



What we heard:

Implementing Canada's plan in 2020

DECEMBER 2021



NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES

At the end of each year, the Nuclear Waste Management Organization (NWMO) reports on the content and nature of our ongoing dialogue with communities, interested individuals and organizations as we advance the implementation of Canada's plan. These "What we heard" reports are intended to share these conversations more broadly, and invite others who may be interested to add their voice and help shape the conversation.

TABLE OF CONTENTS

INTRODUCTION	2
2020 IN REVIEW	3
EXPLORING SAFETY TOGETHER	6
EXPLORING PARTNERSHIP AND WILLINGNESS	9
PROJECT VISIONING	12
BOREHOLE STUDIES AND LAND ACCESS	17
RECONCILIATION AND INDIGENOUS KNOWLEDGE	20
TRANSPORTATION	24
SOCIAL MEDIA AND ONLINE CONVERSATIONS	26
IMPLEMENTING ADAPTIVE PHASED MANAGEMENT 2021 TO 2025	27
GLOSSARY	28

» INTRODUCTION

In 2020, the Nuclear Waste Management Organization (NWMO) continued to implement Canada's plan for the safe, long-term management of used nuclear fuel. The 2020 What We Heard Report is the latest in a series of annual reports that document what we heard through ongoing dialogue and engagement with people and organizations in and around the communities in our site selection process, as well as the broader public.

The global COVID-19 pandemic tested the resiliency of the project and its ability to adapt to rapid social change. Through extensive community collaboration, we revised our engagement program to meet the needs of a very difficult year. This included connecting with people virtually or in safe, socially distanced environments, and establishing new safety protocols. Much of what we heard reflects similar topics from the past decade of engagement, though there was greater emphasis on the potential effects of the project on the communities where it could be sited.

Communities in these areas expressed a desire for transparency, community involvement, and clear reporting focused on the values that are meaningful to their community. Through active collaboration with local leaders and interested citizens, the NWMO continued to explore partnerships and willingness. This included a project visioning process that meant developing a long-term vision for each community and exploring how the NWMO might best help advance that vision. Local residents also helped shape a deeper understanding of their environment by getting involved in biodiversity impact studies, and in both siting areas, we heard about the value of protecting water.

The NWMO also continued to assemble enough land in South Bruce to host a potential deep geological repository. By engaging landowners in the vicinity, we heard a range of views about potential impacts on property values. People in South Bruce also expressed interest in the environmental, social, economic and cultural effects of the NWMO's borehole drilling in the south. Furthermore, we heard about the importance of ceremony and respecting the traditional Indigenous lands on which the boreholes were drilled.

We continued our Reconciliation journey by working with Indigenous communities to navigate the pandemic. Overwhelmingly, we heard that they prioritized keeping their members safe. As a result, the NWMO paused engagement and technical site investigation work. Listening to communities also led us to providing them with financial support for responses to the pandemic, including a donation of masks and funds to Thunder Bay's Regional Food Distribution Association. Indigenous communities continue to highlight the importance of protecting the water, air and land.

The safe and secure transportation of used nuclear fuel to the siting area continued to be an area of interest for communities. In 2020, the NWMO released a draft framework for transportation planning that was shaped by what we heard in previous years. Response to the framework was positive, with people indicating it reflected their priorities and values. We also heard what people want to learn more about as we move through this collaborative process.

The NWMO also published Implementing Adaptive Phased Management 2021 to 2025, inviting public review and comment. We received responses from individuals, organizations, government agencies, Indigenous communities and private citizens across the country. Several themes emerged, including Indigenous relations, protecting the environment, and ensuring equity, security and safety.

We also heard from more citizens through social media than any prior year. Topics that drove conversation included the Land Access Process in South Bruce, opposition and support from community groups, and the NWMO's release of stories, scientific publications and multimedia communications efforts. So far, the concerns and issues we see expressed in public forums are reflective of the broad themes discussed in this report.

Public engagement continues to inform all the NWMO's work. In this report, you will find a detailed summary of the key questions, concerns and topics that we heard about in 2020 across a wide range of engagement programs.

» 2020 IN REVIEW

COVID-19 response

A core principle of Canada's plan for used nuclear fuel, which follows an approach known as Adaptive Phase Management (APM), is a commitment to adapt plans in response to community feedback, new knowledge and changes in context. The significant challenges associated with the global COVID-19 pandemic tested the resiliency of the project and its ability to adapt to rapid social change. The NWMO ended March 2020 complying with all local and provincial public health orders, shuttering offices and cancelling all planned public engagement until further notice.

As we adapted to the pandemic, we adjusted timelines for technical, socio-economic and environmental fieldwork in both the South Bruce and Ignace siting areas, based on community input. Through extensive community collaboration and dialogue, we revised our engagement program to meet the needs of a very difficult year. Although limited in some ways, we were still able to connect with people virtually or in safe,

socially distanced environments, and through the establishment of safety protocols for engagement.

Engaging safely and virtually

Our site selection process has always been rooted in community dialogue and exploration. When the pandemic struck, we immediately redesigned our engagement approaches to keep communities and employees safe. Throughout the first half of 2020, NWMO teams worked with community liaison committees (CLCs) to experiment with virtual options for meetings and workshops. By April, various groups of subject matter specialists were testing out new information technology (IT), trying out new ways to utilize old IT, and converting previously scheduled in-person engagement events to safe and accessible virtual events. We also reached out to industry and business groups to offer briefings, understanding there was still a desire in the community to learn about APM and its potential impacts.



NWMO staff discussing the project with a member of the South Bruce community, November 2020.

In the summer, restrictions in siting areas began to ease and we decided to hold a few, limited public showcases of our Mobile Learn More Exhibit in September. All were well attended and followed local public health guidelines to ensure visitor safety. People were impressed with the effort to provide opportunities to learn more about the project in a safe and community-responsive way. Following an extensive tour of northwest communities in September, we launched our most comprehensive local engagement campaign to date, holding 10 days of safe, socially distanced Open Houses in the four communities that make up the Municipality of South Bruce, Ontario: Teeswater, Mildmay, Formosa and Belmore. Visitors were able to speak to subject matter specialists, learn about radiation and used nuclear fuel, and about Canada's plan to safely manage used nuclear fuel in a deep geological repository. We were also pleased to share details about the upcoming site selection studies in the community that are designed to assess safety, as well as other environmental, technical and social considerations.

To expand access to those who could not attend in person, a Virtual Open House was also hosted,

with NWMO staff standing by to answer community questions through Live Chat. The NWMO also made telephone calls to South Bruce residents to answer questions and invite people to the in-person or virtual Open Houses. What we heard through this combination of safe and virtual learning events was similar to the topics and questions we have heard over the last decade of our site selection process. However, there was a greater emphasis on teasing out potential effects (both positive and negative) of becoming a partner in implementing APM in the area.

We also heard that people wanted the NWMO to have experts on hand that could provide answers to their questions directly where possible, and for us to better understand community concerns and aspirations. Some people also asked for evidence or demonstrations of the safety of Canada's plan. Despite the restrictions in place, residents of siting areas were able to see models and displays developed to assist with learning. In many cases, these materials were sufficient to ease people's concerns about the technology or other aspects of APM.



A Virtual Open House was built to engage with people when attending in person was not possible.

Interest in new and emerging technologies

Another topic we hear about is new and emerging nuclear technologies. Often driven by media reports, there is growing public interest in learning about small modular reactors (SMRs) and how these might impact the implementation of APM. Common questions include:

- How many Canada Deuterium Uranium (CANDU) reactors are in Canada?
- What is an SMR, and how does the technology compare to CANDU reactors?
- What kind of fuel is used for SMRs?
- Will the NWMO be able to manage used fuel from SMRs safely?
- Who will manage radioactive wastes from SMRs, other than the used fuel?
- Can CANDU fuel be reused or reprocessed in an SMR to reduce the volume of waste to be managed by the NWMO?
- Can CANDU reactors overseas reprocess or recycle other kinds of nuclear fuel?

In response to these and other questions, the NWMO developed a backgrounder in 2018 called Small Modular Reactors: Managing Used Fuel, which remains available on our website. It outlines the NWMO's responsibility for the long-term management of all Canada's used nuclear fuel, including any created

using new or emerging technologies. We will also keep up with technological advancements to anticipate any changes in fuel cycles and the types of waste we might be required to manage in the future. This information on new technology is shared with the public through the annual Watching Brief on Advanced Fuel Cycles, available online at www.nwmo.ca/adaptation.

Climate change

People also remain interested in how the NWMO will adapt the project to the challenges posed by climate change. It is a common topic, often prompted by people's belief that the technology could be a means to reduce greenhouse gas emissions from electricity production. We spoke with people who noted major climate and social events around the world in 2020, and we recognize that it is top-of-mind for many people. Our engagement and technical specialists often speak about our specific duty to manage the end of the nuclear fuel cycle, and respond to questions about how we will adapt to present and future climate change, including both warming and cooling (i.e. ice ages), and the possibility of social disruption that might impact the ongoing interim management of used nuclear fuel at reactor sites.

» EXPLORING SAFETY TOGETHER

Community directed learning

Through virtual community liaison committee meetings, lunch and learn events, open houses, workshops and project briefings in the community, people were able to participate in site selection activities throughout the global COVID-19 pandemic and associated lockdowns. Following the disruption to regularly scheduled community events, the NWMO hosted online virtual venues for engagement events on topics such as safety. Presentation titles at community meetings in 2020 included:

- Development of the safety case and international experience
- Geology and borehole drilling in Southern Ontario
- APM Project description
- Environmental site investigation
- Safety assessment
- Corrosion/microbiology radiation and its impact on the engineered barrier system
- NWMO's engineered barrier science
- Transportation planning framework
- Borehole findings and updates

Communities also heard from a diverse range of external voices speaking on Canada's plan for used nuclear fuel, including representatives from the Canadian Nuclear Safety Commission (CNSC), academics, nuclear industry, and voices critical of nuclear energy and the Adaptive Phased Management (APM) project.

Externally organized community meetings in 2020 included:

- CNSC: Their role, research and Indigenous engagement and consultation
- Meet the regulator virtual information session
- Electrochemistry and corrosion science
- A feasibility study on recycling of used CANDU fuel
- Role of fuel handling nuclear operator
- President of the Canadian Coalition for Nuclear Responsibility
- Deep geologic repository concerns

For CNSC presentations, community questions were solicited in advance so that the regulator could tailor the presentation to specific topics of interest. Themes included:

- Public engagement;
- Waste management;
- Geoscience and deep geological repositories;
- Environmental assessment;
- Licensing service agreements;
- Emergency preparedness; and
- Health and safety.

Similarly, a webinar was also organized in Ignace to respond to questions posed by residents to their elected municipal leadership. This webinar covered various topics of concern, as well as questions related to safety, such as:

- Engineered barrier design protections;
- Surface facilities configuration;
- Facility buffer area; and
- Environmental site assessment.

Building confidence in safety with local input

A way of building confidence in the safety of APM is by closely involving residents in the environmental monitoring program. This program will be used to identify potential impacts of the project. Local input has been solicited through a series of workshops held in both siting areas in 2020. Beginning in 2019 and extending through 2020, communities were able to help shape a deeper understanding of their local environmental conditions, through involvement in biodiversity impact studies.

People expressed a desire for openness, transparency, ongoing community involvement, and clear and relevant reporting focused on the values that are meaningful to their community. We heard that the environmental impact of settlement brought-on by the siting of APM is already a consideration, even in this early phase. One focal point common in both siting areas is the value of protecting water. For example, residents requested the establishment of a drinking water supply monitoring program and a study of water cycles. Both were initiated over the course of the year as part of the NWMO's environmental baseline program.

The safety of water is also commonly discussed in relation to the engineered barrier system. People are interested in the behaviour of water at depths below 500m and how it can be studied for the purposes of the project. In fact, people often ask about how the

NWMO will study conditions deep underground, and how we can be confident that our safety measures will ensure safe performance long into the future.

As more detailed studies are being implemented to understand the feasibility of the project in the siting areas, the Municipality of South Bruce and the Township of Ignace have advanced work focused on the communities' visions for the project, by exploring questions, comments and expectations around Canada's plan.

We have heard that ensuring safety and security continues to be a common principle. This includes the demonstration of the highest standards of safety across the lifespan of the project and into the distant future. With strong connections to distinct local environments, community members have indicated that sufficient measures should also be in place to protect waters, land and air. Communities also desire more knowledge on the demonstration of safety of APM, through detailed learning and dialogue on the potential challenges and effects of the project. People are also interested in exploring the kinds of benefits nearby communities might experience with a \$26B national infrastructure project in the area. Indeed, many conversations in 2020 were about beginning to define the potential risks and benefits of the Canada's plan for used nuclear fuel, both with municipal officials and members of the public at large.

FREQUENTLY ASKED QUESTIONS: **SAFETY**

- How long will this radioactive material be dangerous?
- How can you know if it will be safe over millions of years?
- How much radiation would this facility emit in a year?
- Will this affect groundwater and nearby waterways like rivers, lakes and the Great Lakes?
- How will people and the environment be protected? What is the multi-barrier system?
- Do used fuel containers and packages become radioactive?
- Would the driver of a transport vehicle with an NWMO package be safe? What would their dose level be?
- What is a deep geological repository? How will it isolate used nuclear fuel from people and the environment?
- How will the environment, and specifically water, be protected during technical studies when you are drilling boreholes?
- How will the environment be protected when the repository is under construction and during operations?
- What are the safety measures at surface facilities? How will these facilities use water, treat waste and safely manage radioactive sources?
- Used nuclear fuel is moved around at nuclear power plants and in interim storage sites already. Are there any activities that would be considered higher risk than the activity already being done at the nuclear power plants?
- What are the environmental impacts of the rock pile that will be created during the deep geological repository construction?
- How will an emplacement room in the deep geological repository be filled? Will robots be used?
- What is the radiation limit for a nuclear worker in Canada?
- Will there be a monitoring system placed underground?
- How is the NWMO technically demonstrating safety of the project?
- Is the NWMO considering disruptive events such as forest fires, flooding and extreme weather?
- Does the NWMO take into consideration the possibility of earthquakes?
- Can land on top of the repository be farmed?

»» EXPLORING PARTNERSHIP AND WILLINGNESS

With municipalities and First Nations communities bearing the weight of many of the public health challenges presented by the global COVID-19 pandemic, the NWMO continued to listen to communities and respect their needs. This meant ceasing drilling work completely in the northwest siting area and delaying its commencement in South Bruce. Community offices only re-opened when permitted by local regulations and in dialogue with community leadership in both areas.

Communities continued to learn about and explore the Adaptive Phased Management (APM) project, and we advanced engagement activities in ways that met best practices and community expectations around health and safety. For example, the NWMO hosted a range of in-person, virtual, and hybrid engagement and learning events once Ontario began easing restrictions in mid-2020. Even though most NWMO employees were working from home, subject matter specialists participated in meetings of local Councils or community liaison committees, through video and voice conferences.

From working with communities and citizens, we learned that the complex topic of radioactive waste is often best suited to face-to-face discussions without firm time limits. Switching to largely online engagement was a challenge we were able to meet through active collaboration with local leaders and interested residents in the siting communities.

Under the leadership of Ignace and South Bruce, project visioning work was completed in these communities. Beginning in 2019, this community dialogue built on previous discussions in the community to

develop a long-term vision for the community without considering Canada's plan for used nuclear fuel. This most recent dialogue used the community vision as a starting point for engagement activities involving community members in dialogues to explore how the NWMO might best help contribute to and advance that community vision. With the support of third-party consultants, the emerging project vision was summarized and described in reports published in each community. Developing a community specific vision for the project marks the completion of the second step in the 'partnership roadmap', which includes a series of activities developed with communities to explore the potential for partnership.

These communities also began to consider how they will assess and demonstrate their willingness for the project to be implemented in the area. Community discussions are advancing through 2021 with the help of third-party consultants selected by the communities and a report outlining community plans for demonstrating willingness, which is expected to be published in each siting municipality by the end of 2021. The project will only proceed in an area with the involvement of the interested community, First Nation and Métis communities and others in the area working together to implement the project. Conversations and engagement activities continue throughout the siting areas to explore whether there is potential for the support the project will need. Communities will need the information from borehole studies, community studies and draft partnership agreements in order to make this demonstration of willingness; some of that information will be available at the end of 2022, some not until 2023.

Road map to partnership (2017-22)



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

FREQUENTLY ASKED QUESTIONS:

PARTNERSHIP AND WILLINGNESS

- What is the definition of willingness?
- How will willingness and support be gauged? Will there be a referendum?
- What is our community's role in the site selection process? What do you need from us?
- What is the community liaison committee and when does it meet? Can I attend its meetings?
- Will there be changes to the timeline due to the pandemic?
- What are the local and/or regional benefits of hosting? Will there be local jobs or infrastructure?
- How do I get involved in my community's decision-making process? Is there a local committee?
- What does the rock look like here in the region? Is it suitable for a deep geological repository?
- Have you talked to [my neighbour] about the project yet? I think they would be interested to know.
- What happens if local circumstances change? Can we opt out of the process?
- How much land is required to build the repository and facilities? Is there enough in my community?
- Will you be looking at Crown land for the repository?
- How can we prepare people in the community and area to participate in the project, and to develop skills and capacity?
- How will the NWMO ensure that the community and people in the area benefit?
- How can we begin to plan for jobs and longer-term economic development?
- What are the opportunities for businesses and employment associated with site selection?
- How are youth being engaged? How can we retain youth in our communities?
- What learning resources are available to students and youth?
- When will we begin to see economic activity and jobs in the area?
- What kind of training is available in the near future to build the kind of human resource capacity needed to accommodate the project?
- What resources are available to communities now to help build understanding of the project locally and with our neighbours?
- Are there economic opportunities related to the rock that is extracted from the repository?
- Who will be involved in partnership discussions? Local municipalities? Indigenous communities?
- Who needs to be supportive of the project in our area for it to proceed?
- How can I help build this partnership?
- With whom is the NWMO looking to partner?
- What resources are available to learn more about partnership and what partnership would mean for our community?
- Can a few people in an area who are opposed to the project prevent it from proceeding in the area?
- How can we help to get more people involved?

PROJECT VISIONING

Working in collaboration with the Ignace area and South Bruce, project visions were produced to explore the relationship between Canada's plan and each community's future visions for themselves. These visions have been used as a framework for discussing future community studies on potential impacts and benefits, as well as the potential partnership agreements.

The general approach to the workshops, workbooks, and one-on-one discussions focused on three key questions:

1. What are your key priorities and objectives for the Adaptive Phased Management (APM) Project?
2. What are the key concerns and questions about the project that still need to be addressed?
3. What are your thoughts about design features and/or activities that might help the Centre of Expertise support community well-being within the community and area?

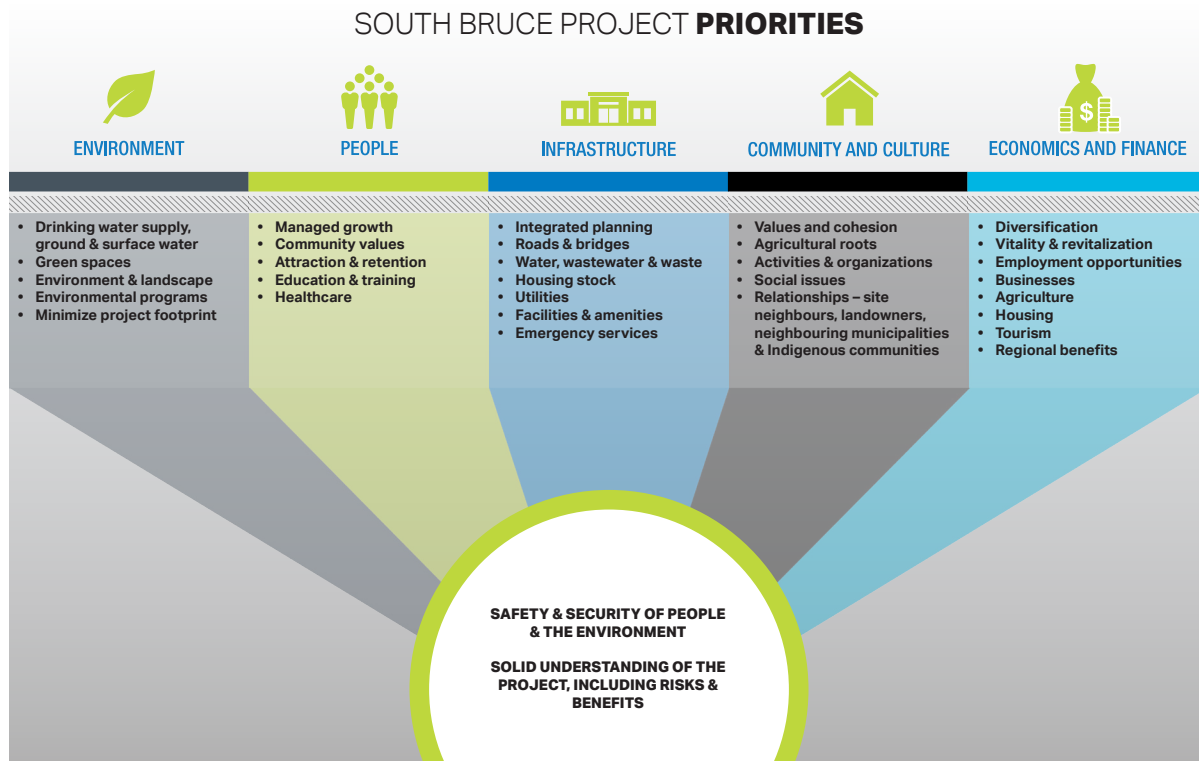
Reports were published in both communities in 2020 and reflected a detailed discussion about the priorities and objectives the community has for the project, if it were implemented in their area.

In both communities, a broad vision for the project was explored using a sustainable livelihoods framework, including the following five areas:

- Environment;
- People;
- Infrastructure;
- Community and culture; and
- Economics and finance.

More information about the visioning process is available in consultant reports online. Please follow the links on the following pages.

SOUTH BRUCE, ONT.



South Bruce's project vision

A series of nine workshops were held in South Bruce in 2019 and 2020, resulting in a draft project vision. Further discussion and comment was sought from community members on the emerging vision before it was finalized and documented in a report published in July 2020. Workshops were held in Formosa, Teeswater and Mildmay, and included two pilot workshops with members of the community liaison committee and municipal staff. Six community workshops and one youth workshop were also held.

The project vision is built on an understanding that first and foremost, the project must ensure the safety and security of people and the environment, including consideration of:

- Transportation safety;
- Safety of the underground facility for public and workers; and
- The risk of leaks, accidents or malfunctions in operations or long-term storage.

The project vision is also premised on ensuring that the community has a good understanding of the project, such as its potential challenges, adverse effects and benefits.

The Municipality of South Bruce drew on the project vision discussion to create a list of 36 draft principles which were ultimately endorsed by the Municipal Council, who resolved that the Municipality's assessment of willingness would be guided by the principles. They also provided a strong basis for conducting a suite of technical, environmental, safety and socio-economic studies in the area, that will be presented to the community and begun in 2021.

KEY QUESTIONS FROM THE SOUTH BRUCE VISIONING WORKSHOPS

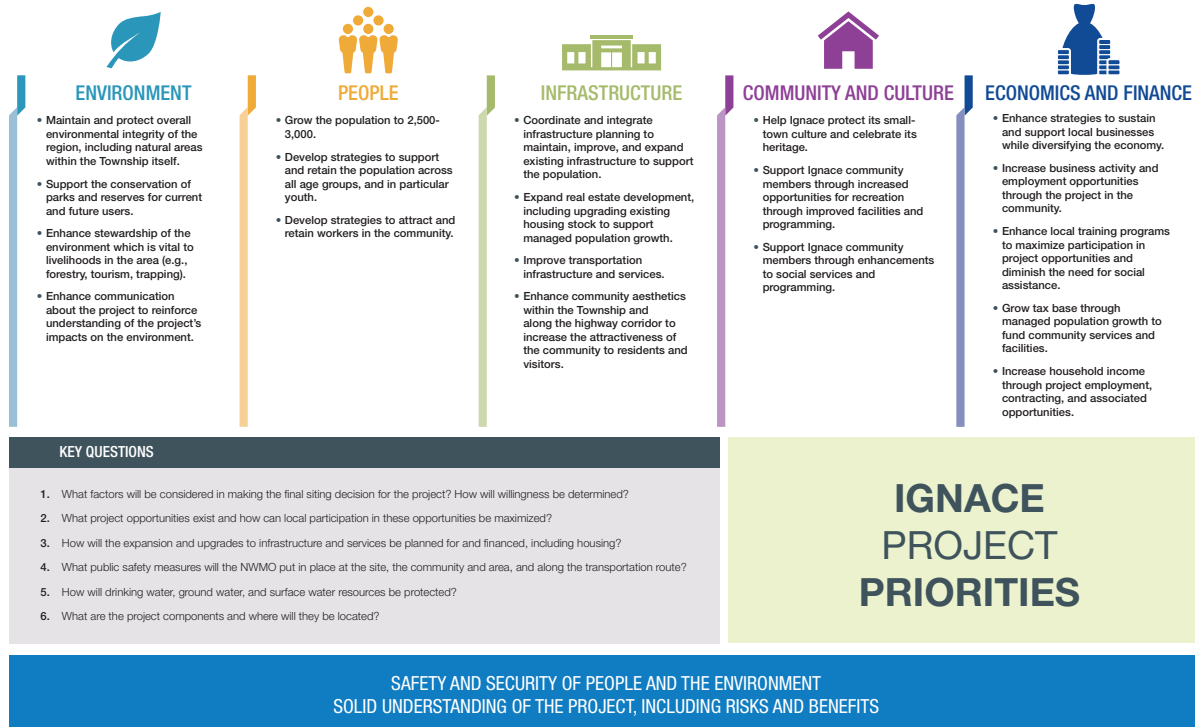
Source:

South Bruce Project Visioning Workshops: Community Conversations on Partnership.

Published July 2020, by AECOM & DPRA Canada.

1. How many and what type of jobs will be created through the project?
2. How will youth be retained and attracted to the community?
3. How will drinking water and surface water resources be protected?
4. What are the project components and where will they be located? Can the rest of the land on the site be used for agriculture?
5. What will be the impact on property values and how will the value of properties be protected?
6. How will the availability and affordability of housing be ensured?
7. How will needed improvements to infrastructure (e.g., roads, water/wastewater, housing) and services (e.g., healthcare, education, emergency services) be planned and financed?
8. How will the agricultural land and industry be protected?
9. How will the community need to show willingness?
10. How will the community, Indigenous communities and municipal neighbours be involved going forward?

IGNACE, ONT.



Ignace's project vision

In December 2019, members of the Ignace, Ontario community began working with the NWMO and third-party consultants to identify priorities and objectives for the Adaptive Phased Management (APM) Project if it were to be sited in the area. Over a series of in-person and online workshops in 2020, as well as the promotion and distribution of a community workbook and one-on-one interviews with community leaders, priorities and objectives for the project were identified. Youth engagement was a focus for the long-term vision, as people said they believed strongly that younger members of the community must share in the vision building work for this very long-term project.

Community discussion was summarized in a report and depicted in an infographic.

A key foundation for the project vision is that the project must first and foremost be safe for both people and the environment. Community members must also have a good understanding of the project and its potential impacts, including risks and benefits. The project must also help foster well-being.

The project vision discussions were documented through a consultant report published on the community's website. Community-directed studies will be developed to collect data to address questions and concerns.

KEY QUESTIONS FROM THE IGNACE VISIONING WORKSHOPS

Source:

Ignace Project Visioning: Community Conversations.

Published October 2020, by InterGroup Consultants.

1. What factors will be considered in making the final siting decision for the project?
How will willingness be determined?
2. What opportunities exist and how can local participation in these opportunities be maximized?
3. How will the expansion and upgrades to infrastructure and services be planned for and financed, including housing?
4. What public safety measures will the NWMO put in place at the site, the community and area, and along the transportation corridor?
5. How will drinking water and surface water resources be protected?
6. What are the project components and where will they be located?
7. How will the project affect the size of the community?
8. How many and what type of jobs and training will be created through the project in the community and area?
9. How will youth be retained and attracted to the community?
10. How will the project affect tourism?
11. How will willingness be determined?
12. How will the availability and affordability of housing be ensured?
13. How will improvements to infrastructure and services be planned and financed to accommodate population growth?
14. How will other communities (Indigenous and municipal) in the area be involved?
15. How will others along the transportation corridor be considered?
16. How will opposition to the project affect the siting decision?
17. What are the emergency response plans for the project?

» BOREHOLE STUDIES AND LAND ACCESS

Land access in South Bruce

The NWMO initiated a process in May 2019 to assemble an area of land required to host a potential deep geological repository site. This public Land Access Process continued until early 2020 when we announced we had signed options for 1,300 acres of land in an area northwest of Teeswater, in the Municipality of South Bruce. Some community members expressed concern about how and when the community was informed of the acquisition and optioning of land through the Land Access Process. Some believed that the community should have been notified of this potential site emerging. However, the NWMO had to maintain confidentiality as these were commercial contracts with the landowners. Now that a specific piece of land has been identified, we will continue discussions with landowners in the vicinity to ensure we understand topics of interest and concern.

Through engagement, we have already heard a range of perceptions about the likely potential impacts on neighbouring property values. In response to these concerns, the NWMO and the Municipality agreed to establish a program to compensate property owners if values are adversely affected by the Adaptive Phased Management (APM) Project, should it be sited in South Bruce.

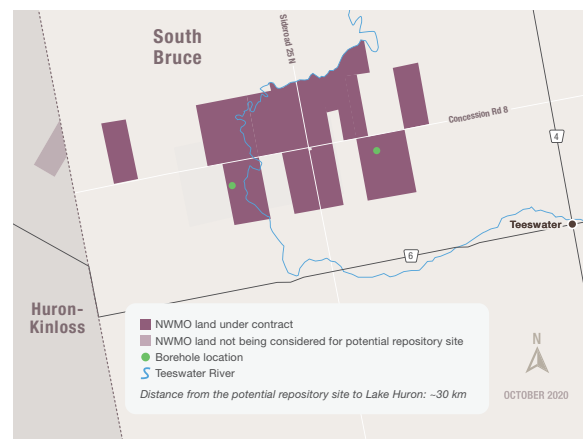
In response to these streams of community and resident input, pre-drilling activities were conducted in 2020, including:

- Archeological survey;
- Cultural verification; and
- Private drinking water well survey.

This work will continue in 2021, with plans for Indigenous cultural verification and continued site visits, pad preparation, well water sampling and other technical assessments.

Among the prevailing community-based conversations, a few landowners and residents expressed concerns about the perception of the community's agricultural products in national and international markets, and some business owners expressed concerns about the project competing for local labour. Land Access news also usually corresponded with increased activity from community members resolutely opposed to Canada's plan for the safe, long-term management of used nuclear fuel, sometimes in an organized fashion at in-person events, and frequently in print media or online.

Near the end of 2020, we had assembled options for just over 1,500 acres of land and made public our plans to proceed with drilling two boreholes on that land. The location of the first borehole is Lot 23, Concession 8, and the second is at Lot 28/29, Concession 8. The construction of the first drill pad and access to the site began in November 2020, with drilling on the first borehole set to begin in Spring 2021.



Borehole drilling in Ignace

In the Ignace area, where borehole drilling has been underway for three years, many people have expressed interest in learning about the drilling results and seek regular updates on the status of newly identified borehole locations.

During pre-drilling engagement in northwestern Ontario, people expressed interest in the potential environmental, social, economic and cultural effects of borehole drilling. For example, we heard about the importance of protecting fish and wildlife habitat and preventing any environmental contamination. Some people who use the land near boreholes asked questions about how we would manage drilling activities so that these did not interfere with hunting, fishing and trapping activities.

At the outset of 2020, the NWMO expected to complete work on its fourth borehole in the Ignace area, located in the Revell Batholith formation, an area located between Ignace and Wabigoon Lake. However, the extraordinary circumstances of the global COVID-19 pandemic resulted in a halt of drilling activities.

We heard about the importance of ceremony and respecting the traditional lands on which boreholes were drilled. Cultural monitors from Wabigoon Lake Ojibway Nation have been at drill sites to ensure land uses and culturally sensitive locations were protected. We continue to follow their leadership when assessing if we are ready to return to drilling activities in the area.



Borehole drilling core samples in storage in Ignace, Ontario

FREQUENTLY ASKED QUESTIONS: **BOREHOLE STUDIES AND LAND ACCESS**

- What is the purpose of borehole drilling?
- How deep will holes be drilled?
- How many workers will be on-site?
- How will siting the boreholes in this location affect my property values?
- How will siting the boreholes in this location affect my use of the land?
- How will siting the boreholes on Crown land affect my Aboriginal and treaty rights?
- How will you address impacts to my business or property while you conduct borehole tests?
- How will siting the boreholes in this location affect surface water, animals and plants?
- How will siting the boreholes in this location advance the well-being of the community and area?
- How will findings from the studies be shared with the communities?
- Do all siting areas have the same rock features? What are some of the differences?
- How much land will be cleared for borehole drilling? Must it all be contiguous?
- What is the environmental impact of the boreholes? What activities take place in preparing land around the boreholes?
- What economic development or business opportunities will result from borehole drilling?
- When you are building borehole access roads, how many water crossings are required?
- How many boreholes will be drilled at an identified location? When will subsequent borehole drilling operations be carried out?
- Will there be environmental monitoring of the borehole drilling sites during operations?
- What is the NWMO doing with the borehole samples? Where are they being stored?
- How does the NWMO's borehole drilling compare to those carried out by mining companies?

» RECONCILIATION AND INDIGENOUS KNOWLEDGE



This year, the NWMO listened to and worked with Indigenous communities in the siting areas to overcome some of the unique challenges presented by the global COVID-19 pandemic.

Overwhelmingly, we heard that Indigenous communities prioritized keeping their members safe. As a result, the NWMO paused engagement and partnership discussions in Spring 2020. Additionally, technical site investigation work was also suspended, and we adapted our timelines in response to safety precautions recommended by communities.

Listening to communities also led us to provide financial support to help siting communities respond to the pandemic. In April, we provided one-time investments of \$25,000 to 19 municipal and Indigenous communities, to assist with local responses to the pandemic. We also donated masks and funds to Thunder Bay's Regional Food Distribution Association. Indigenous communities used these funds in a variety of ways, including purchasing food and supplies. Other communities used the funds to establish and staff checkpoints in and out of the communities.

Despite the pandemic and a shift to carrying out work virtually, the NWMO continued the Reconciliation journey it began in 2018, and celebrated the resilience and adaptability of our Council of Elders and Youth. When lockdown restrictions were first put into place in March, the Council began meeting with NWMO staff virtually to provide advice and guidance. The Council also provided valuable guidance on how we could continue to expand our Reconciliation training program for staff, maintain respectful relationships with Indigenous communities, and find creative ways to incorporate ceremony and spirit into our work, even if we were unable to meet in person.

In 2020, we also developed and piloted phase two in our Reconciliation training program. The two modules now take a deep dive into the relationship that Indigenous peoples have with their identity and land.

What we heard from staff is that the training offered them an opportunity to reflect on their own identities and relationships with land to develop a deeper understanding of the historical and present-day challenges facing Indigenous peoples. The training modules will be rolled out to all NWMO staff in 2021.

We have heard from Indigenous communities that they are happy that the NWMO is making a commitment to Reconciliation, but are still working through their role in the process. From non-Indigenous people, we hear that they are feeling encouraged by the NWMO's Reconciliation Policy, and that these discussions have helped create an avenue to advance Reconciliation with their neighbours. However, they have also indicated they still desire support in identifying and implementing next steps. Among our peers in the nuclear industry and corporate Canada, we have heard a lot of very positive feedback about the leadership role that the NWMO has taken on Reconciliation.

When asked how the NWMO's Reconciliation work could be more relevant to their communities, community members frequently indicated that there could be more opportunities for reciprocal knowledge

sharing, including the importance of Reconciliation and the history of Residential Schools in Canada. With the roll-out of the second Reconciliation training module in 2021, we hope that we can help communities build better relationships, not only with the NWMO, but with one another.

Indigenous communities continue to highlight the importance of protecting the water, air, and land. We also heard about the need to make technical information as accessible as possible by collaboratively designed learning materials and creating opportunities for Indigenous peoples to learn more. Many people want to know how our project will safeguard water now and in the future.

In an effort to build awareness and understanding about Canada's plan for the safe, long-term management of used nuclear fuel with Indigenous people, in 2020 we delivered the latest iteration of the Journey of Water and Teachings From Mother Earth presentations to more than 10 Indigenous communities and municipalities. These efforts continue the process of building a foundation for our work interweaving Indigenous Knowledge and western science. This series of cross-disciplinary presentations is mainly about water's role in the environment and what it can tell the NWMO's specialists, using oral teachings and concepts. The response has been very positive and also helped us identify new areas of inquiry, which we will use to update the presentations.

In 2020 we also held our 3rd annual Indigenous Knowledge and Western Science workshop virtually, allowing us to broaden our invitees to include participants from across Canada, the US, UK and Sweden.

In 2021, a strong focus on water initiatives will guide our work in new and exciting directions, as we explore the element's importance to all living beings, and seek out expertise on both Indigenous and non-Indigenous strategies for its protection.

FREQUENTLY ASKED QUESTIONS: INDIGENOUS RELATIONS AND RECONCILIATION

- How will the NWMO address the United Nations Declaration on the Rights of Indigenous Peoples in the management of hazardous materials in the traditional territories of Indigenous peoples?
- How can we keep our water safe by gaining a better understanding of the water cycle/the journey of water?
- What considerations are we giving to cultural sites in the selection of potential areas for drilling?
- How can we learn more about Indigenous cultures?
- What are some examples of how the NWMO is interweaving Indigenous Knowledge throughout the project?
- How are Indigenous communities involved in borehole drilling activities?
- How will First Nation/Métis communities indicate they are “willing hosts”? What does that mean?
- How do Land Use claims enter into the discussion? Do all the First Nation/Métis communities that have land claims in the area have to agree to be “willing hosts”, even though these land claims have not yet been settled?
- What determines who is involved and who is not in?
- Where or how does the provincial/federal First Nation/Métis governing groups enter into the picture? Do or can they override the decisions of the local First Nation/Métis communities? Do they also have to be “willing hosts”?
- Can my group/community participate in Indigenous cultural awareness workshops?
- What is the NWMO doing with respect to Reconciliation with Indigenous peoples?
- How can non-Indigenous communities be involved in Reconciliation?

NWMO RECONCILIATION STRATEGY

2021 and beyond

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

Continue to enhance Reconciliation training to include unconscious bias training

Include Indigenous Knowledge in water protection plans

Apply the Reconciliation assessment tool to regional engagement strategies

Embed Reconciliation within corporate culture

2020

Enhanced policies and procedures to address Reconciliation

Enhanced procurement program to include an Indigenous strategy

Assessed corporate Reconciliation baseline and developed a Reconciliation measurement matrix

2018

85 per cent of NWMO staff received cultural awareness training

Reconciliation Statement finalized through Indigenous ceremony

2019

Published Reconciliation Policy

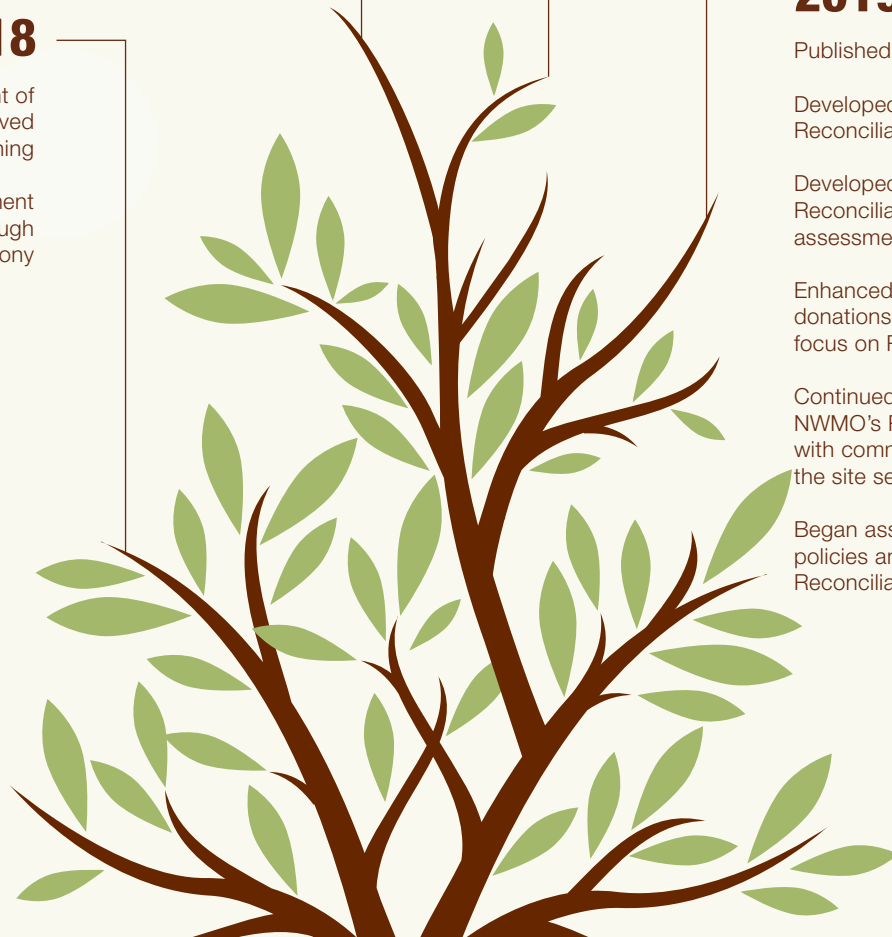
Developed and delivered Reconciliation training program

Developed a corporate Reconciliation baseline assessment tool

Enhanced sponsorships and donations program to include a focus on Reconciliation

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

Began assessment of NWMO's policies and procedures against Reconciliation assessment tool



» TRANSPORTATION

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

In 2020, we released and sought feedback on Moving Forward Together: an invitation to review a draft transportation planning framework to continue the dialogue on transportation planning. The draft framework was based on engagement that took place between 2016 and 2019, and included priorities, objectives, principles and questions to be addressed through transportation planning.

The response to the draft framework was positive and people indicated the document reflected their priorities and values. They also gave the NWMO insights into how the document could be enhanced, and what people are interested in learning about as we move through a collaborative planning process, including:

- A discussion of people's connection to the land and how the transportation planning process and program will honour that connection, including the importance of ceremony.
- Enhanced learning on safety and transportation logistics.
- Further exploration of who to involve in transportation planning and how, including the importance of fact-based information and continued dialogue.



FREQUENTLY ASKED QUESTIONS: **TRANSPORTATION**

- What transportation route will you be using to get the used nuclear fuel from the interim storage facilities to the repository site?
- Is this material safe to transport? What if an accident happens on the way?
- What would emergency response planning and training protocols look like? Will my community require an evacuation plan?
- How will emergency response workers stay safe in the unlikely event of an accident?
- What modes can you use to transport used nuclear fuel? Road or rail? Is water being considered? Which is safest?
- How many trucks or trains would arrive at the site per week?
- Will new or upgraded transportation infrastructure be required to transport used nuclear fuel? Who will pay for it?
- Will your drivers be transporting the used nuclear fuel even in the harsh, northern winter conditions?
- Will you be tracking the transportation packages?
- Will the used nuclear fuel transportation packages emit radiation while being transported to the repository site?
- Will the NWMO respect Indigenous jurisdiction with respect to transportation?
- How does transportation of highly enriched uranium by another organization differ from that of the CANDU fuel by the NWMO?
- In selecting a particular site that could eventually host the repository, does the NWMO consider proximity to rail and road?
- When will you begin considering local transportation routes? Will dedicated highways or rail spurs be constructed?
- Can the Dry Storage Containers be transported? Will used nuclear fuel be transported in the same containers as used in the repository?
- What happens if an unauthorized individual really intended on opening the Used Fuel Transportation Package (UFTP)? Can the package be opened?
- What happens if a UFTP falls into a body of water?
- What is the assumed speed of the truck transporting the UFTP?

» SOCIAL MEDIA AND ONLINE CONVERSATIONS

In 2020, the NWMO heard from more citizens through social media than any prior year. This was significant because we actually decreased our social media presence throughout the year in response to the pandemic. Engagement in South Bruce drove increased interest, with more citizens interacting with the NWMO on Facebook, Twitter, LinkedIn and Instagram to ask questions and provide comments.

Topics that drove online conversations included:

- Securing 1,500 acres of land in South Bruce;
- A peaceful, opposition-led demonstration in northwestern Ontario;
- A variety of stories from the NWMO's technical team; and
- Recognition of the NWMO scientists' work on copper-coating safety by Progress in Materials Science, an international journal.

With the NWMO's milestones driving conversations in South Bruce, particularly on Facebook, roughly 67% of comments were neutral, with roughly 24% negative and 9% positive. However, the number of authors varied and the majority of negative commentary was received from a handful of people. The number submitting neutral comments was much greater.


Some illustrative comments include:

- "Not implementing this solution—designed and built by Canadians—is hiding from our responsibility to put in place a long-term solution for our waste materials."
- "Burying nuclear waste there is no proof of safety as it hasn't been tried and observed for 50-100 years."
- "Very informative! Thanks for your factual and candid responses to the questions many are asking!"


The NWMO also published more original multimedia to its social channels than any other year. Similar to prior years, we observe online discussion groups outside the NWMO's owned channels, typically based around specific siting areas. Some groups are critical of the NWMO's work or presence in their community. Two specific groups were created within the South Bruce community in 2020: Willing to Listen, which is supportive of Canada's plan, and Protect Our Waterways, a community opposition group. Both groups have hundreds of followers and include 5-10 regular participants who share content and commentary.

We continue to monitor all kinds of public discussions for emerging topics and themes, and to hear about issues and questions that are being expressed by some people in the area. So far, the concerns and issues we see expressed in these local forums are reflective of the broad themes discussed throughout this report, and resemble the learning process seen in our face-to-face conversations with people in siting areas.

Visit. Like. Share.

 www.nwmo.ca

   [@nwmo](https://www.instagram.com/nwmo) [@nwmo](https://twitter.com/nwmo)

 [/company/nwmo](https://www.linkedin.com/company/nwmo)

»» IMPLEMENTING ADAPTIVE PHASED MANAGEMENT 2021 TO 2025

In March 2021, the NWMO published *Implementing Adaptive Phased Management 2021 to 2025*, inviting public review and comment.

We received responses from across the country, from individuals, organizations, government agencies, Indigenous communities and private citizens. This type of public input informs and guides our work and helps us update this plan annually. Several themes emerged this year and are summarized below. For a full discussion of the themes, please refer to the dedicated section on *What we heard in the report, Implementing Adaptive Phased Management 2021 to 2025*, available at www.nwmo.ca.

- **Transportation:** The safe and secure transportation of used nuclear fuel is an important component of Canada's plan. Many respondents had questions about this aspect of our plan.
- **Indigenous relations:** People wrote to us to comment on our work towards Reconciliation and ask how the NWMO works with Indigenous communities.
- **Future technologies:** We heard questions about how future technologies like small modular reactors (SMRs) might affect Canada's plan.
- **A central site:** We were asked how we plan to include warnings on the repository site once it is built to ensure future generations understand what it contains. Some also asked about alternatives to a deep geological repository at a central location.
- **Funding Canada's plan:** We were asked to provide clearer language about who is responsible for paying for Canada's plan.
- **Security and safety:** We received comments about the security and safety planning that will be required to implement Canada's plan.
- **Environment:** Respondents told us they share the NWMO's priority that Canada's plan must protect people and the environment for generations to come.
- **Site selection:** As we work towards selecting a single site for a repository, we continue to hear from citizens about our approach to ensuring we work in an area with informed and willing hosts.
- **Equity:** We also heard concerns about whether we are treating the two potential siting areas equitably. Working with communities, we are committed to defining what partnership will look like and developing criteria for determining willingness. In many ways, the two areas require different approaches as each community has different needs, priorities, and aspirations.

GLOSSARY

Adaptive Phased Management (APM) is the name of Canada's plan for the safe, long-term management of used nuclear fuel. APM is both a technical approach and a management system. The end point of the technical method is the centralized containment and isolation of Canada's used fuel in a deep geological repository, in an area with suitable geology and an informed and willing host. APM also involves the development of a transportation system to move the used fuel from the facilities where it is currently stored to the new site. The management system involves realistic, manageable phases, each marked by explicit decision points. It allows for flexibility in the pace and manner of implementation, incorporation of new knowledge, and fosters the sustained engagement of people and communities throughout its implementation.

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

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

Land access is a process the NWMO initiated in 2019 to reach agreements with landowners in South Bruce, Ont., to allow sufficient access to land for studies at a potential deep geological repository location, and to confirm a potential repository site could be identified. The agreements include a combination of option and purchase arrangements that enable the NWMO

to conduct studies while allowing the landowners to continue using the land.

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

Property value protection is a program the NWMO has committed to develop, in consultation with the Municipality of South Bruce, to compensate certain property owners in the vicinity of the deep geological repository if their property values are adversely affected by the project. This program will be developed as part of a series of well-being studies that the NWMO plans to complete with the involvement of the community.

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

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

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

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

Willingness is fundamental to the siting process. From the very beginning, the NWMO outlined a number of principles regarding willingness. These include a commitment to only site the project in a community that is informed and willing, time and resources for communities to learn about the project before making a decision, and a compelling demonstration of community willingness. Community residents, at the grassroots level, must be involved in that demonstration of willingness.

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

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

**For more information,
please contact:**

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

   @nwmocanada
 /company/nwmocanada

© 2021 Nuclear Waste Management Organization





NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES