoples on the lands where we work.

As part of establishing a solid foundation for working with Indigenous peoples, in 2019 the NWMO released our *Reconciliation Policy*, setting out how we will contribute to Reconciliation in all our work. Reconciliation enables the NWMO to build meaningful relationships with all communities involved in the siting process that are grounded in love, trust, honesty, humility, bravery, respect and wisdom. In step with the policy, the NWMO will continue to meaningfully engage with First Nation, Métis and municipal communities and organizations as we work together to implement Canada's plan.

The NWMO will also continue to recognize the truth of the historic wrongs and the challenges we have today, and seek opportunities to co-create a better future. The 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. Additionally, we will work with communities to support Reconciliation opportunities in their area.

This past year, the Indigenous Relations team worked with Reciprocal Consulting – an Indigenousowned firm specializing in Indigenous evaluation and monitoring – to create our annual Reconciliation report and Indigenous Relations dashboard, which will be evaluated 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 instil Reconciliation as a core value, which is reflected in how we act as an organization. As we move forward with the project, we will ensure that Reconciliation is considered in all our work.

We continue to apply our Reconciliation assessment tool to key NWMO documents. We have completed 13 reconciliation assessments of the NWMO's policies, as well as applied the tool to both regional engagement strategies and the Integrated Strategy for Radioactive Waste. We have also taken the assessment tool outside the organization to use it with some of our partner universities to apply this lens as they expand their research programs related to our work.

As part of our team's learning process, we identified areas of improvement for the assessment tool and revised it to be more user-friendly, provide more clarity and ensure it is more accessible to facilitate deeper dialogue. This will improve its effectiveness when we apply it in the future. Cultural awareness training is one way the NWMO supports our team's learning. As of December 2021, 95 per cent of the NWMO's staff have completed cultural awareness training and ReconciliACTION training (or Reconciliation training Part 1), and 80 per cent have completed Reconciliation training Part 2. Reconciliation training Part 3 was rolled out in fall 2021 as our Indigenous Relations training program continues to evolve.

The actions we take in implementing the *Reconciliation Policy* (2019) will demonstrate our contribution to this important movement towards change.

NWMO RECONCILIATION STRATEGY

2021 and beyond

Develop an Indigenous youth strategy that includes a scholarship program and recruitment strategy

Continue to enhance Reconciliation training to include unconscious bias training

Include Indigenous Knowledge in water protection plans

Apply the Reconciliation assessment tool to regional engagement strategies

Embed Reconciliation within corporate culture

2020

Enhanced policies and procedures to address Reconciliation

Enhanced procurement program to include an Indigenous strategy

Assessed corporate Reconciliation baseline and developed a Reconciliation measurement matrix

2019

Published Reconciliation Policy

Developed and delivered Reconciliation training program

Developed a corporate Reconciliation baseline assessment tool

Enhanced sponsorships and donations program to include a focus on Reconciliation

Continued to communicate the NWMO's Reconciliation program with communities involved in the site selection process

Began assessment of NWMO policies and procedures against Reconciliation assessment tool

2018

85 per cent of NWMO staff received cultural awareness training

Reconciliation Statement finalized through Indigenous ceremony

Indigenous Knowledge

The NWMO is committed to interweaving Indigenous Knowledge into all our work. Important teachings from Indigenous Knowledge Keepers have guided 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.

For example, when identifying a borehole location, Indigenous Knowledge – including ceremony – contributed to the decision-making process alongside geoscientific studies and environment studies. Additionally, at both potential sites, local Indigenous experts work with us to ensure Indigenous protocols guide our field activities. This creates a safe space for western scientists and Indigenous Knowledge Keepers to learn together on the land, which we will continue to facilitate as the project moves forward.

In 2021, we again hosted two workshops that provided opportunities to explore the intersections between Indigenous Knowledge and western science. Participants at these workshops included Indigenous Knowledge Keepers, Elders, scientists, industry professionals and NWMO employees.

Workshop discussions explored the sacred relationship and stewardship role Indigenous Knowledge Keepers have with water and the commonalities that exist within western science perspectives. We explored why water governance is important, and the roles of sustainability, climate change and environmental stewardship within water governance initiatives, from both Indigenous worldview and non-Indigenous perspectives. We learned that water governance needs to be inclusive of water protection and that we need to restore the wrongs that have been done to water.

We also learned that water has a story to tell, and it is our responsibility to listen and learn from that story. Water has life-giving forces, and with that, come certain duties and responsibilities to ensure that it is respected, protected and nurtured. All attendees were encouraged to start to build a personal relationship with water.

We have also interwoven Indigenous perspectives into presentations about water, a subject of vital importance to people. Several communities in our site selection process asked us to provide more information about how our work will protect water. Since 2017, we have developed and continue to engage with communities through three presentations that explore the relationship with water, clay and copper, which are vital components of the multiple-barrier system in our proposed deep geological repository.

Developed with input from Indigenous communities, the presentations incorporate Indigenous teachings about water, clay and copper, and use oral tradition as part of how they are delivered. The NWMO delivered five of these presentations in 2021. We will continue to seek opportunities to present these vital teachings in the future.

There is often a misconception that Indigenous Knowledge is only applicable to knowledge of the land, when actually, it is inclusive of resource management, science, governance, conflict resolution and much more. For example, our Human Resources department has taken steps to interweave Indigenous Knowledge into their work by co-ordinating with the Indigenous Relations team to offer sharing circles to continue supporting mental health during the COVID-19 pandemic.

During the next five years, we will continue to find opportunities to interweave Indigenous Knowledge into everything we do, and create space to learn from ceremony and apply those teachings to how decisions are made at the NWMO.

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.

Canada's long-term 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 (NFWA*) 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 2021* (www.nwmo.ca/annualreport2021). In addition to these trust fund contributions, waste owners are also responsible for funding the NWMO's annual operating budget.

Owner	Trust fund balance (\$ million) December 2021	Deposit to trust funds (committed and future bundles) (\$ million)* 2022
OPG	5,025	52
NBP	205	4
HQ	182	0
AECL	59	1
Total	5,471	57

Total trust fund deposits: Year 2022

* Annual trust fund deposits are required to be made within 30 days of the submission of the annual report. A deposit date of April 30 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 3.1 million bundles, and more bundles are produced each year as nuclear reactors continue to generate electricity.

The NWMO 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 cost estimate is based on an expected volume of about 5.5 million fuel bundles. With this expected volume, the total lifecycle cost of the project – from the beginning of site selection 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 either 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, as well as developments with other Canadian nuclear waste initiatives.

In Canada, work is underway across the nuclear sector to advance small modular reactor (SMR) technology. The NWMO would be responsible for the long-term management of their nuclear fuel waste. We are working with SMR developers to identify the types of fuel waste that may result. Once we have sufficient information, we will determine how to optimize and handle the fuel waste for long-term management, potential impacts to the repository design and how our funding formulas can be adapted to include new entrants.

We annually update a watching brief on used nuclear fuel reprocessing and alternative used nuclear fuel management technologies (www.nwmo.ca/adaption). We also monitor and report on potential inventories of used nuclear fuel quantities for implications to the repository design (www.nwmo.ca/ howmuchfuel).

A core principle of Adaptive Phased Management is a commitment to adapt plans in response to input obtained through engagement activities. By way of example, we developed a transportation planning framework based on what we heard from communities and people interested in Canada's plan. Beginning in 2020, we shared it publicly for broader engagement. In 2021, we refined the framework based on feedback from Canadians and Indigenous peoples.

As another example, we also adapted our regulatory plans in response to changes in the *Impact* Assessment Act passed in 2019. More information about the regulatory plan can be found in the *Regulatory decision-making process* section of this report.

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.

Our commitment to Reconciliation and interweaving Indigenous Knowledge into our work guides our efforts on all priority areas.

The next five years will see us transitioning from site selection to the regulatory decision-making process. These planning priorities reflect the many activities required during this transitional period.

In this section, we outline our plans within these seven work streams.





The NWMO will:

- Demonstrate the NWMO's engineered-barrier system meets safety requirements, and can be produced effectively and efficiently;
- Complete conceptual sitespecific facility designs to support regulatory decisionmaking; and
- Initiate preliminary repository design work.

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.

Over the next five years, we will advance site-specific repository designs that incorporate data collected through borehole drilling and preliminary environmental baseline investigations. This work will support the site selection decision, and ultimately, the preliminary design will progress based on the selected location. This information will also support the preparation of regulatory submissions and assessments.

We will continue to optimize our processes and techniques to enhance confidence in the strength of the engineered-barrier system design and components. 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.

- Complete the design, fabrication and testing of prototype repository containers, buffer and emplacement systems;
- » Maintain a prototype test and demonstration facility for engineered-barrier evaluations;
- >> Complete full-scale engineered-barrier system emplacement trials at our test and demonstration facility;
- » 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; and
- Arrange independent peer reviews of specific aspects and features of the engineered-barrier design, and seek reviews of the engineered-barrier system testing program.



SITE ASSESSMENT

The NWMO will:

- Complete sufficient geoscientific investigations and preliminary environmental baseline monitoring to inform site selection; and
- Begin additional borehole drilling and baseline data collection at the selected site.

The period from 2022 to 2026 will see the NWMO identify a single, preferred site, and then move into the licensing and regulatory decision-making process.

In the next five years, site assessment activities will transition from preliminary assessment at the two remaining potential sites, to detailed site characterization at the selected site.

To ensure we appropriately incorporate Indigenous Knowledge, we seek guidance from local Knowledge Keepers in planning and executing our studies. Local Indigenous experts ensure Indigenous protocols guide all field activities. These activities have included cultural verification studies of potentially affected areas, the use of ceremony before work is carried out, and cultural awareness training for staff and contractors working in the field.

As site assessment continues between 2022 and 2026, we will work with interested municipalities, First Nation and Métis communities, and others in the area as they reflect on 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.

As the NWMO works towards selecting a site to host the deep geological repository, we continue to engage with citizens in a variety of ways, in part to support communities as they explore the project and consider if they are willing to host it. Canada's plan is constantly being adapted to reflect the priorities of our siting communities.

In 2021, we continued geoscience fieldwork activities in both potential siting areas, including borehole drilling and testing, and installation of shallow groundwater monitoring networks. Further site assessments, environmental, social and technical work in both areas will continue over the next few years, as described throughout this report.

- Support implementation of the project through engagement on specific topics such as safety of people and the environment, project benefits and stewardship of the land;
- Continue field studies, including borehole drilling, and consider factors identified by Indigenous Knowledge Keepers to inform geoscientific, engineering, environmental and safety assessments;
- Support the process to select a suitable site for hosting the deep geological repository in a safe location, through geoscientific studies in the vicinity of interested communities; and
- Support regulatory decision-making and initiate detailed site characterization studies to confirm the site is technically suitable for hosting the deep geological repository.



SAFETY

The NWMO will:

- Develop preliminary sitespecific safety assessments;
- 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 phase.

The NWMO is committed to keeping people and the environment safe for generations to come. We place all aspects of public and employee safety first and foremost in everything we do, including environmental, conventional, nuclear and radiological safety.

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.

The NWMO has initiated the development of site-specific safety case studies for the two potential sites remaining in the site selection process. We are applying our pre-closure and post-closure safety assessment methodologies to these sites. This work includes examining features of the repository system under site-specific conditions, as well as confirming that people and the environment will be protected in the long term under a range of scenarios.

Safety is an important subject of discussion for communities, which continue to identify and ask more detailed questions about topics such as the multiplebarrier system, safety assessments and water management during construction and repository operations. As we continue to improve our knowledge of the sites, we share our understanding of safety with the community through presentations, on our digital platforms and by making the NWMO's specialists available.

- 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. This allows the NWMO to learn from 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 the NWMO's technical work is scientifically rigorous, while developing young engineers and scientists that are 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 projects, 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 licensing phase of the project, by creating and sustaining an environment where employees take proactive responsibility for their safety and that of their colleagues in all activities.



MOBILIZATION

The NWMO will:

- Develop a human resources strategy, and implement IT systems and other support infrastructure to prepare for the next phases of work following site selection; and
- Begin planning, design and tendering for construction of the Centre of Expertise.

Planning continues for how Canada's plan will be implemented following site selection in 2023. Once a preferred site is selected, there will be increased activity in the local and regional area.

This large national infrastructure project will result in significant economic benefits. The number of jobs sourced from the siting area will depend in part on the location of the repository. The impact will include direct jobs at or near the repository site, indirect jobs created by suppliers and contractors working on the project, and induced jobs created by the expenditures of people employed in the area.

The NWMO will seek to build an equitable, diverse and inclusive workforce, maximize job opportunities in the local area – the municipality and surrounding region, including First Nation and Métis communities – and develop capacity in communities through investments in training and education.

Site selection will also mark the beginning of a multi-phase organizational transformation for the NWMO. As we focus on one siting area, we will need to increase resources within the region, ensure we have the technology in place to support Canada's plan, and secure land for the NWMO's facilities and the Centre of Expertise. We will also move our operations to be based in the location selected for the repository.

Internally, we are preparing for this increased activity by putting in place the human, organizational and information resources needed to undertake detailed site characterization, make regulatory submissions, and construct and operate the deep geological repository.

- Develop work plans and assess resource requirements to advance detailed 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 staffing presence in the potential siting areas and provide local contracting opportunities for the project;
- Deepen our safety culture and build a learning organization, encouraging and supporting continuous employee learning;
- 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 put them in position to secure jobs related to the plan;
- Continue to use information technology tools and technology to automate processes, support strategic initiatives, and digitize information, content and records. We will also use artificial intelligence, business intelligence and data analytics to drive operational efficiencies and aid in critical decision-making; 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 interweaving Indigenous Knowledge and practices into all our work.

REGULATORY DECISION-MAKING PROCESS

The NWMO will:

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

The NWMO's overriding objective in implementing Canada's plan is protecting people and the environment for generations to come. We 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.

Our site investigations and associated technical studies will adhere to relevant municipal, provincial and federal requirements. We keep abreast of all regulatory changes that are pertinent to the project.

For example, the NWMO has already begun, and will continue over the next five years, to conduct studies consistent with the *Impact Assessment Act* passed in 2019. We have adapted our plans to this change in legislation. We expect to formally begin the regulatory decision-making process in 2024.

We will continue to interact with the Canadian Nuclear Safety Commission (CNSC), consistent with the terms of a special project arrangement in place, prior to submission of a licence application.

- 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. This includes collaboration with Indigenous communities to interweave local Indigenous Knowledge into this understanding as a foundation for the environmental, social, health and economic assessments;
- Establish environmental monitoring programs in potential siting areas in close collaboration with community members and Indigenous Knowledge Keepers;
- Work with potential host communities to define their role in the regulatory decisionmaking process and then facilitate their participation;
- >> Obtain from the CNSC and other regulatory authorities certainty regarding the requirements of the *Impact Assessment Act* and implementation under the Act;
- Prepare materials required to initiate the federal impact assessment and regulatory decision-making process;
- Submit the project description required to initiate the impact assessment process; and
- >> Following the receipt of the Site-Specific Impact Assessment Guidelines and Permitting Plan from the Impact Assessment Agency of Canada, begin the impact assessment process and prepare the necessary reports for licensing.

The regulatory decision-making plan

Once a site has been selected in 2023, the NWMO will shift our focus to the regulatory decision-making process that would allow construction of the deep geological repository to move forward if approvals are granted. These 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 involved:

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

Together, these processes will help the government assess various aspects of the project to determine whether it should move forward, including safety, sustainability, adverse effects, national security and impacts on Indigenous peoples.

The NWMO and the host communities for the project will undertake a substantial work program requiring several years of effort. Overall, our target is to transition to site preparation by 2028.

For additional information on the regulatory decision-making process, go to www.nwmo.ca/regulatory.





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 will work with siting communities to build the sustainable and resilient partnerships required to implement the project. In 2022 and 2023, we will continue to work with municipal and Indigenous communities in each siting area to explore the potential for partnership.

Together with communities, we are following a partnership road map and pathway that outlines a sequence of partnership-building topics to explore. Communities will build on the values and principles they have identified to guide our discussions and to ensure the project is implemented in a manner that enhances community well-being.

As the exploration of partnership deepens, municipalities in the siting process continue to express interest in enhancing relationships with their Indigenous neighbours. The NWMO supports learning through cultural awareness and Reconciliation training and provides support where appropriate in establishing formal lines of communication.

In keeping with the NWMO's commitment to supporting community well-being, we have allocated funding to each host community to advance community-led projects. These funds have been committed to ensure each of our hosts are in a positive position for participation and working actively with the NWMO.

Following site selection in 2023, we will shift focus from achieving and exploring the potential for partnerships with both host and regional communities, to the implementation and overall governance of partnership agreements. Continued engagement and framework development for all partnership discussions will focus on shared values and supporting long-term community well-being. Youth engagement will also remain a priority, given the intergenerational nature of the project and the need for intergenerational transfer of knowledge to support implementation.

Ultimately, only one site can be selected for the deep geological repository. As communities exit the site selection process, the NWMO remains committed to ensuring they are better off for having participated. We take great pride in the feedback to date from local leaders who maintain their communities benefited from their involvement in the 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;
- Conduct socio-economic studies to further assess potential impacts and benefits associated with the project;
- Work with the siting communities to build awareness of the project in the region and identify the required partners to build supportive and resilient partnerships;
- Ensure communities engaged in the siting process have the resources and information they need to fully participate in siting activities, reflect on their interests 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 process.



TRANSPORTATION

The NWMO will:

- Demonstrate the potential for a socially acceptable transportation plan through dialogue on the transportation planning framework;
- Continue refinement of the used fuel transportation system; and
- Begin implementing the transportation planning framework, which will be updated every three years.

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.

From a technical perspective, used nuclear fuel can be transported safely and securely through the use of robust transportation packages. 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.

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 2023. 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 in 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.

This collaborative approach has resulted in a transportation planning framework that will form the foundation for developing a socially acceptable transportation plan. Engagement on this framework, along with updates to the used fuel transportation system design description, will provide confidence that a socially acceptable transportation plan can be developed and will support a site selection decision in 2023.

Consistent with the transportation framework, the NWMO will continue to implement the framework while seeking feedback to ensure our planning remains reflective of Canadians' and Indigenous peoples' perspectives. The NWMO recognizes that a wide range of individuals and groups have an interest in transportation planning, and we are working to understand their interests so that we can continue to address questions and concerns.

Indigenous peoples must be involved in planning for transportation. Applying a Reconciliation lens to all our work enables us to recognize that given our country's history of past and continuing wrongs, it is imperative that we build positive and respectful relationships based on trust, rights and equity.

- Continue transportation planning that is reflective of citizens' values, principles and objectives;
- » 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;
- >> Establish key requirements for emergency management and transportation security for 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 to ensure that all Canada's radioactive waste has long-term management solutions (radwasteplanning.ca).

We were asked to lead the strategy development in part to leverage our nearly 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.

The NWMO is following an open and transparent engagement process to inform a strategy that will reflect the values and interests of the public. In 2021, we came a long way. We heard from communities across Canada, Indigenous peoples and technical experts to help inform practical recommendations to the Government of Canada on a more comprehensive radioactive waste management strategy.

We hosted our first Canadian Radioactive Waste Summit, conducted 12 community engagement events, and led a series of technical workshops and roundtable sessions with interested parties. We also engaged with Indigenous peoples through dedicated activities. The perspectives that we heard are critically important to making informed and practical recommendations to the Canadian government on an Integrated Strategy for Radioactive Waste.

As the Integrated Strategy for Radioactive Waste is now moving into the reporting phase, these sessions will be summarized in a series of "What we heard" reports that will be published in the first half of 2022. These reports will be publicly available and will inform the development of the strategy heading forward.

We also produced a technical options report, an accessible summary of this report, and various learning tools to ensure that information on the options for the long-term management of Canada's radioactive waste is available to those who are interested in learning more and sharing their views.

We have sought input from Canadians and Indigenous peoples to develop a strategy for Canada's low- and intermediate-level radioactive waste, using new ways to engage with interested individuals and organizations, while respecting public health directives related to the COVID-19 pandemic. There will be an opportunity for those who are interested to share their opinion on the recommendations at radwasteplanning.ca before they are submitted to the government.

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.

The NWMO's recommendations will not be finalized until the Government of Canada completes the modernization of its radioactive waste policy. The Integrated Strategy for Radioactive Waste will be informed by this policy review and finalized once a direction is known.

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 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 apply 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 long-term management of nuclear waste. 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.

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 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. 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 individuals, society 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 2021, the NWMO published Implementing Adaptive Phased Management 2021 to 2025 – the previous five-year version of this plan – and invited public review and comment.

We also published a digital survey to accompany the report, to solicit feedback online from Canadians and Indigenous peoples. This was our first year using a digital survey with this report, and we received 761 survey responses. This new approach is one of many examples of how the NWMO is leveraging digital technologies to provide more options for engagement with Canada's plan. We also received helpful insights as we continue to make documents like this more accessible.

We received comments from organizations and individuals across the country, from those who live in the siting areas and those who live abroad.

The survey offers a snapshot into respondents' thinking. It offers us insight into their confidence in our ability to implement Canada's plan, and the results also revealed where respondents identify areas of opportunity for the NWMO. This type of public input informs and guides our work, and comments received have helped us update this plan.

Through the responses, several themes emerged. This is a summary of what we heard.

Confidence in Canada's plan

A majority of respondents to our digital survey said they have confidence in the NWMO's ability to implement Canada's plan for the safe, long-term management of used nuclear fuel.

The survey asked respondents about their confidence in the NWMO's ability to implement the plan, as well as in each of our planning priorities – engineering, site assessment, safety, mobilization, partnership, transportation and licensing. Overall, and for each priority, 55 per cent of respondents said they were "confident" or "very confident" in the NWMO's ability to implement the plan and protect people and the environment for generations to come.

Of course, the inverse of this majority shows there are Canadians and Indigenous peoples who have questions about our work and Canada's plan. The survey revealed regional variances in confidence levels. Respondents in southwestern Ontario indicated 72 per cent were confident in Canada's plan versus the northwest where 50 per cent of respondents expressed confidence.

This regional divide prompted the NWMO to consider how we are communicating with people living in each area. We continued our work in the southwest, and over the summer of 2021, we rolled out more communications and engagement opportunities to share information in the northwest. This included a revamped office in Ignace and more visits from our Mobile Learn More Centre, our rolling exhibit designed to travel across the country to share Canada's plan.

Transportation

Transportation of used nuclear fuel was another area where region-specific questions and considerations were raised by survey respondents.

Survey responses from the northwest and from communities where used fuel is currently stored expressed an interest in learning more about the plans to safely transport used nuclear fuel. Respondents told us questions still remained around the safety of used fuel transportation and the effects of increased traffic on road or rail. However, 76 per cent of respondents let us know they understood this was a priority area for the NWMO.

The NWMO has also been working with Canadians and Indigenous peoples on our transportation planning framework, which was released in 2021. The results of the survey showed an opportunity to bolster our work to inform people across Canada about the global track record of safely transporting radioactive materials. This will create the foundation for developing a socially acceptable transportation plan.

Long-term safety

The majority of comments about our safety and engineering planning priorities were positive, and Canadians and Indigenous peoples indicated they want to know more about safety over the very long term.

There is international scientific consensus, based on decades of scientific study, that a deep geological repository is the best practice for the safe, long-term management of used nuclear fuel. The NWMO is constantly testing and evaluating our design and assumptions, and our work is based on ensuring the repository safely contains used nuclear fuel for the very long term – so long that the used nuclear fuel returns to the level of radioactivity found in uranium ore that occurs naturally.

Throughout 2021, and in the years to come, we will continue to test those assumptions. During the five-year period covered in this plan, we will develop a safety case that will provide the reassurance Canadians and Indigenous peoples are seeking. We will also begin a rigorous regulatory decision-making process that will require the NWMO to demonstrate the safety of the repository design, which you can read about in more detail in the *Planning priorities* section of this plan.

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.

Water

Many of the survey respondents highlighted the protection of water as a key area of importance.

We share this value at the NWMO. Water is a life force that sustains us, flows between us, and shapes the land. Protecting water, people and the environment is a priority we share with Canadians and Indigenous peoples.

The entire purpose of Canada's plan – the reason we are investing the time, effort and money to implement it - is to protect people and the environment, including water.

By listening to and working with Indigenous Knowledge Keepers, Elders, scientists, conservation authorities, industry professionals, youth and others - and interweaving what we learn into our work - we are continuously assessing our potential impact on water guality, water systems and the surrounding environment, to ensure that we continue to protect all types of water.

We are already studying water at and near the potential repository sites. In the proposed repository, used nuclear fuel will be isolated far away from water using a series of engineered and natural barriers called the multiple-barrier system. The system is designed to keep the used nuclear fuel in and water out so the two do not come into contact with each other.

We have learned through several studies, including borehole drilling, that at the depth of the proposed deep geological repository, there is very little water. This rock has essentially been disconnected from the water on the surface for millions or even billions of years. The rock also acts as a natural barrier and is one part of the multiple-barrier system to contain and isolate the used nuclear fuel within the repository from the very limited amount of water in the rock and the surrounding environment.

The responses we received underscored the significance of this work, and we are continually working to ensure that we are protecting water. We have also provided more information on our website with a dedicated page on water protection (www.nwmo.ca/water), and answered questions from community members in our You Asked Us section online (www.nwmo.ca/waterFAQ).

Reconciliation

The NWMO has made a strong commitment to Reconciliation. Indigenous Knowledge is interwoven into everything we do. These are big commitments and important values in our organization. The majority of respondents told us they share these priorities, and they wanted us to continue to do more to demonstrate our work.

Over the past year, we have completed an audit of the implementation of our Reconciliation Policy (2019). This review helped us identify areas where we are doing well and others where we can improve. It is an important tool that ensures we do more than just say we are committed to Reconciliation. It keeps us accountable to actually doing the work.

We have also increased our efforts to communicate about the ways we incorporate Indigenous Knowledge. You will find it more clearly interwoven in this report, and especially throughout our Annual Report, which was published alongside this document. It is one way we can ensure people understand that Indigenous Knowledge is as central to our work as understanding the composition of rock or copper.

Finally, we had a minority of comments that clearly did not align with our values. The NWMO does not stand for hateful language, and we have worked to ensure our engagement platforms - both those in person and online are safe spaces. Where necessary, the NWMO has removed offensive comments, shared our online community guidelines with users and publicly denounced remarks made on the NWMO's Facebook page. We support communities that want to learn more about how they can contribute to Reconciliation, and we regularly donate to organizations that support the cause.

This is the right thing to do. It is also pragmatic: Indigenous peoples have a constitutional right to weigh in on major infrastructure projects, including a deep geological repository.

Willingness and partnership

We heard challenges expressed about treating the two potential siting areas equally.

This plan is about working with everyone who has expressed interest. Together with communities in both remaining siting areas, we are committed to defining what partnership will look like and developing criteria for determining willingness, as described in the *Selecting a site* section of this plan.

In many ways, the two areas require different approaches. Each community has different needs, priorities and aspirations. Differences in geology mean some of the technical assessment work required is not the same.

We heard from a number of respondents that they want a clear definition of willingness from the NWMO.

However, it is not up to us to determine what willingness means to a community. Instead, it is up to communities to tell us what it means to them and how we can then gauge it. That is why we are supporting our potential siting areas in developing their definition of willingness and working towards what a partnership would look like.

In 2021, the Township of Ignace and Municipality of South Bruce separately completed their process to determine how each of their communities will express willingness to be a host community for a deep geological repository for used nuclear fuel. This marks a major milestone in the site selection process.

In Ignace, willingness will be determined by a Council resolution, which will be informed by public input. In South Bruce, the Council has endorsed a process to determine willingness through a byelection after a draft hosting agreement has been negotiated.

We have always said 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. Open and transparent dialogue with the public, and listening to different viewpoints, have always been fundamental to the NWMO's approach and will continue to be integral to every step moving forward.

Questions from communities surrounding potential sites

The survey responses told us that people who live near – but not directly in – the potential siting areas wanted to know more about Canada's plan. We heard questions about the effects of transportation, the safety of water, the impact of increased employment in the area, and the long-term safety of the repository.

That is why the NWMO has demonstrated our commitment to being present in communities near our potential siting areas, to ensure people have the information they need about Canada's plan. In 2021, our Mobile Learn More Centre visited 32 communities, and we met with representatives from 49 municipal councils. Our engagement staff also participated in over 50 community activities, offering residents a variety of opportunities to learn more and interact with the NWMO.

In southern Ontario, we continue to hear questions about the potential impacts on property values. The NWMO has committed to developing, in consultation with the Municipality of South Bruce, a program that will provide residents located near the deep geological repository with peace of mind that the value of their property is protected should the SON-South Bruce area be selected as the site where the project will be hosted.

The NWMO is here to ensure Canadians and Indigenous peoples have the information they need to understand Canada's plan. This report is one such document. We encourage you to take this year's survey and let us know how you feel about our priorities and next steps in working towards building a deep geological repository for the safe, long-term management of used nuclear fuel.

Share your thoughts

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. Our feedback form for the implementation plan is available online. We invite you to visit www.nwmo.ca/implementationplan and share your thoughts until **June 10, 2022**.

You may also email us at learnmore@nwmo.ca or send us a letter. Please include your name, mailing address and contact information in any written response.

Your response should be addressed to:

Lisa Frizzell Vice-President of Communications, NWMO Re.: Implementation Plan 2022-26 22 St. Clair Avenue East, Fourth Floor Toronto, ON M4T 2S3 Canada

For more information, please contact:

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