Proposed site selection process for Canada's second deep geological repository for radioactive waste

2025 discussion document

nwmo
NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

Land acknowledgment

The Nuclear Waste Management Organization (NWMO) endeavours to begin a siting process that incorporates diverse voices of many different people from across Canada. We aspire to respectfully listen to and engage with First Nations, Métis and Inuit Peoples whom we acknowledge as stewards of the land, and we will also seek to listen to and engage with Canadians who now call this land home.

We are committed to learning about and from Indigenous culture, respectfully aligning with Indigenous Knowledge, and fostering reciprocal relationships with First Nations, Métis and Inuit Peoples, as we hold ourselves accountable to actions that move us forward in Reconciliation.

As a public, not-for-profit national corporate organization, we acknowledge that we have a long road ahead of us in understanding and learning about the deep connection that First Nations, Métis and Inuit Peoples have with the land, while balancing the need to collaboratively find a safe, long-term solution for the storage of nuclear waste for the safety of all people, animals, land and waterways in Canada for generations to come.

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Welcome

Thank you for your interest in this discussion document, which outlines our proposed site selection process for the safe disposal of several classes of existing and future radioactive waste from Canada’s nuclear power facilities. This document outlines the types of radioactive waste to be managed, the technical and social methods we propose to follow to safely contain and isolate this waste, the collaborative dialogue-based process we propose to use to find informed and willing hosts, and the principles, goals and activities we believe will light the way. Ensuring safety of people and the environment, including the protection of water — while respecting Indigenous Knowledge, rights and well-being — are foundational in all our work.

We welcome and encourage your feedback on this proposed site selection process. Your input will help inform the process, which we aim to launch in approximately 2028.

We are committed to a transparent and inclusive engagement process and anticipate beginning public dialogue sessions midway through 2025. To learn more, visit our website at nwmo.ca or email us at ILW@nwmo.ca.

Introduction

Nuclear energy is a safe, reliable and low-carbon source of electricity that minimizes greenhouse gases. For more than 60 years, nuclear energy produced here in Canada has been safely powering our communities, homes, schools, hospitals and workplaces. This technology has also been supplying our country and the world with life-saving medical isotopes, thus playing a crucial role in medical imaging, diagnostics and treatment.

Governments in Canada and around the world have made clear that nuclear energy is a vital tool in meeting climate targets, achieving a net-zero emissions economy, and ensuring a continued safe and secure energy system.

Along with the significant benefits of nuclear energy comes the challenge of managing the radioactive waste. While all radioactive material in Canada is safely stored in accordance with international standards at federally licensed facilities, plans for long-term disposal of the waste are also being made. Many countries around the world are working on the same issue, recognizing that the time to take action is now, rather than burdening future generations.

At the Nuclear Waste Management Organization (NWMO), we play an important role in developing and implementing long-term waste management plans.

With more than 20 years of engagement with Canadians and Indigenous Peoples, we have heard that most feel a responsibility to put plans in place now for the long-term management of radioactive waste — plans that will keep people and the environment safe and secure for generations to come. The NWMO will ensure these plans reflect our commitment to Reconciliation in an evolving landscape and are informed and guided by Indigenous Knowledge, while also being supported by western science and international best practices.

LEARN MORE

OUR ORIGINAL MANDATE

The NWMO was created in 2002 by Canada's nuclear energy generators to develop and implement Canada's plan for the long-term management of used nuclear fuel. This was mandated by the Government of Canada under the *Nuclear Fuel Waste Act* (NFWA).

Canada's plan for used nuclear fuel, which follows an approach known as Adaptive Phased Management, emerged through a study of international best practices and a three-year dialogue with Canadians and Indigenous Peoples, as well as experts in the field of radioactive waste management. It is based on the values and objectives they identified as important.

Adaptive Phased Management was accepted by the federal government in 2007. It involves both a technical method and a management approach. The technical method is to build a deep geological repository in a suitable rock formation deep underground to safely contain and isolate the used nuclear fuel. The management approach involves phased and adaptive decision-making, supported by public engagement and continuous learning. The plan is being implemented with informed and willing host communities using steps that are technically sound, environmentally responsible and economically feasible.

To select a site for the deep geological repository for used nuclear fuel (from this point forward referred to as the first repository), the NWMO worked together with Canadians and Indigenous Peoples over two years to develop a site selection process. We made a commitment to only proceed at a site that both is safe and has informed and willing host communities. The process guided us and the communities we worked with in arriving at the important decision of where to locate the repository. That first site selection process was launched in 2010 and culminated in 2024 in the selection of Wabigoon Lake Ojibway Nation and the Township of Ignace as the host communities for the first repository.

As Canada's plan for used nuclear fuel advances, we are also proudly taking on a new endeavour assigned to us by the federal government in fall 2023. The additional responsibility is the focus of this document.

OUR ADDITIONAL RESPONSIBILITY

In 2020, Canada's Minister of Energy and Natural Resources tasked the NWMO with applying our technical, public engagement and siting expertise towards developing an integrated strategy for all Canada's radioactive waste. The resulting Integrated Strategy for Radioactive Waste — a first-of-its-kind for Canada — was developed through more than two years of engagement with Canadians, Indigenous Peoples, generators of radioactive waste, and waste owners, as well as studies of both technical considerations and international best practices. Following the publication in 2023 of Canada's modernized *Policy for Radioactive Waste Management and Decommissioning*, the minister accepted the integrated strategy.

One of the recommendations in the Integrated Strategy for Radioactive Waste was that Canada's intermediate-level and non-fuel high-level radioactive waste be disposed of in a deep geological repository (from this point forward referred to as the second repository), with development and implementation by the NWMO. This is our additional responsibility.

As a first step and building on our experience, our new task requires us to develop a process to find a safe location for the second repository, with informed and willing hosts.

KEEPING THE BIG PICTURE IN MIND

As we move forward, it is important to keep the big picture in mind and recognize the diverse voices that have contributed to the work over the last quarter century, while we continue to learn from our experience, further our Reconciliation journey, and adapt to a changing energy and societal landscape.

Building on our experience

Our goal is to develop a site selection process that builds on past experiences and reflects what we have heard is important to Canadians and Indigenous Peoples. The project will not proceed without the involvement of Indigenous communities. We commit to prioritizing engagement with Indigenous communities from the start of the proposed siting process. The NWMO is committed to Reconciliation and co-creating a shared future built on rights, equity and well-being for Indigenous Peoples.

New nuclear projects on the horizon

We are implementing our additional responsibility in a rapidly changing technological, societal, environmental and policy landscape. Nuclear energy has been identified explicitly by the federal government as a pillar in Canada's climate change strategy for achieving a net-zero emissions economy by 2050 and ensuring a continued safe and secure energy system for Canada in the face of global challenges.

In this evolving environment, there is potential for not only extending the life of existing nuclear plants, but also building new nuclear reactors. The Canadian nuclear sector is actively exploring emerging nuclear technologies such as small modular reactors and advanced reactors. If implemented, these developments will result in additional volumes of intermediate- and high-level radioactive waste, which will need to be safely managed in a deep geological repository for the long term.

In implementing our work, it is important that we consider what this future waste might look like and make long-term plans that include it. The development of another consent-based siting process in Canada, this time for the second repository, offers an opportunity to think about synergies and efficiencies that would strengthen integration, adaptability and resiliency of Canada's strategy.

We have the responsibility to ensure all intermediate- and high-level waste from existing and future nuclear projects has a safe home with informed and willing host communities. While the site selected for Canada's used nuclear fuel repository (the first repository) has some capacity for expansion, any change to the scope of that project at the selected site would require the consent of the host communities and approvals by applicable regulatory processes. Hence, we are also exploring the potential to include future used nuclear fuel in the repository that we will use to manage the intermediate-level and non-fuel high-level waste (the second repository). In keeping with our long history of demonstrating adaptability, this "may-be-needed-in-the-future" scenario is emblematic of the flexibility we have learned is necessary for responsible long-term planning.

This is our opportunity to serve Canada well by preparing for the future. This is what we understand Canadians and Indigenous Peoples want when it comes to our obligation to protect future generations.

OUR COMMITMENT TO RECONCILIATION AND ALIGNING WITH INDIGENOUS KNOWLEDGE

The NWMO is on a continuous learning pathway towards Reconciliation. As part of our commitment to Reconciliation, we recognize both the historic and current injustices Indigenous communities have endured. We continue to learn as an organization, remaining involved in collaboration and discussion with Indigenous communities on the work of Reconciliation. We understand that Indigenous Knowledge is a complex and sophisticated system of knowledge drawing on millennia of wisdom and experience, that constantly grows and expands with the experience of each generation. These knowledge systems recognize that people are part of and are one with Mother Earth, emphasizing the interrelationships among all components of the environment. Indigenous Knowledge includes important knowledge about the land and ecology and about developing and maintaining effective and meaningful relationships between generations and within and between communities.

Our commitment to understanding and aligning with Indigenous Knowledge in our work is reflected in many ways — through oversight by our Indigenous Relations team, guidance from the NWMO's Council of Elders and Youth, input from Indigenous representatives within the organization (including in our executive team and Board of Directors), and engagement with Indigenous communities. Our work is guided by our Ethical and Social Framework and meaningful policies such as our *Indigenous Knowledge Policy* (2020), *Reconciliation Policy* (2019), Water Statement (2023) and Sustainability Statement (2023). In all areas in which we operate, the commitment to these policies is an essential part of creating and maintaining positive, respectful relations. Further to this, we also respect the First Nations principles of OCAP (ownership, control, access and possession) of cultural knowledge, data and information.

Purpose of this document: Invitation to comment

We invite you to review the proposed site selection process outlined in this document and then join us in dialogue to help inform the process. The goal? To strengthen this proposed site selection process for the safe, long-term management of radioactive waste in a deep geological repository with informed and willing host communities. This second repository may contain the following types of radioactive waste:

- Intermediate-level waste (existing and future);
- Non-fuel high-level waste (existing and future); and
- Used nuclear fuel from future nuclear energy projects.

This proposed site selection process is built on the strength and experience gained from our previous work involving finding a safe site for a repository for used nuclear fuel (the first repository). It incorporates learnings from our more than 20 years of engagement with Canadians, Indigenous Peoples, generators of radioactive waste, and waste owners.

Your participation and input are welcome and appreciated. They will help inform our site selection process. Here are some questions to consider:

- Is the document clear and thorough?
  - Does this document clearly lay out the proposed site selection process for the second repository?
  - Does it provide you with enough information on the purpose of the deep geological repository?
- Is the process logical and fair?
- Does this proposed process seem sufficiently adaptable to changes in the energy landscape, and societal preferences and concerns?
- Does the process capture past learnings and honour past input, but also provide opportunities for continuous learning and improvement?
- Does the proposed process provide for the kinds of information and tools that are needed to support the participation of communities that may be interested?
- Do you agree with the guiding principles outlined in this document?
- Is the proposed process consistent with Reconciliation and Indigenous rights?
  - In your view, does the proposed siting process respect the *United Nations Declaration on the Rights of Indigenous Peoples Act* (2021) and reflect a commitment to co-create a shared future with Indigenous communities?
  - Does the proposed siting process provide sufficient guidance to advance relationship building with Indigenous and municipal governments and meet the needs of community members?
- What else needs to be considered?

There are several ways to have your say, as outlined on p. 24 of this document. We look forward to hearing from you.

What radioactive waste needs to be managed?

The proposed site selection process outlined in this document pertains to finding a site for Canada's second deep geological repository. This repository is intended for the long-term management of all Canada's current and future intermediate-level and non-fuel high-level waste, and potentially used nuclear fuel from future reactors. All existing intermediate-level and non-fuel high-level waste is currently safely stored on a temporary basis in federally licensed storage facilities either at a consolidated waste facility or at the nuclear sites where it is produced.

Figure 1: This map depicts the location of the majority of Canada's current intermediate-level waste.

INTERMEDIATE-LEVEL WASTE

Intermediate-level radioactive waste is generated primarily from nuclear power plants, research reactors, and medical isotope manufacturers and users, including some medical applications. It consists of components from such areas as the nuclear plant's purification systems (e.g., filters, resins), the nuclear reactor core (e.g., pressure tubes) and equipment used to support reactor operations (e.g., core detectors).

Intermediate-level waste contains long-lived radionuclides that require hundreds to tens of thousands of years to decay and typically emit high-energy radiation. Unlike high-level waste, it does not generate significant amounts of decay heat. Regardless of its different shapes and sizes, this waste will be disposed of in containers designed to meet rigorous safety standards.

While this waste is currently safely stored on an interim basis at facilities licensed by the Canadian Nuclear Safety Commission (CNSC), it will need to be moved to an underground repository for long-term management. This is considered best international practice.

NON-FUEL HIGH-LEVEL WASTE

Non-fuel high-level radioactive waste comes from activities such as production of certain medical isotopes in nuclear facilities. Medical isotopes have various industrial and medical applications such as cancer treatments, medical imaging, or sterilization of single-use medical devices and surgical instruments. There is a very small amount of this waste because advancement in medical isotope production has reduced the amount of waste produced.

This waste generates a significant amount of heat and radioactivity, which requires shielding. While non-fuel high-level waste is currently safely stored on an interim basis at facilities licensed by the CNSC, it will need to be moved to an underground repository for long-term management. This is considered best international practice.

INTERMEDIATE- AND HIGH-LEVEL WASTE FROM FUTURE REACTORS

Canada, like other countries around the world, has been called upon to reduce greenhouse gas emissions in order to curb climate change. Because of this, there is significant interest in investing in additional nuclear generation for electricity and industrial applications.

While some new nuclear energy may be generated using existing technology in place at Canada’s nuclear reactors, some may involve other technologies, including large reactors, small modular reactors, micro reactors or advanced reactors not currently used in Canada. These would result in additional radioactive waste.

At this time, the total volume of waste from future nuclear energy expansion projects and new nuclear technologies is not known because these projects are still in development. As more information becomes available, it would be incorporated into our planning and discussed with any interested potential host communities.

How will the radioactive waste be managed?

IN A DEEP GEOLOGICAL REPOSITORY

The disposal of intermediate- and high-level radioactive waste in a deep geological repository is considered best international practice from both a technical and a societal perspective. Almost all countries with commercial nuclear power production are planning to isolate their intermediate- and high-level waste in a deep geological repository.

Deep geological repositories are designed to safely isolate radioactive waste from people and the environment in a suitable rock formation. They use a system of multiple barriers, including engineered barriers such as specially designed waste containers and natural barriers such as the rock itself. In Canada and worldwide, the deep geological repository approach to managing radioactive waste is the culmination of more than 40 years of scientific research, development and demonstration of technologies and techniques. For more information about the project, see Appendix A.

We have learned from Indigenous Knowledge Holders to more holistically understand the impacts of our work on rock formations and water. In the context of geoscience, the NWMO's approach to understanding potential sites has been improved by acknowledging that the cultural significance of these elements is important and can be combined with the findings of western science.

WITH INFORMED AND WILLING HOST COMMUNITIES

Community willingness is a key requirement before the NWMO selects a site for a repository for the disposal of this radioactive waste. The process of identifying a suitable site begins with communities expressing interest in learning more about the site selection process and the project. Then, the suitability of those communities will be evaluated through a series of technical and social site evaluations to determine whether the project can be implemented there both safely and in a manner that fosters community well-being. While the NWMO conducts evaluations, communities in turn assess whether the project aligns with their vision and values.

As the process unfolds, the NWMO (from a technical perspective) and the communities (from a well-being perspective) assess whether there is potential for the project to be safe and sustainable in that location, and whether there is potential to work together over the long term. It should be noted that both the NWMO and the communities have a decision-making role in determining whether to proceed to the next activity and ultimately move forward to the regulatory phase. It is the regulators and eventually the federal government that determine whether the project can proceed.

An interested community may include an Indigenous community or a municipal community, and ideally, the expression of a joint interest in which neighbouring communities work together. The project will not proceed without the involvement of Indigenous communities. We commit to adopting an engagement approach that will prioritize engagement with Indigenous communities right from the start of the process. Consistent with Canada's *Policy for Radioactive Waste Management and Decommissioning*, and in the spirit of Reconciliation, we acknowledge, respect and honour Indigenous Peoples as rights holders.

Further, we acknowledge that call to action 92 of the Truth and Reconciliation Commission (2015) calls upon the corporate sector in Canada to adopt the *United Nations Declaration on the Rights of Indigenous Peoples* as a Reconciliation framework and to apply its principles, norms and standards to corporate policy and core operational activities involving Indigenous Peoples and their lands and resources. The NWMO will be guided by Canada's *United Nations Declaration on the Rights of Indigenous Peoples Act* (2021), including the requirement for free, prior and informed consent.

In terms of establishing willingness, the NWMO will not dictate how this is done. It will be up to each potential host community to identify the processes and mechanisms they wish to use to demonstrate that the project has the support of community members. We also recognize that the host communities may consist of both Indigenous and municipal communities, and that each have distinct willingness considerations and priorities.

Best practice and recent experience in Canada for siting deep geological repositories suggest there are a range of approaches a community may use in order to achieve this. These include documenting support expressed through open community discussions or town hall meetings, telephone polls, online meetings, surveys, community votes and referenda.

The location and number of potential host communities from which willingness will be required in each siting area will be influenced by the geographic extent of the potential siting area associated with the interested community, as well as geopolitical boundaries, treaty rights and land use.

IN A LOCATION TO BE DETERMINED

The site selection process will guide us and the communities we work with in finding a location for the second repository. Based on our past engagements with Canadians, Indigenous Peoples, generators of radioactive waste, and waste owners, we propose the process be focused in provinces with a current or prospective interest in nuclear energy. The waste to be managed could be located:

- In the same location as the first repository (i.e., co-location);
- In a new deep geological repository (the second repository) located somewhere else in a current or prospective nuclear province; or
- In a combination of both scenarios (hybrid).

In each scenario, safety and host community willingness are paramount. Additionally, in any of these three scenarios, it would be necessary to incorporate a plan for expansion to address the need for future intermediate- and high-level waste produced from future nuclear expansion projects and new nuclear reactor technologies.

Co-location with the first repository

The proposed siting process would be open to the communities that we are currently working with to host the first repository. However, while they are welcome to consider expressing interest, this is not required. We remain respectful to our commitments made to those communities — Wabigoon Lake Ojibway Nation and the Township of Ignace — and any change to the scope of that project at the selected site would require the consent of the host communities and approvals by applicable regulatory processes.

If those communities express interest and are willing to host the additional radioactive waste, technical site investigations provide confidence that this additional waste could be safely managed in that location for the long term and regulatory approvals are received, then the waste could be co-located with the first repository.

Co-locating this additional radioactive waste may be possible within the potential expansion capacity of the first repository (with the information that is known to date). Adding this waste would result in an increase in the surface and subsurface size of the repository. This option provides the benefit of using existing surface and subsurface infrastructures and knowledge of the site.

A stand-alone deep geological repository (second repository)

The proposed siting process could result in communities different from the first repository's host communities hosting this radioactive waste. This option allows for new communities to benefit socially and economically from hosting this new repository.

To ensure Indigenous communities and municipal communities are informed about the project, the NWMO would work collaboratively with them throughout the site selection process.

Surface and subsurface investigations would need to be done to confirm the potential of the proposed site to safely and securely contain and isolate the waste.

Once the communities are selected to host the second repository and all required regulatory approvals are received, new surface and subsurface infrastructure would be developed, including such elements as administration, operating and support buildings, and an underground repository.

A hybrid scenario

The communities that have agreed to host the first repository (i.e., Wabigoon Lake Ojibway Nation and the Township of Ignace) may be interested in hosting only some of the additional radioactive waste, in which case both a co-location scenario and a stand-alone scenario may be explored.

Whichever scenario is selected, the NWMO will remain respectful of the commitments we have already made. This includes commitments to Canadians, Indigenous Peoples and the communities hosting the first repository. Community willingness is required before a project is implemented.

Goals of the proposed process

The site selection process needs to achieve the following goals:

A. ***Finding a site that is safe, secure and sustainable:*** Recognizing that radioactive waste can remain hazardous for long periods of time, we need to ensure that any site that is selected to host the facility will safely contain and isolate intermediate- and high-level radioactive waste for the long term. The site must be in an appropriate geological formation to ensure long-term safety.

B. ***Finding host communities that are informed and willing:*** The NWMO will support potentially interested Indigenous and municipal host communities to carefully and thoroughly consider the project's potential benefits and risks before deciding whether they are willing to host it. We commit to engage local Indigenous communities early in the process. We will not proceed without their involvement and support.

C. ***Fostering ongoing conversations:*** The NWMO will commit to fostering conversations with Canadians and Indigenous Peoples throughout the process. This includes listening and learning, as well as sharing assessments of health, environmental, social, economic and cultural effects of the project in a transparent manner, and aligned with the NWMO *Indigenous Knowledge Policy* (2020).

D. ***Helping to demonstrate and reinforce global excellence:*** We commit to adhere to and help shape international best practices in the field of radioactive waste management and consent-based siting processes.

Guiding principles

We understand that the siting process needs to be grounded in a set of principles that reflect the values, concerns and priorities of Canadians and Indigenous Peoples.

These principles have been shaped through ongoing dialogue with Canadians and Indigenous Peoples during our years of experience developing and implementing Canada's long-term plan for used nuclear fuel, as well as our engagements during development of the Integrated Strategy for Radioactive Waste. We understand that the way we proceed through siting activities to achieve a fair process is important to achieving the goals. The set of principles that have guided the development of the proposed siting process are:

Safety: Safety is paramount and must be demonstrated, not only through technical safety analyses, but also from a social perspective (i.e., not causing harm to communities). The site ultimately selected must be proven, through rigorous technical studies aligned with shared Indigenous Knowledge, to be capable of protecting present and future generations of people and meeting the highest standards of environmental protection. This includes the protection of air, soil, wildlife and habitat, and in particular, water — incorporating scientific perspectives and Indigenous worldviews.

The protection of water: Consistent with the NWMO's Water Statement, the protection and safety of water is vital, both now and for all future generations, as guided by the NWMO *Indigenous Knowledge Policy* (2020) and western science. Through our engagements, we have heard that the protection of water and waterways is imperative. We must consider water and its relationship with a deep geological repository and the surrounding area.

Free, Prior and Informed Consent (FPIC): For the interested Indigenous community, we will uphold the principle of free, prior and informed consent.

Informed and willing host communities: To be a willing host, an Indigenous or municipal community where the repository will be potentially located must demonstrate willingness before the project can proceed. To be willing, a community must be informed. To be informed, a community must be aware of the project, including its benefits and potential impacts on the environment and quality of life.

Reconciliation and Indigenous Knowledge: Consistent with the NWMO's *Reconciliation Policy* (2019), we recognize both the historic and the current injustices endured by Indigenous Peoples. We respect Indigenous Peoples' status in Canada as rights holders and are committed to co-creating a shared future. We also understand that respectfully aligning with Indigenous Knowledge in our work, while adhering to our *Indigenous Knowledge Policy*, will help us to successfully develop and implement a fair site selection process. We will seek guidance from Indigenous communities to find ways to respectfully align with Indigenous Knowledge in the site selection process and honour and protect it in its application.

Sustainability: Consistent with the NWMO's Sustainability Statement (2023) and associated guiding principles, the site selection process must adhere to our established short- and longer-term sustainability priorities and goals. These guiding principles support ecological, social and economic well-being in balance with nature, and promote respect for local, regional and global natural environments now and in the future. We will continue to incorporate protocols associated with Indigenous Knowledge and Indigenous Peoples' concepts of sustainability. Sustainability also includes fiscal and environmental responsibility. The project must be managed in such a way that the total cost and our environmental impact do not become a burden for current or future generations.

Meeting regulatory requirements: The selected site must meet all applicable regulatory standards and requirements for protecting the health, safety and security of people and the environment. This includes the protection of water and respect for Canada's international commitments on the peaceful use of nuclear energy, as well as Canada's commitment to the *United Nations Declaration on the Rights of Indigenous Peoples*. The regulatory standards and requirements are used as starting points for the siting process and continue to be critical components of the ongoing process.

Process led by community and the right to withdraw: The activities in this proposed siting process are initiated by communities expressing interest in learning more about the project. Communities will proceed to the next step only if they choose to do so. Communities have the right to end their involvement in the siting process at any point up to and until the hosting agreement is signed, subject to all regulatory requirements being met and regulatory approval received.

Inclusive engagement: Our engagement process is designed to be inclusive and transparent, and to include representative participation to help shape and implement a site selection process that reliably reflects what is most important to Canadians and Indigenous Peoples. We will provide multiple opportunities for dialogue and engagement with interested communities, surrounding communities, governments and Indigenous communities to answer questions, hear comments and concerns, and gain understanding.

Informing the process: The site selection process will be informed by the best available knowledge relevant to making a decision or formulating a recommendation, including science, social science, Indigenous Knowledge and ethics. In keeping with our commitment to transparency, the information and insights that are collected and used to assess the potential suitability of a site will be published for public review and scrutiny, if deemed appropriate by the communities. At major milestones, decisions may also benefit from independent, third-party review.

Community well-being and capacity building: Communities that agree to host the project and are ultimately selected as willing hosts have a right to benefit from doing so. The NWMO will assist communities in reviewing and considering the potential impacts and benefits of the project on their rights, including their lands, territories, and resources, and their quality of life. NWMO funding will be available to communities for a period of time during the site selection process to build their capacity to assess their interests, learn about the project, seek independent advice and counsel, involve community members and make informed decisions. The project must be implemented in a manner that fosters the long-term well-being and quality of life of the communities and area in which it is implemented.

The proposed process

The proposed process in this document builds on the strength and learnings from the first repository. The NWMO has been working in collaboration with Indigenous and municipal communities to assess suitability of potential candidate sites for the first repository for more than a decade. This has allowed us to develop world-class assessment approaches and expertise in integrating both technical and community well-being assessments, including opportunities to align with Indigenous Knowledge and learnings.

Figure 2 shows an overview of the activities of the proposed site selection process. A summary of the activities is outlined in Table 1, and more details can be found in the appendices. The proposed process is designed to be flexible and adaptive. The activities are intended as a navigation aid to help communities in planning and visualizing how the process could play out, rather than as a precise process. There could be cases in which preparatory and planning work for an activity will be initiated by the NWMO or interested community prior to formal initiation of that activity. Individual communities may also be at different points in the process at any given time. Some activities may also be completed at a faster pace, depending on past involvement of the community with the first repository.

The process starts with communities expressing interest in learning more about the project. It will then involve an initial screening (Appendix B), followed by a series of iterative technical and social assessments (Appendices C to E) to narrow down the number of interested communities. The level of detail and the duration of each activity will depend on the siting scenario being considered and the amount of available information for each potential siting area, as well as the interests, needs and preferences of the interested Indigenous and municipal communities. A high-level timeline is provided in the project information (Appendix A) to help communities with planning.

We know that working with Indigenous Peoples, aligning with Indigenous Knowledge, applying what we have learned from past experiences, and honouring these learnings throughout the assessments in accordance with our *Indigenous Knowledge Policy* (2020) are critical elements of the process. We will seek opportunities to co-develop and work with Indigenous Peoples to ensure local Indigenous Knowledge and land use is part of assessments; opportunities are provided for communities' participation in field studies; ceremonies and offerings led by communities may be conducted prior to fieldwork; cultural training for contractors is provided prior to fieldwork; and assessment findings are shared with the communities.

The NWMO will continue to listen and learn as we go, refining practices, maintaining flexibility, and adapting to new social inputs and regulations as they emerge. We are seeking input on the process that follows, prior to finalizing.

THE SITING PROCESS AT A GLANCE

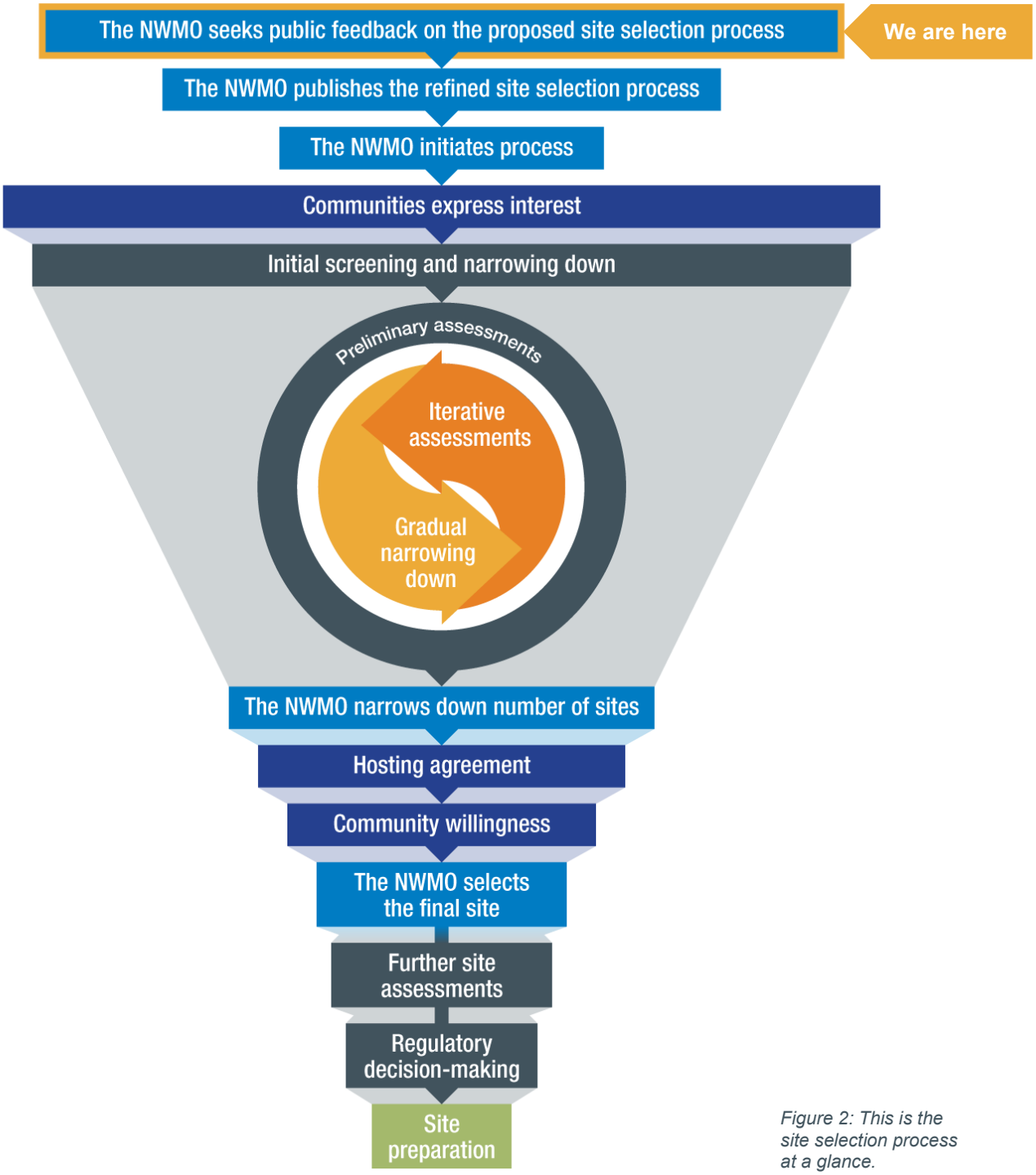

Figure 2: This is the site selection process at a glance.

TABLE 1: SITE SELECTION ACTIVITIES

Pre-site selection
Public dialogues to refine the proposed site selection process
The NWMO actively engages in dialogues with Canadians and Indigenous Peoples, and a wide range of interested parties, to seek feedback and ideas about the proposed site selection process (i.e., this document). Engagement on the proposed site selection process, focused in current and prospective nuclear provinces, is achieved through a variety of engagement tools and activities such as in-person and virtual presentations, one-on-one and group discussions, online comments and webinars. At the end of the engagement period, the NWMO publishes the site selection process, informed by the public feedback received.
Site selection process
The NWMO initiates the site selection process
The NWMO initiates the siting process with a program of information and engagement activities designed to help build awareness and understanding of the NWMO, the types of radioactive waste involved, the project, and the goals, principles and activities in the site selection process. The NWMO launches an inclusive and comprehensive outreach program to provide information and respond to requests for information. The program focuses its outreach activities with Indigenous Peoples, municipalities, the broad public, individuals and organizations located in provinces with existing or prospective nuclear projects, and others interested in learning more about the project and the site selection process. The information shared in the outreach program is posted on the NWMO website for broad public access and review. Activities of this nature are expected to continue throughout the site selection process and in parallel with subsequent activities.
Communities express their interest in learning more and entering the process
Communities express interest in learning more about the process. For the purpose of expressing interest, "community" is defined as a political entity that has the mandate to speak for a community or group of communities. This could include an Indigenous community, a municipality, a township, a county or a combination of these. Requests to learn more must be made with the support of accountable authorities (e.g., elected representative bodies). This may involve an existing Indigenous government, the municipal council of a community, a new group established by a community involving community leaders, or other group as deemed appropriate by the community. It is important to note that ultimately the project would not proceed without the involvement of Indigenous Peoples. The NWMO from the beginning works with the communities expressing interest to engage Indigenous and municipal communities in the vicinity of the siting area to build awareness of the site selection process and the project in order to build collaborative, sustainable and resilient relationships.

An initial screening assessment is conducted, and the NWMO provides detailed briefing

The objective of this activity is to quickly assess whether the project has the potential to be feasible in that location. The NWMO evaluates the conditions of the potential location against a list of initial screening criteria, including Indigenous community interest. The evaluations are based on readily available information, including Indigenous Knowledge (see Appendix B). Communities evaluate their interest in remaining in the process based on their learning and capacity-building plan, supported by the NWMO. Communities not meeting all initial screening criteria will be excluded from further consideration.

Communities that do not see any potential for alignment with the project may choose to exit the process. The communities not excluded by the initial screening decide whether they are interested in continuing to the next activity in the site selection process (i.e., preliminary assessments). These communities could get access to resources in the form of funding and information to support learning and capacity-building activities such as:

- Seeking independent expert advice;
- Aligning with Indigenous Knowledge;
- Building relationships with local communities (e.g., Indigenous/municipal) in the vicinity of the siting area;
- Augmenting or developing a long-term vision for sustainability;
- Learning about the project; and
- Conducting engagement activities to inform residents and assess interest in hosting the project in their community.

The nature of resources provided will be outlined in a short-term agreement between the community and the NWMO.

Preliminary assessments: Iterative technical and social assessments, and narrowing down process

At the request of interested communities successfully passing the initial screening, the NWMO begins, in collaboration with those communities, a series of preliminary assessments.

The objective is to determine: (1) whether the project can be safely located at the site, (2) whether the project suits the community and (3) whether there is potential for long-term collaboration.

Preliminary assessments explore the following technical and social aspects:

1. **Safety:** The site must be able to safely contain and isolate the waste in a manner that will protect people and the environment, including water and waterways, over the very long term (more details in Appendix C). The gradual narrowing down is completed through:
   a. **Desktop studies:** Technical desktop studies involve geoscientific, environmental and engineering feasibility studies based on the interpretation of readily available information.
   b. **Field studies for remaining communities:** This includes additional technical site evaluations involving geoscientific and environmental field investigations, as well as application of Indigenous Knowledge and the involvement of Indigenous community members. The nature and duration of technical studies and field investigations will be site specific depending on available site information and the number of communities still in the process.
2. **Community well-being:** The site must be located in an area where the project can be implemented in a way that supports the quality of life of the local communities as they themselves define it. This includes both Indigenous and municipal communities. Communities create or express a vision for the future with and without the project. They agree on and either lead or participate in studies to evaluate community well-being based on continued learning and

capacity-building plans. Communities establish methods to evaluate or manage changes that may occur (positive and negative) as a result of the project. They receive input on whether to proceed to the next phase of the process (a hosting agreement). Communities agree on and design a decision-making model to express willingness (more details in Appendix D).

3. **Long-term collaboration with communities:** The site must be located in an area where strong and resilient relationships can be developed with Indigenous and municipal communities and the NWMO in the siting area (more details in Appendix E).

Depending on the number of communities passing the initial screening, there may be a comparative analysis, and the NWMO may prioritize communities for preliminary assessments according to their potential. Meanwhile, communities themselves assess the potential of the project to align with their own principles and values, and decide whether the project is good for them.

The preliminary assessments serve to gradually narrow down the number of communities with strong potential to meet the technical and social requirements of the project, to those where there is strong potential for the communities and the NWMO to collaborate in the long term.

The various assessments will be collaboratively planned and conducted in discussion with Indigenous and municipal communities. The NWMO seeks opportunities to align with Indigenous Knowledge in the assessments, consistent with our *Indigenous Knowledge Policy* (2020).

A comprehensive learning and engagement program is collaboratively designed and implemented by the NWMO and interested communities to build awareness of the project and explore the potential for building resilient relationships in communities and surrounding areas. This is important because the project will be implemented over many decades and will require community relationships that can stand the test of time.

The cost of these types of activities is covered by the NWMO.

The first few communities that can successfully meet the safety and social requirements move to the next activity. Communities with lower potential to meet the technical and social requirements are gradually removed from the site selection process during this phase until only a few sites with strong potential are identified.

Hosting agreement

The NWMO and the selected communities develop and sign mutually agreeable hosting agreements, subject to community willingness and regulatory approvals. Hosting agreements detail the commitments made by the NWMO and the communities should the site be selected, and set out roles and expectations on working collaboratively as they move forward together into the regulatory process.

Potential host communities demonstrate willingness
Potential host communities demonstrate their willingness to accept the project and the terms of the hosting agreement. It will be up to each potential host community to identify the processes and mechanisms it wishes to use to demonstrate its willingness to host the project in a manner that meets the specific needs of the community and to also demonstrate clearly to the NWMO whether the project has the support of community members.
The NWMO selects a preferred site
The NWMO selects a preferred site that meets the safety and social requirements. The selected site must have confirmed willingness of local siting communities, including Indigenous Peoples in whose territory the facility will be built.
Post-site selection
Additional site assessments
For the selected site, building on the work completed in the preliminary assessments, the NWMO initiates additional site assessments to confirm the suitability of the site and prepares the necessary supporting documentation to initiate the regulatory decision-making process for the site. The NWMO continues to collaborate with the communities in the siting areas and continues to align with Indigenous Knowledge to collaboratively plan and conduct the technical studies for a co-development approach.
Regulatory decision-making
Regulatory authorities review the safety of the project through an independent, formal and public stepwise regulatory process. The implementation of the project will be regulated under the *Nuclear Safety and Control Act* and its associated regulations to protect the health, safety and security of the public and the environment, and to respect Canada's international commitments on the peaceful use of nuclear energy. Once all regulatory requirements are satisfied, the NWMO is given a series of successive approvals to proceed in a stepwise manner through site preparation, construction, operations, decommissioning and closure. Local and Indigenous-owned businesses will be given opportunities to support the project, driving further community economic development.
Site preparation, construction, operations, decommissioning and closure
This step involves site preparation, construction, operations, decommissioning and closure of the required repository surface and underground facilities. Operations will begin after an operating licence is obtained from regulatory authorities. The NWMO will continue to work with the host communities to ensure commitments to the communities are addressed throughout the entire lifetime of the project.

Regulatory reviews

Regulatory oversight by the Government of Canada involves a number of departments and agencies.

Natural Resources Canada monitors the NWMO on an ongoing basis to ensure compliance with the *Nuclear Fuel Waste Act* and *Policy for Radioactive Waste Management and Decommissioning*.

Implementation of a deep geological repository falls within federal jurisdiction and is regulated under the *Nuclear Safety and Control Act* (NSCA) and its associated regulations.

Under Section 26 of the NSCA, activities associated with a nuclear facility can occur only in accordance with a licence issued by the Canadian Nuclear Safety Commission (CNSC). The CNSC regulates the use of nuclear energy and materials and transportation to protect the health, safety and security of Canadians and the environment. It also implements Canada's international commitments on the peaceful use of nuclear energy, and disseminates objective scientific, technical and regulatory information to the public.

Repositories implemented by the NWMO will be subject to the CNSC's comprehensive licensing system. The system covers the entire life cycle of the repository from site preparation to design and construction, operations, decommissioning of surface facilities, closure and release from CNSC licensing. This stepwise approach requires a licence through all phases of the repository life cycle. As part of this licensing process, the project will be evaluated for its environmental, economic, social and health impacts.

While regulatory approvals will be sought only after a preferred site with willing hosts has been identified, the NWMO will begin discussions with regulatory agencies early in the process to ensure we understand, and are on the path to meeting, regulatory requirements as they evolve over time.

Role of third-party review

Consistent with our values, the NWMO will continue to rely on independent reviews and advice throughout the site selection process and beyond, to ensure our activities meet the highest standards of transparency, safety and best available knowledge.

The site selection process will be strengthened by advice from the Council of Elders and Youth, an advisory body to the NWMO that provides counsel on the application of Indigenous Knowledge in our work.

We may also call upon consultants, experts and international collaborators to support and strengthen the numerous technical and social assessments that will be required to assess the suitability of potential sites, and the potential for partnerships in each siting area.

Potential host communities would receive funding to seek independent expert advice during the site selection process, if they choose to do so.

What comes next?

JOIN THE DISCUSSION

You can help support Canada in having a fair process in place to identify informed and willing communities to host a deep geological repository for intermediate-level waste, non-fuel high-level waste, and possibly used fuel from future reactors.

We want the site selection process to reflect the ideas, experience and best advice of a broad cross-section of Canadians, Indigenous Peoples and other interested parties. Thus, we hope to receive feedback from the widest possible diversity of respondents, and encourage feedback from people of all backgrounds, including marginalized and under-represented groups from BIPOC, disability and 2SLGBTQI+ communities.

> We invite you to review this document and let us know what you think. Any feedback/comments received will be anonymized and summarized with other comments and published in "what we heard" reports. Your submissions will not be attributed directly to you without your permission.

ENGAGEMENT AND DIALOGUE OPPORTUNITIES

We are committed to a transparent and inclusive engagement process. We anticipate beginning public dialogue sessions midway through 2025. We will start early engagement with a particular focus on dialogue with Indigenous Peoples, municipalities, youth and elected officials. We will broaden outreach to individuals and organizations located in provinces with existing or prospective nuclear interest, as well as the general public. As part of the NWMO's commitment to Reconciliation, we wish to invite Indigenous communities to meet with us.

The site selection process will be informed by what we hear during the engagement process. We anticipate publishing the new version and launching the site selection process for the second repository in approximately 2028.

To learn more:

- Visit our website at nwmo.ca;
- Engage with us through our social media channels;
- Invite us to your community;
- Attend a presentation, either in person or virtually;
- Email us at ILW@nwmo.ca; or
- Mail us at 22 St. Clair Avenue East, Fourth Floor, Toronto, ON M4T 2S3.

Glossary

Adaptive Phased Management: Adaptive Phased Management is Canada's plan for the safe, long-term management of used nuclear fuel. It is both a technical method and a management approach, with an emphasis on adaptability. The end point of the technical method is the centralized containment and isolation of Canada's used nuclear fuel in a deep geological repository in an area with suitable geology and informed and willing hosts. The management approach involves realistic, manageable phases, each marked by explicit decision points. It allows for flexibility in the pace and manner of implementation and fosters the sustained engagement of people and communities throughout its implementation.

Deep geological repository: A deep geological repository typically consists of a network of underground tunnels and placement rooms for radioactive waste, constructed several hundred metres below the surface, where both natural and engineered barriers contain and isolate it from people and the environment.

Emerging nuclear technologies: If implemented, emerging technologies such as small modular reactors or advanced nuclear reactors will generate additional intermediate- and high-level radioactive waste in Canada. The NWMO is responsible for the long-term management of this additional radioactive waste.

Environment: As defined by the Canadian Nuclear Safety Commission, environment refers to the following components of the Earth:

- Land, water and air, including all layers of the atmosphere;
- All organic and inorganic matter and living organisms; and
- The interacting natural systems that include the above components.

Free, Prior and Informed Consent (FPIC): from the Institute for Human Rights and Business

- **Free:** Consent is given voluntarily and absent of coercion, intimidation or manipulation. The process is self-directed by the community from whom consent is being sought unencumbered by coercion, expectations or timelines that are externally imposed.
- **Prior:** Consent is sought sufficiently in advance of any authorization or commencement of activities.
- **Informed:** Engagement and type of information that should be provided prior to seeking consent and also as part of the ongoing process. Information should be accessible, clear, consistent, accurate, constant, and transparent, and delivered in appropriate language and culturally appropriate format.
- **Consent:** Refers to the collective decision made by the rights holders and reached through the customary decision-making processes of the communities.

High-level radioactive waste: This waste generates significant heat via radioactive decay. High-level waste is associated with penetrating radiation, thus requires containment and isolation for hundreds of thousands of years in a deep geological repository. High-level radioactive waste includes mostly used nuclear fuel, but there is a very small amount of non-fuel high-level waste that comes from other activities such as medical isotope production in nuclear facilities.

Intermediate-level radioactive waste: Intermediate-level waste is generated primarily from nuclear power plants, research reactors, and medical isotope manufacturers and users, including some medical applications. It consists of components from such areas as the nuclear plant's purification systems (e.g., filters, resins), the nuclear reactor core (e.g., pressure tubes) and equipment used to support reactor operations (e.g., core detectors). Intermediate-level waste generally contains long-lived radionuclides in concentrations that require containment and isolation for periods greater than several hundred years. Intermediate-level waste needs no provision, or only limited provision, for heat dissipation during its storage and disposal. Due to its long-lived radionuclides, intermediate-level waste generally requires a higher level of containment and isolation than can be provided in near-surface repositories. Waste in this class may require disposal at greater intermediate depths of the order of tens of metres to a few hundred metres or more.

Low-level radioactive waste: Low-level radioactive waste comes from operating reactors and from medical, academic, industrial and other commercial uses of radioactive materials. Low-level waste contains materials with radionuclide content above established clearance levels and exemption quantities (set out in the *Nuclear Substances and Radiation Devices Regulations*), but generally has limited amounts of long-lived activity. Low-level waste requires containment and isolation for periods of up to a few hundred years. An engineered near-surface disposal facility is typically appropriate for low-level waste. The responsibility for disposal of low-level radioactive waste resides with the waste owner and waste generator, not with the NWMO.

Non-fuel high-level radioactive waste: Non-fuel high-level radioactive waste comes from activities such as production of certain medical isotopes in nuclear facilities. Medical isotopes have various industrial and medical applications such as cancer treatments, medical imaging, or sterilization of single-use medical devices and surgical instruments. This waste generates a significant amount of heat and radioactivity, which requires shielding and isolation in a deep geological repository.

Radionuclide: A type of atom that is unstable and can release energy in the form of radiation as it changes into a different type of atom. They can occur naturally in the environment such as in soil and rocks or are produced as a byproduct of generating electricity in nuclear reactors. Some examples of radionuclides include uranium, radon and carbon-14.

Rights holders: Indigenous Peoples are rights holders and hold collective rights that flow from their continued use and occupation of certain areas. There are inherent rights that Indigenous Peoples have practiced and enjoyed since before European contact. Each First Nation has historically functioned as a distinct society; there is not one official overarching Indigenous definition of what these rights are. These rights are constitutionally protected.

Shielding: Shielding refers to protecting nuclear energy workers, the public or the environment from exposure to the harmful effects of ionizing radiation (a type of energy released by atoms that travel in the form of electromagnetic waves or particles). Shielding is achieved by using barriers such as lead, concrete, rock, depleted uranium, steel or a combination of these materials.

Small modular reactors: Small modular reactors are advanced reactors that produce electricity of up to 300 MW(e) per module, which is less than current power generation reactors.

United Nations Declaration on the Rights of Indigenous Peoples and ***United Nations Declaration on the Rights of Indigenous Peoples Act*****:** Responding to the Truth and Reconciliation Commission's Calls to Action 43 and 44, in 2016, the Government of Canada endorsed the United Nations Declaration on the Rights of Indigenous Peoples without qualification and committed to its full and effective implementation. On June 21, 2021, the *United Nations Declaration on the Rights of Indigenous Peoples Act* received royal assent and immediately came into force. It creates a lasting framework to advance the implementation of the United Nations declaration at the federal level.

Used nuclear fuel: Used nuclear fuel is a byproduct of nuclear power. Used nuclear fuel received at the repository would be a stable solid material sealed in a durable container. In the case of CANDU reactors, it is a solid material sealed in a bundle. Used nuclear fuel is highly radioactive and will remain that way for a long time. It is classified as high-level radioactive waste.

Waste: In the context of this report, waste is assumed to be a radioactive waste, unless specified otherwise (e.g., non-nuclear waste).

Waste generator/producer: The radioactive waste generator/producer is the organization whose operations produce radioactive waste.

Waste owner: The radioactive waste owner is the organization currently responsible for the radioactive waste.

Appendix A: More details about the project

WHAT ARE THE KEY COMPONENTS OF THE PROJECT?

Developing and constructing a deep geological repository for the long-term management of radioactive waste is a large and complex project that will be implemented over generations.

The shape and form of the project components depend, in part, on where the project will be located. It may be co-located with a deep geological repository that is being planned for existing used fuel, may be constructed as a stand-alone dedicated repository or may involve a combination of both.

Deep geological repositories typically consist of a network of underground tunnels and placement rooms for radioactive waste several hundred metres below the surface in stable rock formations. Their depth depends on the radioactive waste form, the geological setting and the impact of glacial cycles. They are designed with layers of safety, ensuring the containment system remains inherently safe and intact, even in the unlikely event that one or more components fail.

On the surface or above ground, the deep geological repository could include administrative buildings; buildings to support the receipt, handling and packaging of the radioactive waste; a ramp and headframes, hoisting and shafts buildings to access the underground repository; and support facilities such as a water treatment plant and an excavated rock management area.

Below ground, access tunnels leading to a network of engineered placement rooms would be constructed for the disposal of the radioactive waste in disposal-ready containers. We expect that the intermediate- and high-level radioactive waste placement rooms would be separate to accommodate their unique geometries and radiological characteristics.

The radioactive waste would be monitored throughout all phases of the project, and the waste is expected to be retrievable up to the completion of the monitoring phase and closure of the deep geological repository. The access tunnels and shafts would be sealed only when regulatory conditions are satisfied.

A strong safety case must be developed that demonstrates with confidence that the project can be safely implemented at the designated site. The project must meet all applicable regulatory standards and requirements for protecting the health, safety and security of people; protecting the environment, including water and waterways; and respecting Canada’s international commitments on the peaceful use of nuclear energy.

HOW WILL THE RADIOACTIVE WASTE BE TRANSPORTED TO THE SELECTED SITE?

The process of transporting the radioactive wastes described in this document will follow well-established requirements and standards laid out by federal regulatory authorities such as Transport Canada and the Canadian Nuclear Safety Commission (CNSC). The transport of radioactive materials in Canada is governed by the *Packaging and Transport of Nuclear Substances Regulations* and *Transportation of Dangerous Goods Regulations* that are based on internationally accepted standards.

In fact, radioactive waste has been safely transported in Canada, particularly in Ontario, for several decades without any radioactive material being released into the environment. This equates to several thousands of shipments over millions of kilometres.

Intermediate- and high-level radioactive wastes are transported in specially designed transportation packages. As a requirement, the packages must have been subject to tests in which they survived and retained their content under accident conditions. This is to ensure the safety of the public and the environment, including the protection of water. These accident conditions include a series of severe tests, including drops from height, a water immersion test and a fire test. As well, the design, testing, manufacturing and quality assurance program for these transportation packages are reviewed by the

CNSC. Once the CNSC is satisfied that transportation regulatory requirements are met, it will issue a package design certificate of approval for the use of these packages in the public domain. These transportation packages are also required to be inspected and maintained on a regular basis and are subject to CNSC re-certification.

Transport Canada's regulations require that additional transport requirements be met such as shipping documentation, safety marks, training and emergency management before a shipment of radioactive material can occur in the public domain.

While the transportation program would not begin until the second repository is operational, likely in several decades, the NWMO recognizes it is a subject of broad public interest. We understand the dialogue around waste transportation is a priority for many Indigenous communities, and we are committed to listening to their concerns and perspectives. Early planning and engagement with Indigenous and municipal communities is essential to ensure their perspectives are considered in the transportation planning process.

WHAT IS THE COST OF THE PROJECT?

The eventual cost of this project depends on the volumes of radioactive waste generated, the location of the site, how the nuclear landscape evolves in Canada, and other factors. Estimates will consider what costs can reasonably be expected to occur over the many decades of the project, along with a contingency for unexpected events.

Costs would include the various phases of the project, including pre-siting, siting and detailed characterization, regulatory reviews, design, construction, operations, transportation, and the decommissioning and closing of the repository. There could be cost advantages to the co-location scenario, as efficiencies from the first repository would be built in.

The NWMO will work towards determining the potential project cost range for these scenarios over the next several years and revise them, as necessary, as future reactors, nuclear energy expansion projects and new nuclear technologies come on stream.

Nuclear waste owners are currently setting aside funds to cover the costs of radioactive waste disposal through various methods, including segregated funds and trust funds.

HOW WILL THE PROJECT BE FUNDED?

Funds required to cover the full cost for disposal of these wastes in a deep geological repository will be borne by nuclear waste owners and generators. It is specified in the Government of Canada's modernized *Policy for Radioactive Waste Management and Decommissioning* that waste owners and generators are responsible for funding and developing plans for the disposal of radioactive waste.

Oversight and regulation of radioactive waste management and decommissioning is the responsibility of the CNSC. As mandated under the *Nuclear Safety and Control Act*, the CNSC requires waste producers to provide financial guarantees to cover the cost (in present value terms) associated with interim storage, decommissioning and the long-term management of radioactive waste produced to date.

The guaranteed funds are reviewed independently by the CNSC as part of the waste owner licence requirements and are satisfied by segregated funds or other guaranteed financial instruments.

This same requirement, to set aside funds for disposal, would be applicable for new or small nuclear waste owners (e.g., small modular reactors, micro reactors) and producers of any future radioactive waste that is produced in Canada. The NWMO is committed to working with new or small nuclear waste owners and producers to ensure that the costs associated with the disposal of their intermediate- and high-level waste is reflected in their financial guarantees to the CNSC.

WHAT IS THE EXPECTED TIMING OF THIS PROJECT?

Timing will depend on many factors and will evolve as more information about future nuclear projects becomes available. Construction of the deep geological repository will only start after willingness of the host communities is established, and after the appropriate regulatory and environmental approvals have been received. Thus, it is not expected to begin until at least the late 2040s. Figure A1 below shows a preliminary timeline.

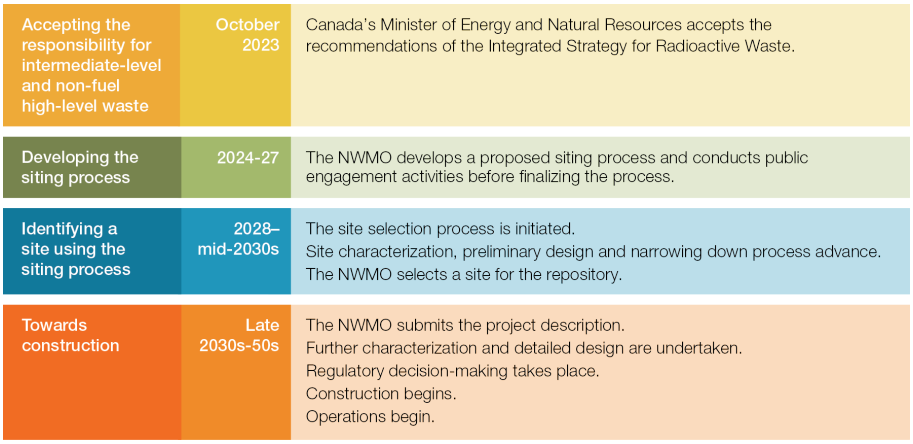

Figure A1: This is a proposed timeline for the project.

While planning and implementing a large project includes adhering to schedules and timelines, we understand that meaningful, collaborative work requires careful consideration, patience, open-mindedness and humility.

WILL THE DEEP GEOLOGICAL REPOSITORY BE MONITORED?

There will be an extensive environmental and operational monitoring program for ground and surface water, radiation, air quality and more. Monitoring will start prior to construction and will continue through operations and beyond. There will also be an extended monitoring period following placement of the waste to ensure the repository is performing as expected.

Appendix B: Initial screening criteria

To determine: Are there any obvious reasons why the project is not feasible in this location?

Initial screening is conducted at the request of communities interested in learning more about the project. The purpose is to quickly assess whether there are any obvious conditions that would exclude a community from the site selection process based on readily available information, including Indigenous Knowledge, or reciprocally for the community to learn and understand at a high level if the project has no potential to be a good fit for it.

The following screening criteria *must* be satisfied:

- The potential exists for developing long-term, sustainable and resilient relationships among interested Indigenous communities, municipal communities and the NWMO in the vicinity of the potential site.
- The site must have available land of sufficient size to accommodate the surface and underground facilities.
- This available land must be outside protected areas, heritage sites, provincial parks and national parks.
- Natural hazards in the repository area are unlikely or can be mitigated through facility design so as not to affect operations.
- This available land must not contain sufficient known groundwater resources at the repository depth that could be used for drinking, agriculture or industrial uses, so that the repository site is unlikely to be disturbed by future generations.
- This available land must not contain economically exploitable natural resources as known today, so that the repository site is unlikely to be disturbed by future generations.
- This available land must not be located in areas with known geological and hydrogeological characteristics that would prevent the site from being safe, considering the detailed safety requirements.
- The required infrastructure to support the implementation of the project is available or could reasonably be developed in the area.

Communities that pass the initial screening and confirm their intent to continue to learn more will move to the next activity.

Appendix C: Preliminary assessment: Safety

To determine: Is there potential for a safe site at this location?

Any site selected to host the project must be able to protect present and future generations, as well as the environment, including water. The preferred site will have a host rock with desirable characteristics (geological, hydrogeological, chemical and mechanical) that support containment and repository performance.

Safety will be assessed by evaluating the following safety-related questions and performance objectives, as well as potential factors identified by Indigenous Knowledge:

1. **Safe containment and isolation of the radioactive waste.** Are the characteristics of the rock at the site appropriate to ensure the long-term containment and isolation of intermediate- and high-level waste from people, the environment, including water, and surface disturbances caused by human activities and natural events?
2. **Long-term resilience to future geological processes and climate change.** Is the host rock geologically stable and likely to remain stable over a long term in a manner that will ensure the repository will not be substantially affected by geological and climate change occurrences such as earthquakes and glacial cycles?
3. **Safe construction, operations and closure of the repository.** Are conditions at the site suitable for the safe construction, operations and long-term monitoring and decommissioning of the repository?
4. **Isolation of the radioactive waste from future human activities.** Is human intrusion at the site unlikely, for instance through future exploration or mining?
5. **Amenability to site characterization and data interpretation activities.** Can the geological conditions at the site be practically studied and described on dimensions that are important for demonstrating long-term safety?

The above questions and objectives must be addressed in an iterative manner throughout the preliminary and detailed assessments to gradually develop confidence in safety, based on a series of safety criteria, as described in more detail in Table C1.

These safety criteria were selected in order to ensure that the expectations of Canadian regulators, as outlined in legislation and guidance documents, will be addressed through the site assessment process. Regulatory authorities will independently review the project and site to ensure safety and the protection of people and the environment, including water, before the project can proceed. The safety criteria are also comparable to those of other countries, as well as those recommended by the International Atomic Energy Agency.

TABLE C1: SAFETY CRITERIA		
Factors affecting safety	Performance objectives	Suggested evaluation factors to be considered
1. Containment and isolation by the host rock at the repository site	The geological, hydrogeological, chemical and mechanical characteristics of the host rock should: • Promote long-term isolation of intermediate- and high-level waste from humans, the environment and surface disturbances; • Promote long-term containment of intermediate- and high-level waste within the repository; • Restrict groundwater movement; and • Prevent the movement of any released radioactive material.	• The depth of the host rock formation should be sufficient for isolating the repository from surface disturbances and changes caused by human activities and natural events. • The volume of available competent rock at repository depth should be sufficient to host the repository. • The volume of available competent rock at repository depth should provide sufficient distance from active geological features such as zones of deformation or faults and unfavourable heterogeneities. • The mineralogy of the rock, and the geochemical composition of the groundwater and rock porewater at repository depth, should not adversely impact the expected performance of the repository multiple-barrier system. • The hydrogeological regime within the host rock should exhibit low groundwater velocities. • The mineralogy of the host rock, and the geochemical composition of the groundwater and rock porewater, should be favourable to slowing radionuclide movement. • The host rock should be capable of withstanding natural stresses and thermal stresses induced by the repository system without significant structural deformations or fracturing that could compromise the containment and isolation functions of the repository.

TABLE C1: SAFETY CRITERIA		
Factors affecting safety	Performance objectives	Suggested evaluation factors to be considered
2. Long-term stability of the repository site	The containment and isolation functions of the repository should not be unacceptably affected by future geological processes and climate changes, including earthquakes and glacial cycles.	• Current and future seismic activity at the repository site should not adversely impact the integrity and safety of the repository system during operation and in the very long term. • The expected rates of land uplift, subsidence and erosion at the repository site should not adversely impact the containment and isolation functions of the repository. • The evolution of the geomechanical, hydrogeological and geochemical conditions at repository depth during future climate change scenarios such as glacial cycles should not have a detrimental impact on the long-term safety of the repository. • The repository should be located at a sufficient distance from geological features such as zones of deformation or faults that could be potentially reactivated in the future.
3. Repository construction, operations and closure	The surface and underground characteristics of the site should be favourable to the safe construction, operations, closure and long-term performance of the repository.	• The strength of the host rock and in situ stress at repository depth should be such that the repository could be safely excavated, operated and closed without unacceptable rock instabilities. • Natural hazards in the repository area are unlikely or can be mitigated against through facility design so as not to affect operations. • The available surface area should be sufficient to accommodate surface facilities and associated infrastructure.

TABLE C1: SAFETY CRITERIA		
Factors affecting safety	Performance objectives	Suggested evaluation factors to be considered
4. Human intrusion of the repository	The site should not be located in areas where the containment and isolation functions of the repository are likely to be disrupted by future human activities.	• The repository should not be located within rock formations containing economically exploitable natural resources at repository depth such as gas/oil, coal, minerals and other valuable commodities as known today. • The repository should not be located within geological formations containing groundwater resources at repository depth that could be used for drinking, agriculture or industrial uses.
5. Site characterization	The characteristics of the site should be amenable to site characterization and site data interpretation activities.	• The host rock geometry and structure should be predictable and amenable to site characterization and site data interpretation.

Appendix D: Preliminary assessment: Community well-being

To determine: Is the project good/beneficial for the community?

This project is a large, high-technology project that will have an impact on the host communities and surrounding areas. The construction of a deep geological repository is conducted in phases, including siting, site characterization, licensing, design and construction. This project will involve scientists, Indigenous Knowledge Holders, engineers, professionals, tradespeople, public engagement researchers and communicators, and many others, who will be working and potentially living in the community.

The project also offers employment and income revenue to the siting area and host province, including the opportunity for the creation of job training, the development of transferable skills and capacity building. Local businesses, including Indigenous-owned businesses, will be given opportunities to support economic, cultural and environmental sustainability.

Beyond ensuring safety, the NWMO's commitment to any host community and region is that its long-term well-being or quality of life will be fostered through its participation in this project.

We understand that interested communities are best positioned to assess their long-term interests, and ultimately decide to what extent the project is compatible with their community members' vision and aspirations. It is therefore important that interested communities assess whether they are ready to manage economic growth while ensuring they maintain the long-term health and sustainability of their community and region. We also understand that there is no universal template to assess community well-being. The assessment approach is shaped by the specific social, economic and cultural conditions of each community.

We are grateful to the Indigenous and municipal communities we have worked with and to members of the Council of Elders and Youth who have helped us to better understand what fostering well-being might look like in various communities.

The following well-being assessment framework is proposed as a high-level guide that potential host communities may wish to consider as they explore how this project can be implemented in a manner that will foster their well-being or quality of life and that of surrounding areas. The framework needs to be adapted and refined to meet the specific needs, and social, cultural and spiritual practices of each community, including the role of Indigenous Knowledge.

The framework involves potential host communities and the NWMO working collaboratively through the following activities and milestones:

1. Engage Indigenous and municipal community members to develop an initial long-term community well-being vision without considering the project, if not already available;
2. Engage in sustained two-way dialogues where the NWMO learns about the community and the community learns about the safety, environmental, social, cultural and economic aspects of the project;
3. Update the community's long-term well-being vision through layering the various aspects of the project on community members' priorities, concerns and aspirations;
4. Assess the project benefits and impacts through a wide range of environmental, socio-economic and cultural assessments, considering community members' questions, concerns and priorities;
5. Identify possible project implementation plans and mitigations the NWMO would need to put in place to ensure that the project helps foster well-being, which would be reflected in a hosting agreement between the community and the NWMO; and
6. Potential host communities make an informed decision on willingness to host the project.

These suggested activities and milestones are supported by sustained engagement, learning and awareness-building programs, and our *Indigenous Knowledge Policy* (2020) and *Reconciliation Policy* (2019), within the siting area and the region.

The shape and manner of community well-being assessments will be designed and implemented considering each community's needs and its internal engagement and decision-making processes, and the need for independent assessments where required.

Ongoing engagement, learning and awareness building

Figure D1: Community well-being framework: These are suggested activities to support communities to make an informed decision.

In considering the above framework, and to ensure that well-being assessments cover the interests of a wide cross-section of the community, the NWMO encourages Indigenous and municipal communities to consider a holistic approach. It could include key elements of the sustainable livelihood framework such as people or human assets, infrastructure or physical assets, society and cultural or social assets, natural environment or natural assets, and spiritual assets. This framework is the result of the many years of dialogue among Canadians, Indigenous Peoples and the NWMO.

Figure D2: These are factors for communities to consider while discussing well-being.

Table D1 outlines community well-being criteria based on growing international experience in establishing factors that contribute to the well-being of communities in which large projects such as this one are implemented. They are proposed as a starting point for discussions with interested communities and would be adapted to address the specific needs, questions, concerns and priorities of each community.

Low performance on any one of these factors would not exclude a community from consideration. The ability of the community to benefit from the project, and the resources that would be required from the NWMO to support the community in achieving this benefit, would be a consideration in the selection of a site. This applies after all safety considerations have been satisfied, along with other site selection factors outlined in this document.

TABLE D1: COMMUNITY WELL-BEING CRITERIA	
Community well-being criteria	Evaluation factors
Potential social, economic and cultural effects during the implementation phase of the project, including factors identified by Indigenous Knowledge	Sites will be evaluated against the extent to which positive and negative effects on the host community can be addressed during the implementation phase of the project, including the following areas: • Cultural beliefs and practices; • Health and safety of residents and the community; • Sustainable built and natural environments; • Local and regional economy and employment; • Community administration and decision-making processes; and • Balanced growth and healthy, livable community.
Potential for enhancement of the community's and the region's long-term sustainability through implementation of the project, including factors identified by Indigenous Knowledge	Sites will be evaluated against the extent to which positive and negative effects of the project on long-term sustainability of the host community and region can be addressed in the following areas: • Health, safety and inclusiveness/cohesion of the community; • Sustainable built and natural environments; • Dynamic resilience of the economy; • Community decision-making processes; and • Balanced growth and healthy, livable community.
Potential to avoid ecologically sensitive areas and locally significant features, including factors identified by Indigenous Knowledge	Sites will be evaluated for the following: • Ability to avoid ecologically sensitive areas and locally significant features; • Ability to protect water; and • Ability to avoid or minimize impacts on culturally significant sites identified by Indigenous communities.
Potential for physical and social infrastructure to adapt to changes resulting from the project	Sites will be evaluated for the following: • The availability of physical infrastructure required to implement the project; • The ability of the community, and the social infrastructure it has in place, to adapt to changes resulting from the project; and • The NWMO resources required to put in place physical and social infrastructure needed to support the project.

Appendix E: Preliminary assessment: Long-term collaboration with communities

To determine: Is there potential for long-term relationships and collaboration between the NWMO and the communities?

Since our inception, the NWMO has been committed to building relationships and collaboration with Canadians, Indigenous Peoples, interested communities, the scientific community and a wide range of people in addressing the technical and societal challenges and opportunities associated with the long-term management of radioactive waste.

One of the key criteria for selecting a safe site with informed and willing host communities is the potential to develop supportive and resilient relationships in the siting area. It is critical that the project be implemented collaboratively with communities, in a manner that is sustainable for the many decades required for the project to undergo regulatory review and licensing, construction, operations, decommissioning and closure.

In addition to assessing the potential for fostering community well-being or quality of life, the NWMO will assess the potential to develop sustainable, collaborative relationships in each potential host community. This will be done through engagement, information gathering, learning and dialogue with community residents and area leaders. This process will be guided by the NWMO's *Indigenous Knowledge Policy* (2020) and *Reconciliation Policy* (2019).

The potential for building sustainable long-term relationships will be informed by indicators such as:

- Level of support for the project by community leadership and citizens in the siting area;
- Support for field studies that are required to assess potential suitability of the sites;
- Confidence in safety as measured by the degree to which potential host communities have learned and understand the safety aspects of the project, and their degree of acceptance of it;
- Potential to identify a site as measured by the degree to which potential host community members are willing to discuss options and exchange ideas on the topic; and
- Potential for the project to align with community and area aspirations for community well-being and sustainable development.

As we continue to work with communities, we also commit to learning more about the relationships that are needed in each siting area and how their potential can be assessed, nurtured and sustained.

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