



# What we heard:

## Implementing Canada's plan in 2018

DECEMBER 2018



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.

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# » INTRODUCTION

Over the course of 2018, the NWMO continued to implement Adaptive Phased Management (APM), Canada's plan to safely manage used nuclear fuel. As part of our work to find a single site for a deep geological repository, we moved ahead with detailed technical studies in siting areas, and explored numerous topics with potential host communities, surrounding municipal, First Nation and Métis communities (Indigenous communities), and national and provincial Indigenous and municipal organizations. The key topics of interest to the communities, organizations and interested individuals with which we are working are the focus of this report, and cover six main areas: safety, first and foremost; Canada's plan and the site selection process; partnerships and community well-being; interweaving Indigenous Knowledge into our work; what we are learning through borehole studies; and the transportation of used nuclear fuel to a future repository.

Throughout 2018, five areas were the focus of the site selection process and studies, and engagement continued in those communities with a goal of identifying a single preferred site by 2023. In the course of implementing APM together with communities, dialogue has driven many questions, comments and other input from communities and others who are interested in site selection. This is the latest in a series of annual reports that summarizes what we are hearing from ongoing dialogue and engagement activities.

In 2018, together with communities, we engaged in activities, ranging from one-on-one conversations to larger group discussions, community symposia and tours of interim storage facilities and proof test facilities, presentations to community groups, and participation in conferences. We engaged with individuals and groups through meetings and briefings, monthly meetings of community liaison committees

(CLCs), community open houses, learning and sharing gatherings, drop-in events at local community offices, and festivals and public events.

We also engaged with and heard from citizens through the NWMO website, CLC websites, and the NWMO's expanded set of social media channels, including LinkedIn, Facebook and Instagram. In depth discussions also took place at meetings of the NWMO's Council of Elders and Youth, meetings of provincial and national Indigenous organizations, municipal conferences, and meetings of the NWMO's Municipal Forum.

This 2018 report presents an updated list of "frequently asked questions," inclusive of both historical topics collected over previous years and new topics emerging from recent discussions. While general topics of interest are largely similar year-to-year, there is a broadening and deepening of communities' understanding of the project as we advance dialogue on aspects of safety, preliminary borehole drilling, and partnership. This has led to progressively more nuanced questions, new lines of inquiry, and new ways of exploring topics together. As presented in this report, what we heard this year is set in the context of six key areas of interest and corresponding 2018 activities:

**Exploring safety together:** People continued to want to talk about health and safety as an initial point of discussion. We continued to work with potential siting area communities to set the agenda for exploration of and engagement on safety within the community and the broader region. Together, we identified topics of focus to explore and designed new and innovative materials to support dialogue. Discussions on safety focused on the protection of people and the environment with a focus on water, safety assessment and testing, transportation, and safety aspects of surface facilities associated with the project.



**Adaptive Phased Management and the site selection process:**

Initial learning about the NWMO, APM and the process to site a repository evokes a common set of questions, and these remained prevalent with people new to engagement in communities and regions in 2018. We continued to engage people new to the project in learning and exchange, and also advanced in the exploration of partnerships in siting areas. Conversations continue about APM and how it was developed. Conversations also continue about the siting process and the criteria that will be used to select a preferred area and site. New and emerging topics include how the plan will adapt to new and emerging technologies. Reflecting discussions with the NWMO Council of Elders and Youth, a Reconciliation Statement was developed. The statement outlines the NWMO's commitment to a journey that creates a better future and establishes new relationships with Canada's Indigenous peoples.

**Exploring the potential for partnership and fostering community well-being:**

We continued to advance dialogue with communities to develop values and principles to guide more detailed discussions about the project as part of advancing along the "partnership road map," and continued to work together on initiatives fostering community well-being. As discussions broaden within a siting area beyond the communities that initially expressed interest, questions about the safety of the project and the involvement of people in the broader area are increasingly important to building the conditions for partnership.

**Interweaving Indigenous Knowledge:** Indigenous communities continued to advance Indigenous Knowledge studies in their areas, and foster learning

and exchange about the project with their neighbours. The NWMO continued to engage communities in the interweaving of western science and Indigenous Knowledge.

**Choosing sites for borehole studies:**

We continued to engage with people in and around the Ignace and North of Superior areas on plans for borehole drilling. The initiation of borehole drilling is one of the means to better understand the geological and physical conditions of the rock at a potential repository site, and the potential to meet the robust requirements of the project. These conversations continue to evoke both excitement about the project and concerns among those who may be new to the project and in the immediate vicinity.

**Transportation:**

In addition to regular and ongoing dialogue to explore the basis of confidence in the safety of transportation, we engaged a cross-section of citizens in public attitude research and dialogue. We publish a summary of the year's work in the *Transportation themes 2014 to 2018: What we heard about transportation planning*.

In addition to discussion on key themes and points raised through engagement, input from social media and online conversations are also summarized in this report, along with comments received on our annual implementation plan.

The *What we heard: Implementing Canada's plan in 2018* report reflects key points raised by the many individuals and groups that, in the spirit of learning and collaboration, worked to advance Canada's plan in 2018.

## » ONGOING AREAS OF INTEREST

A rolling list of common questions and topics that we have encountered between 2013 and 2018 can be found in the *Appendix: Ongoing areas of interest* (“Appendix”). While some questions remain typical and are repeated year-over-year, areas of inquiry are emerging or evolving in tandem with the implementation of subsequent phases of the project and as relationships with communities strengthen. This year, these include capacity building, and discussions on expanding and strengthening relationships. Communities are beginning to consider capacity needs required to prepare for partnership and a potential future with the project, as well as how to advance relationships with regional and other neighbours.



Indigenous guides such as John Harrison (above) work with the NWMO on our environmental characterization field team.

# » EXPLORING SAFETY TOGETHER

Safety has been the pre-eminent area of interest since 2002, when the NWMO began a three-year engagement process on possible approaches for the long-term management of Canada's used nuclear fuel. Canadians were absolutely clear that the project must be safe for both people and the environment, and must be the first consideration.

Through ongoing dialogue with municipalities and Indigenous communities, we have explored a range of safety-related topics of interest, which are largely similar year-to-year, and are reflected in the health and safety questions listed in the *Appendix*. Health and safety, especially the safety of water, remains a top-of-mind consideration.

Conversations on safety gravitate to the nature of nuclear fuel and the CANDU fuel design – that used nuclear fuel is a solid, not a gas or liquid, and is neither flammable nor explosive. People new to learning about APM are also interested in the long-term safety of the deep geological repository, and require assurance that the health and safety of future generations and the environment will be protected through the repository's engineered and natural barriers that will safely isolate used nuclear fuel from the environment.

Through a dialogue-driven approach to the exploration of safety, communities are shaping the agenda for further conversations and learning with a broader set of community members, both at home and within the region. This year, we have heard that although many people understand how safety is being assessed, there are many more who are still learning. Together, we are designing new materials and forums for conversations related to: how to assess safety; how to protect people and the environment; how to ensure safety and security at a future surface facility; and how to safely transport used nuclear fuel.

During the three-year study, the public identified a number of key objectives that it considered essential to the project. These included public health and safety, protection of workers, and protection of the environment. Safety needs to be the first consideration.

As the site selection process advances, health and safety continues to be the topic that generates the most discussion. People want to be confident that our transportation, construction and operational procedures will ensure public and worker safety, and protect the environment.

We work collaboratively with communities involved in the siting process to identify and analyze issues and potential events of concern, to build shared understanding of these issues, and in turn, to build public confidence in APM's ability to manage used fuel safely for the long term.

# EXPLORING SAFETY TOGETHER

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## Assessing safety and building confidence

People in potential siting areas have requested that we deliver new safety presentations that provide a more in-depth look at the NWMO engineered-barrier system and other safety programs, and do so through a clear, concise, public-friendly format. At the request of communities, in 2018 our engineers and engagement teams provided updates on international radioactive waste management, plans for safe borehole drilling, the multiple-barrier system, and protecting people and the environment. Our transportation engineers delivered a presentation, entitled *Dose Consequences From Used Nuclear Fuel Transportation*, which was well-received by the communities within Ontario and across Canada. The NWMO Learn More program also supported the CLCs to host third-party experts to present on safety topics, and several invited guest speakers. In one community, the CLC hosted a regional nuclear waste management symposium.

Questions have included: what are the local rock characteristics, and how do they contribute to safety? What is the expected performance of engineered barriers like copper and steel, especially over the long periods of time involved? How are the used fuel containers designed and manufactured for safety? What is the NWMO's approach to long-term safety monitoring below and above ground?

Students from South Bruce toured the Ontario Power Generation rock core storage facility to learn about samples from boreholes.



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This year, NWMO safety specialists presented findings from a new safety study that focused on the safety of the repository after operations cease and the facility is decommissioned. Through computer modelling, this illustrative case study estimates radiation exposure for a hypothetical family living and subsisting above a repository. Presentations to communities outlined dose levels under a variety of scenarios, including failure of the engineered barriers within the repository.

People have also asked about other “what-if” scenarios, in reference to abnormal or disruptive events that need to be addressed by the NWMO, related to forest fires, flooding, prolonged cold weather, and earthquakes.

We also heard that communities are very interested in learning more about the safety features of the construction and operation of on-site surface facilities. People are interested in security measures and our planning for the unlikely event of malicious acts at the facility. People are interested in learning about worker safety at the repository site, and in particular, when used nuclear fuel is being transferred from transportation packages to the used fuel containers that will be emplaced underground.

#### **Examples of suggested scenarios that need to be considered**

- How would the surface facilities and the people working there be kept safe in the event of forest fires or flooding?
- What would be the impact of a prolonged period of cold weather?
- What would happen in the event of an earthquake?

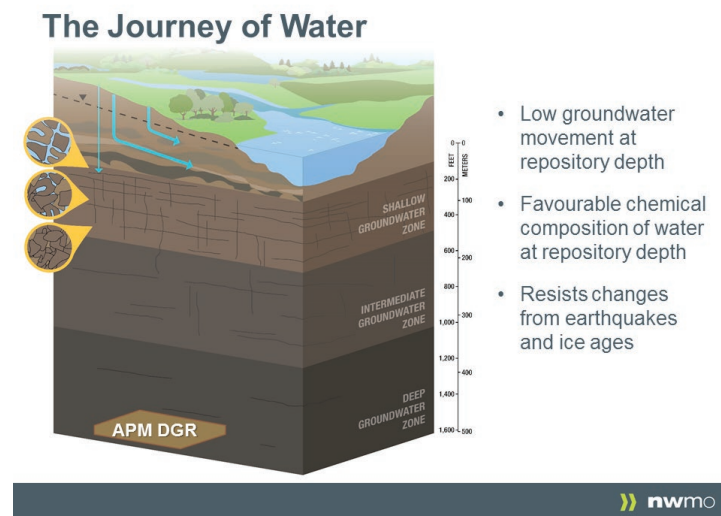


# EXPLORING SAFETY TOGETHER

## Protecting people and the environment

People, especially those new to the project, are generally interested in learning about radiation, including health effects of radiation exposure. People are also interested in how the project will protect the health of lands and waters that sustain life. Community members underline “water is life,” and safeguarding clean, fresh water must be a foremost priority for the NWMO in all aspects of work. Both Indigenous and non-Indigenous communities highlighted the importance of protecting the water, air, and land, as well as the need to make technical information as accessible as possible through collaboratively designed learning material, and creating opportunities to learn more.

In 2018, the NWMO together with communities developed two new presentations – *The Journey of Water* and *Teachings From Mother Earth* – a series of cross-disciplinary presentations about water’s role in the environment, and what it can tell us as part of our ongoing studies. The presentations show how a repository located deep underground is isolated from water sources near the surface and water bodies above ground. These presentations are also part of ongoing efforts to use traditional oral teachings and concepts to interweave Indigenous Knowledge and western science.



A slide from the NWMO's presentation, *The Journey of Water*.

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The presentations are designed to communicate information, facilitate meaningful exchange between community members and NWMO specialists, and have been well-received by audiences. *The Journey of Water* encouraged discussion on the nature of water that lies at repository depth and introduced the idea of water having “memory” based on the nature of minerals dissolved within it. Our specialists described how the data is being collected from early borehole work and how it will contribute to the NWMO’s understanding of repository safety. The presentation describes how the chemical composition of the water in the pores of rock deep underground can indicate how long the water has been trapped there, how slowly it is moving through the rock at repository depth, and the suitability of the rock to potentially isolate used nuclear fuel from people and

the environment.

Community members also engaged in discussions about the environmental baseline studies conducted this spring and summer in the Hornepayne and Manitouwadge areas. Collaborative planning of these studies assisted in ensuring any community and area sensitivities were addressed.

This year, people expressed interest in better understanding plans for water management and treatment practices during the repository’s operation. People expressed interest not only in the long-term safety of water, but also in water management during construction and operations. Work is underway to develop additional materials to facilitate conversations with communities about the various safety features of surface facilities.

# » ADAPTIVE PHASED MANAGEMENT AND THE SITE SELECTION PROCESS

Though many individuals from interested municipal, First Nation, and Métis communities, and surrounding areas have been engaged in the site selection process over many years, new people continue to join the conversation each year. In last year's report, we explored the kinds of questions asked by people newly exposed to APM in contrast with those familiar with the project. This includes interest in learning more about how APM compares with the management of used nuclear fuel in other nuclear jurisdictions, and how lessons learned (both positive and negative) relate to our process. These questions are included in the *Appendix*.

This year, we include what we are hearing regarding emerging areas of interest such as new and emerging technologies, as well as conversations held in the context of collaboration on the NWMO's evolving policies. Importantly, this includes a recently launched NWMO Reconciliation Statement that outlines a commitment to taking steps to create a better future by acknowledging historical wrongs and addressing the challenges of today.



Manitouwadge residents (left to right) Bill Andruniak, Debbie Andruniak and Dave Weadon listen to Jeff Binns, a corrosion scientist at the NWMO, during a tour of our proof test facility in Oakville, Ont.



## Considering new and emerging technologies

Towards the end of last year, we began hearing questions about new and emerging technology, specifically small modular reactors (SMRs). Prompted by media stories about research and development into experimental reactors, these conversations were largely exploratory, and reflected people's interest in learning about the technology and the NWMO's role in managing waste that arises from its use. Common questions included: what is an SMR, and how does the technology compare to the CANDU reactors currently operating? What kind of fuel do they use? Will the NWMO be able to manage it safely? Can CANDU fuel be reused in an SMR in an effort to reduce the volume of waste to be managed by the NWMO?

In response to these questions, the NWMO published a backgrounder in 2018 on *Small Modular Reactors: Managing Used Fuel*, which contains information on SMRs as it relates to the NWMO. The backgrounder outlines that the NWMO is responsible for managing all Canada's used nuclear fuel, including that created using new or emerging technologies such as SMRs. The *Nuclear Fuel Waste Act* requires us to provide services for managing nuclear waste over the long term at a fair and reasonable cost. It also outlines that as research and development of this new and emerging technology continues, we will keep abreast of advancements to anticipate any changes in fuel cycles and the types of waste that may need to be managed in the future. We also continue to share information through the annual publication of a *Watching Brief on Advanced Fuel Cycles* (available on our website).

# ADAPTIVE PHASED MANAGEMENT AND THE SITE SELECTION PROCESS

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## **Evolving policies**

The NWMO's Ethical and Social Framework was developed by the NWMO Roundtable on ethics during the study phase of work (2002-05). It was the subject of cross-country dialogue, engagement and confirmation. As the NWMO has moved through different phases of work, it has continued to carry forward and work within the framework, including the ethical principles and approach outlined in the framework. In 2018, the NWMO initiated work to refine the framework to ensure it more explicitly aligns with the current stage of work. In late fall, conversations were initiated with communities engaged in the site selection process and groups such as the NWMO's Municipal Forum, an assembly of leaders with experience and expertise on municipal issues and challenges, to reflect on the framework. This conversation will continue in 2019 as part of conversations with communities to build the conditions for partnership required by the project.

Through ongoing conversations, we are hearing that everything the NWMO does needs to start with values and principles, and they must be the thread that runs through all our activities. We are hearing that the framework "stands the test of time" and that it is difficult to imagine more powerful language to guide our work.

As part of work to update the NWMO's environmental policy, we developed a draft environmental responsibility statement reflecting what we have heard and learned from communities is important. People have emphasized the safety of people and the environment as an all-encompassing value for the project and community. Specifically, people have expressed that the environment is precious and all aspects must be protected, including waters, land, air, and wildlife. We have heard from Indigenous communities about the interconnectedness of people and Mother Earth in every aspect of life. Ultimately, the project should contribute positively to the environmental quality of an area. We have begun to take the draft statement out to community and advisory groups for feedback and comment, and conversations continue.

## Reconciliation Statement

In an Indigenous ceremony held in July 2018, and attended by members of the NWMO's Board of Directors, Council of Elders and Youth, and senior leadership, the NWMO acknowledged historical wrongs in Canada's past and issued a Reconciliation Statement to guide the organization forward. Following a Pipe Ceremony and a traditional gift exchange, the NWMO's President and CEO spoke about the importance of hearing the many Indigenous voices that have led the organization on a journey towards reconciliation.

The statement, available on our website, recognizes the NWMO's ongoing involvement, collaboration, and discussions with Indigenous communities, and commits the organization to contribute to reconciliation through a Reconciliation Policy, and associated implementation strategy that will be measured annually and publicly reported to contribute to the Truth and Reconciliation Commission of Canada's calls to action.

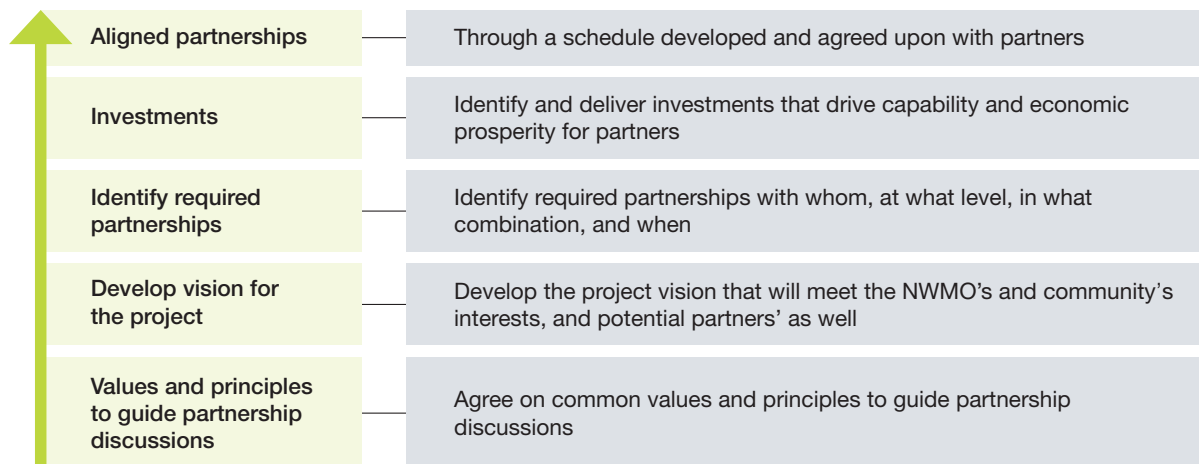
The commitment to a new policy builds on a strong foundation of interweaving Indigenous Knowledge in our decision-making, and reflects the advice of the Council of Elders and Youth who had urged the organization to acknowledge the past while co-creating a different future based on fairness, equity and respect. We heard during these early conversations over 2016-17 that reconciliation requires input from members of both First Nation and Métis, and non-Indigenous communities to be successful.

The NWMO has begun to engage communities and organizations on how to advance reconciliation through the implementation of Canada's plan. In early discussion, CLCs have expressed their enthusiasm and desire to work together with Indigenous neighbours in the spirit of reconciliation. We are hearing from community leadership a strong interest in learning and capacity building through NWMO-supported cultural awareness training. Some CLCs have adopted the practice of performing a traditional land acknowledgment at the start of regular meetings. In other communities, leaders have asked the NWMO to help arrange meetings between municipal officials and the nearby First Nation leadership. We have heard people asking about and attending powwows in the wider region, and across the board, people in municipal communities have indicated that they are thinking of ways to be inclusive of nearby First Nation and Métis communities.

# » EXPLORING THE POTENTIAL FOR PARTNERSHIP AND FOSTERING COMMUNITY WELL-BEING

Late in 2017 and early in 2018, the NWMO shared the “partnership road map” for discussions with communities advanced in the siting process. The first step in the road map involves the community-based identification of values and principles to guide more detailed conversations about the project. The principles are intended to help guide community and NWMO discussions to explore what it would mean if the APM project were implemented in its area. Ultimately, the project will only proceed with the involvement of municipal, First Nation and Métis communities in the area, and surrounding communities working in partnership to implement it.

## Road map to partnership (2017-22)



**Exploring partnerships –  
Values and principles**

The municipalities initially interested in exploring the project in the five siting areas completed engagement with their community members to prepare a draft set of values and principles to be used to guide future conversations with the NWMO on the project and partnership. Through workshops, working groups, open houses, and one-on-one conversations, community members participated in shaping a set of values and principles distinct to their community.



# EXPLORING THE POTENTIAL FOR PARTNERSHIP AND FOSTERING COMMUNITY WELL-BEING

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## **Exploring partnerships – Values and principles (continued)**

Ensuring safety emerged as a pre-eminent principle in all communities. Other principles clustered around how we work together, and included such values as transparency, honouring commitments, mutual accountability, and respect for diversity. We heard about the seven grandfather teachings (humility, bravery, honesty, wisdom, truth, respect, and love). Communities also reflected on values that would guide growth and community well-being in the event the project were sited in their area. And finally, the importance of working regionally with other municipalities and Indigenous communities was underlined.

In the Indigenous community context, the introduction of the conversation on partnership led to discussion about language and the various connotations and meanings that are associated with a word such as partnership. For some, the term suggests an advanced stage in a relationship, and yet, the relationship is still evolving, so it feels premature to use this word. In one community, the word partnership was subsequently replaced with an Ojibway word *Gakinamottiimin*, which means learning and sharing together. Wabigoon Lake Ojibway Nation (WLON) held workshops to prepare values and principles.

Conversations about partnership are beginning with a collaborative process to identify a set of shared values and principles to guide our work together over the coming few years. This is the first step in the partnership road map. Conversations to date have underscored the importance of dialogue-driven, collaborative processes, wherein communities and the NWMO together design engagement processes, in particular in reaching out to a broader base of local residents and eventually to regional neighbours. WLON's third regional learning and sharing gathering held in September and the Huron-Kinloss Nuclear Waste Management Symposium held in August are just two examples of this collaborative approach.

## **Community well-being and project benefits**

Dialogue on values and principles for partnership encouraged many conversations and shared ideas about community well-being and project benefits. First and foremost, people talked about the importance of economic benefits in the area and surrounding communities. We heard comments and questions about preparing for future jobs and business opportunities, and the need to learn from approaches to apprenticeships and local hiring that are already working in communities. People were curious about opportunities for value-added or spin-off business development. Youth were recognized as the future of the project and future employees or suppliers to the project. People called on the project to help youth consider career opportunities that would position them to be part of the APM project in the future. People were mindful of the responsibility of decisions taken today, and how these would impact future generations and their livelihoods.

Other related questions included: how is “community” to be defined? How will we assess and gauge willingness? Who needs to be part of the partnership? How will benefits be shared equitably?

People talked about the importance of stewardship of the land, and this took on specific meaning in the context of agricultural land, and there was emphasis on how land might be used within and around the footprint of the site. There were questions about impacts on property values and how local people might be affected. People were interested in how the project would influence growth, the need to manage change, and the need for long-term strategic and sustainability planning. In this context, people wanted to retain inherent community values such as “the family feel” and “a gentle and hospitable community.”

These, and other project benefit topics, made for robust discussions about partnership.

# EXPLORING THE POTENTIAL FOR PARTNERSHIP AND FOSTERING COMMUNITY WELL-BEING

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## Building capacity

As we move from learning together about the project to exploring partnerships, we have heard that the nature of capacity-building support needs to evolve. Past efforts have focused on funding to support learning and informed decision-making. These efforts continue. However, communities are also increasingly focused on preparing for a possible future that includes the project. Communities want to ensure they have the resources they need to support engagement of their community and advanced decision-making.

Communities are taking initiative in planning for the future. For example, the Ignace Municipal Council recently hired an Economic Development Manager, and unveiled a new strategic brand – *Explore Our Possibilities*. The brand highlights the successes and stories of local business people, and invites entrepreneurs and businesses to consider Ignace as a destination for future opportunity. Other municipalities are also focusing on strategic economic planning.

We continue to speak with municipalities, and First Nation and Métis communities about how our support programs can be further evolved to help build capacity so that people can participate in learning to make informed decisions.

Dr. Mahrez Ben Belfadhel (left), NWMO Vice-President of Site Selection, and Jason Felix, Ignace Economic Development Manager, at the rebrand unveiling event in Ignace, Ont.





## **Building and strengthening relationships**

Over the past year, conversations have intensified on the topic of who needs to be involved in an area in order for the project to proceed. Strong relationships between neighbours will be required to co-ordinate planning and advance the project. In the five remaining siting areas, it was municipalities that first indicated an interest in learning about the project and possibly hosting the APM project in their area. The Indigenous communities in those regions now find themselves integral to the siting process. A desire to explore ways to build relationships with those Indigenous neighbours has been expressed by people living in municipalities involved in the site selection process.

The NWMO has been approached to help facilitate these opportunities through our involvement in CLCs, and regional engagement activities. People have asked about how best to establish lines of communication between communities and their Indigenous neighbours, and afterwards, how to build understanding and awareness of cultural differences, especially with regards to protocol and decision-making.

There is also a keen interest to better understand the Aboriginal rights laid out in Canadian law, especially Section 35 of the *Constitution Act* (1982), and how these must be respected. Similarly, people are keen to learn more about traditional land claims, and about First Nation and Métis rights holders who live in and around siting areas.

Discussion continued to focus on strengthening avenues of communication, and understanding by the non-Indigenous community of the Indigenous culture, world view, rights, and issues that can foster enhanced regional relationships as the siting process progresses.

As efforts to build out relationships to other communities in an area as part of partnership activities continue, and new communities become involved and begin to learn about the project and the NWMO's activities, we are hearing from them questions about the safety of the project, the fit of the project in the area, and also about the decision-making process for selecting a preferred site and their involvement in it, including respect for rights. Addressing these questions is an important focus of discussion and critical to successfully advancing the kinds of relationships the project will need.

# » INTERWEAVING INDIGENOUS KNOWLEDGE

In 2018, we continued to advance dialogue with Indigenous communities focused on interweaving Indigenous Knowledge with western science in the implementation of APM.

As support, resources are available for communities to conduct their own studies, and to hold community discussions to determine if and how a community wishes to share its Indigenous Knowledge. Together with communities we are working with, a new presentation, entitled *Teachings From Mother Earth*, was also developed to help build on the success of *The Journey of Water* presentation that was delivered extensively in 2017.

## **Learning from each other**

Engagement in 2018 built on relationships with local and Indigenous communities, and we continued establishing Learn More Agreements that facilitate a conversation on many of the social and technical aspects of the project. We continued to hear that First Nation and Métis communities are interested in discussing the ways in which the NWMO can engage with community-specific approaches, and that we need to ensure that we are communicating our work plans to local and Indigenous communities early enough to give communities time to engage, for example, in preparations for ceremonies, or seek guidance from Elders.

Engagement activities with Indigenous communities – such as presentations to Chief and Council, and to Métis leadership – can cover a broad range of topics. We have heard, and are incorporating into our processes, topics and approaches inclusive of Indigenous Knowledge and world views. The collaborative development of *The Journey of Water* and the *Teachings From Mother Earth* presentations are good examples of integrating Indigenous Knowledge into our work to protect people and the environment.

## Teachings From Mother Earth

The safety of water is an important topic for local and Indigenous communities. With a focus on water safety, *The Journey of Water*, a multidisciplinary presentation for communities, was introduced to address this topic. Designed with input from Indigenous communities, and delivered by the NWMO's geoscience and Indigenous specialists, *The Journey of Water* expresses, through oral teaching, that water itself has a story to tell, and introduces the idea of water having "memory," a concept used traditionally in some Indigenous communities. For example, the analysis of mineral composition of small amounts of water sampled hundreds of metres below the surface can tell specialists important information about the age of water, which helps us to determine whether rock at a particular location will be safe for a repository.

As a further initiative, the NWMO has developed the *Teachings From Mother Earth* presentation. Building on previous work, and with input from Indigenous communities, we explore with communities the concept of natural analogues, and what they can tell us about the engineered-barrier system designed for the deep geological repository. Natural analogues are comparative geologic conditions that provide evidence that the engineered-barrier system will perform as predicted by demonstrating that they have been stable on a time scale relevant to the project. For example, natural copper plates found in mudstones provide a natural analogue for used nuclear fuel canisters coated in copper and placed in a clay backfill. Although formed 200 million years ago, these copper plates show little corrosion since that time, due in part to the protection of the clay-rich mudstone. We are learning from communities that looking back in the past with natural analogues helps to build confidence in looking to future conditions and repository safety.

Once developed, municipal communities and others involved in the siting process such as the Municipal Forum expressed interest in receiving the presentation. The presentation was well-received and has helped advance conversation about common interests and build mutual understanding.

Before rolling the *Teachings From Mother Earth* presentation out to a wider audience, we sought input from Indigenous perspectives in communities, and received feedback on the scope and content of the presentation. In particular, we heard that it was important to build on the teachings from the previous presentation on *The Journey of Water* in a way that would continue to expand on knowledge and confidence in the project. We heard that using an Indigenous concept such as Mother Earth in our presentations was appropriate, and is an example of interweaving Indigenous Knowledge. At one of the first presentations of *Teachings From Mother Earth*, the NWMO was fortunate to have Indigenous women, the traditional water keepers in their communities, help deliver water teachings alongside this adaptable presentation, and the presentation was also delivered at a learning and sharing gathering attended by members of the Grand Council of Treaty 3 in northwestern Ontario.

# » CHOOSING SITES FOR BOREHOLE STUDIES

The NWMO is continuing to advance plans for borehole drilling in siting areas. The purpose of borehole drilling is to retrieve core samples that help to build an understanding of the rock characteristics at or near a potential repository site.

After engaging communities and people in the area, the NWMO drilled its first borehole in the Ignace area. Engagement is ongoing to plan and implement additional boreholes and studies within the same area to further explore the geology.

In 2018, we also initiated conversations to identify a potentially technically suitable and socially acceptable site on which to focus borehole studies in and around the communities of Manitouwadge and Hornepayne.

We are continuing this discussion with interested communities, First Nation and Métis communities, and surrounding communities about our plans for borehole drilling to understand any concerns and respond to questions, and to seek local and Indigenous Knowledge and/or land use information to enhance understanding of the siting areas.

Conversations have evoked both excitement about the project and concerns among those who may be

new to the project or use land in the immediate vicinity of proposed boreholes. Since borehole drilling locations have the potential to be considered for the site of the repository, conversations with nearby land users tended to focus on potential impacts to these individuals.

The large majority of people we spoke with had no concerns about the proposed borehole locations or drilling activities, and expressed interest in the borehole drilling process and a desire to learn more. Many people asked general questions about the project, and NWMO staff took the time to introduce our organization and mandate before addressing questions specific to borehole drilling. For example, people asked: what is the purpose of borehole drilling, how deep will holes be drilled, and how many workers will be on site? Will borehole drilling have an impact on property values, will it impact my current activities on the land, and how will the environment be protected during these studies? What economic development opportunities will result from borehole drilling or if the repository is located in the area?

People who use the land in proximity to proposed boreholes asked questions about how we would manage drilling activities so that these did not interfere with hunting, fishing and trapping activities. We heard people had a preference to use existing roads or trails to access borehole locations, where possible, and the need to minimize the disturbance that may result from accessing the borehole locations with existing, new or improved access roads. The importance of protecting fish and wildlife habitat and preventing any environmental contamination was noted.

A few individuals expressed concerns around potential impacts of the borehole drilling process with respect to social, cultural, economic, or natural environmental considerations, and asked for further information on the potential impacts to the environment, in particular on water quality in surrounding water bodies, and the safety and environmental protections required of drill operators contracted by the NWMO. The use of water during drilling is well-known to many community members; therefore, water management measures were often discussed, including plans to truck water in to the site, and trucking out waste water to licensed facilities.



Example of drilling equipment  
in Ignace, Ont.

# » TRANSPORTATION

The safe and secure transportation of used nuclear fuel is an important component of Canada's plan for the long-term management of used nuclear fuel. Although the transportation of used nuclear fuel to a repository site is not expected to begin before 2040, it is a key point of interest and discussion in dialogue with communities in 2018. Since 2014, we have published an annual rolling summary of the ongoing conversations with communities about this important topic. The most recent report is *Transportation themes 2014 to 2018: What we heard about transportation planning*. The following is a high-level summary of the themes and discussions contained in that report.

In 2018, the NWMO continued to engage with siting area communities, First Nation and Métis communities, and others in the area. An underlying theme that is included in all our discussions is the safety and security of transporting used nuclear fuel from the interim storage facilities to any of the potential siting areas. People new to the process typically want to know more about the safety and security in a general sense. For example, learning about the Used Fuel Transportation Package and various regulations that the NWMO must adhere to in order to transport used fuel. For those familiar with the process, for whom the safety case is well-understood, our dialogue about safety has deepened and become more participatory in nature. For example, including accident scenarios raised by the public into our risk assessment studies, and sharing that information with municipalities, First Nation and Métis communities, and people in the area.



The safe and secure transportation of used nuclear fuel is an important component of Canada's plan for the long-term management of used nuclear fuel.

More generally, as conversations on transportation advance, there is substantial agreement on other themes and questions that need to guide and be addressed in transportation planning. Across all these conversations, whether at open houses as part of the site selection process, at conferences or gatherings to encourage learning about Canada's plan, or focused public attitude research on the questions posed in our discussion document, several key themes or touch points are emerging:

- Primary consideration is safety and the protection of people. Safety, including workers, people transporting the used nuclear fuel and people along the route, needs to be a primary consideration.
- We must protect the environment during transportation, including watersheds and other environmentally sensitive areas.
- We must have in place strong procedures to secure shipments from threats such as terrorism or theft.
- Emergency response plans must be developed and be in place in case of emergencies along transportation routes. First responders and other emergency response personnel need to be equipped and supported.
- The costs associated with the transportation of used nuclear fuel must be fully covered, and not fall on taxpayers and future generations.

- Jurisdictional roles, responsibilities and authorities must be clearly articulated and understood.
- People will have concerns. Education, communication and engagement are fundamental to overcoming people's natural tendency towards nimbyism, and fears and misconceptions about nuclear energy and the transportation of used nuclear fuel.

Over the past two years, the NWMO also completed two rounds of public attitude research on transportation planning. This work sought to understand the perceptions of a wide cross-section of citizens through focus group sessions in Ontario, Quebec, and New Brunswick, workshops involving representatives of Indigenous and municipal communities participating in the siting process, and public dialogue sessions. Reports from that research are available on the NWMO website, and a summary of findings is included in the *Transportation themes* reports written for 2017 and 2018.

Community and NWMO learning and dialogue continue as we move forward together to implement Canada's plan. Information gained by the NWMO through these conversations is being used to guide the development of a Transportation Planning Framework, which will act as the road map for transportation planning.



# » SOCIAL MEDIA AND ONLINE CONVERSATIONS

The NWMO continued to hear from citizens via our website and email, as well as through social media channels Facebook, LinkedIn and YouTube, which were launched in 2017. This year saw the launch of NWMO on Instagram. The expansion of our social media presence is planned to continue with the launch of the NWMO's account on Twitter in 2019. Social media have rapidly become key communication channels for Canadians, with some surveys indicating that more than two-thirds have at least one social network profile and more than half are using multiple platforms. Throughout 2018, the number of contacts received through NWMO-managed social media channels has remained consistent in volume and frequency, on average one or two contacts per day.

Generally, engagement with NWMO social media channels are positive and supportive of our mission. Substantive public input has coalesced around the educational content delivered through these channels, especially content aimed to demystify the topic of nuclear waste. For example, visitors to our social media channels regularly engage with content describing CANDU nuclear fuel as a solid (not liquid or gaseous) material, the hazards associated with exposure to radiation, and the NWMO's implementation of Canada's plan to keep people and the environment safe while managing used nuclear fuel. Some followers have become so engaged with the material that they even respond to other users' questions and comments with links to both NWMO-generated and third-party material.


The types of questions and comments we hear through social media tend to gravitate towards safety-related topics, especially when NWMO-generated content has referenced third-party or internationally recognized experts in the field of nuclear waste management. Generally, there appears to be a desire for this kind of expert verification of the NWMO's work, and to the viral, shareable nature of social media exposing the NWMO and our work to the sizeable audiences following well-respected domestic and international specialists in the field.




Due to the multimedia-based foundation of social media, we continue to hear about the value of rich content in engaging followers. People want to see posts featuring high-resolution photography, easily consumable text, and descriptive videos that address complex topics in a way that is easily understood by casual viewers. We have also learned that social media users living in and around siting communities like to see themselves featured in NWMO content, through updates about the progress of the site selection process, as well as content used to promote learning and capacity-building opportunities. For example, one of our most popular posts of the year featured middle-schoolers learning to build, program and command LEGO robots provided through the NWMO's Early Investments in Education and Skills program. Stories about community investments are clicked on more frequently than some of our technically oriented content about used nuclear fuel, but also are a gateway for curious visitors to find and explore that technical content, and to further expand our reach and audience.

Outside NWMO-run social media channels, we still observe many online discussion groups based around specific siting areas, some critical of our work or presence in their community. While targeted oppositional posts are a minority of the online discussions we observe, 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 mirror the learning process seen in our face-to-face conversations with people in siting areas.

## Visit. Like. Share.

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# » IMPLEMENTATION PLAN

## 2018-22

In 2018, the NWMO also received comment and direction from interested individuals and groups on our annually updated strategic plan, *Implementing Adaptive Phased Management 2018 to 2022*, which describes our strategic objectives and five-year work plan. Based on feedback we received about our past plans and other communications materials, last year we created a document that is easier to read and understand, with language designed to be more open, friendly and accessible. We also streamlined the public review process, and extended the timeline to receive public comments from two months to four months.

The 2018-22 plan was released in March 2018 for public comment, and comments were received until the end of July. We received mostly positive comments and affirmations of support for the APM process and our strategic plans for the next five years, along with some specific suggestions to help strengthen the plan. Some respondents asked for clarification on terms or concepts used in the implementation plan, why multiple boreholes were required in each siting area, and why some potential siting communities are located at such a considerable distance from operating nuclear reactors. One respondent suggested a specific First Nation with which to engage, as well as some potential engagement activities, and another offered comments on the logistics, urgency and complexity associated with transporting used nuclear fuel. A few respondents expressed criticism of APM or urged that the NWMO consider alternative solutions to Canada's plan, including the use of experimental nuclear technology or used fuel reprocessing.

The feedback received is still under review and will be covered more fully in the 2019-23 plan to be published in March 2019.

## » CONTINUING DIALOGUE

In 2018, we heard from and engaged a broad range of interested communities, First Nation and Métis communities, individuals, and organizations as we worked collaboratively to advance the implementation of Canada's plan.

The NWMO has observed that as conversations continue, and more communities, individuals and groups become involved, there is substantial agreement on the themes and questions that need to guide and be addressed in implementing Canada's plan. We also understand that as we advance to identify borehole sites and potential repository locations, conversations, questions and concerns will become more focused and personal. Special care and respect will be needed to collaboratively advance this work.

The NWMO continues to invite comments and suggestions about our work programs and plans, and thanks the communities, individuals and organizations that continue to lend their thinking to ensuring the long-term containment and isolation of Canada's used nuclear fuel today and for generations to come.



NWMO staff gather input from Ignace and area residents at an open house in July 2018.

# » APPENDIX: ONGOING AREAS OF INTEREST

The following is a rolling list of frequently asked questions and topics we have encountered during site selection work.

## **Exploring safety together**

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- For how long will this radioactive material be dangerous?
- How can you know 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 the environment be protected?
- 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, and how will it isolate used nuclear fuel from people and the environment?
- How will the environment be protected when the repository is under construction?
- How will the environment, and specifically water, be protected during technical studies when you are drilling boreholes?
- What are the safety measures at surface facilities, and how will these facilities use water, treat waste and safely manage radioactive sources?
- What are the environmental impacts of the rock pile that will be created during the deep geological repository construction?
- 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?

## Adaptive Phased Management and the site selection process

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- What is used nuclear fuel?
- How much nuclear fuel exists, and how is it being managed now? How much used fuel will there be by the time the repository is operating?
- Who owns the NWMO? Who do you report to? How are you regulated?
- How was APM developed? Who approved it? Do Canadians support it?
- How much will this project cost, and who are the used fuel owners that are paying for it? Is inflation included in cost projections?
- How long will it take to find a site? How long will it take to construct, and for how long will the repository operate?
- What government approvals will be required to build and operate the site?
- Will the selection of a preferred site for the repository trigger a federal and/or provincial impact assessment?
- Has the NWMO considered energy and water “footprints” in its planning?
- How many communities are involved in the site selection process?
- What is the nature of the NWMO’s work in the area?
- How many people have attended NWMO learning events? How many of my neighbours are coming out to meetings?
- Do you have a local office where I can learn more about the project?
- What kind of site and/or rock is the NWMO looking for?
- How are other countries managing their used nuclear fuel?
- What criteria are being used for narrowing down the siting areas?
- Where will surface facilities be located – nearby or in the region?
- Where will workers live during the 10-year construction period?
- What can be done with the acreage that will not be taken up by APM surface facilities?
- Are you talking to neighbouring communities, and local First Nation and Métis communities?
- What is our community’s role in the site selection process? What do you need from us?
- What is the CLC, and when does it meet? Can I attend its meetings?
- What types of used nuclear fuel will be managed by the project, and will used nuclear fuel from other countries be accepted by the deep geological repository?
- How does the NWMO plan to address used fuel from SMRs?
- First Nation/Métis “willing hosts”? What does that mean?
- Land use claims, how does that 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 in 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”?
- What is the NWMO doing with respect to reconciliation with Indigenous peoples?
- How can non-Indigenous communities be involved in reconciliation?

## Exploring the potential for partnership and fostering community well-being

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- What are the local 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?
- How does the rock look here in the region? Is it suitable to site a repository?
- Have you talked to [my neighbour] about this 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 locally to build the repository and facilities? Is there enough in my community?
- Will you be looking at Crown land?
- How can we prepare people in the community and area to participate in the project, develop skills and more?
- 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 borehole drilling? How do we get involved?
- How are youth being engaged, and 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 this project?
- What resources are available to communities now in order 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 in order for it to proceed?
- How can I help build this partnership?
- What resources are available to learn more about partnership, and what partnership would mean for our community?
- How will willingness and support be gauged?
- Can a few people in an area who are opposed to the project prevent the project from proceeding in the area?
- How can we help to get more people involved?

## **Building relationships**

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- What is the protocol for reaching out to the First Nation community in my area?
- What are Aboriginal rights, and how must they be respected?
- Who has rights, and who has traditional territory in the area?
- How can we understand and be respectful of cultural differences and decision-making processes?

## **Building capacity**

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- How can we engage more community members in learning?
- How can we get more community members attending CLC meetings?
- How can we take the learning out to community groups?
- How do we build community capacity in planning and economic development sufficient to support reflection on this project and preparing for its implementation? What other expertise and studies will we need?
- What opportunities are there for this project to contribute to well-being during participation in the siting process?

## Choosing sites for borehole studies

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- How will siting the boreholes in this location affect my use of the land?
- How will siting the boreholes in this location affect my property values?
- 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? What is the environmental impact of the boreholes?
- When you are building borehole access roads, how many water crossings are required?
- How many boreholes will be drilled at an identified location?

## Interweaving Indigenous Knowledge

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- How will the NWMO address the United Nations Declaration on the Rights of Indigenous Peoples in the management of hazardous materials in Indigenous traditional territories?
- How can we learn about how to keep our water safe by better understanding 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 culture?
- What are some examples of how the NWMO is interweaving Indigenous Knowledge throughout the APM project?
- How are Indigenous communities involved in borehole drilling activities?



## Transportation

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- What transportation route will you be using to get the used nuclear fuel from interim storage facilities to the repository site?
- Is this material safe to transport? What if an accident happens while 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?
- 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 canisters?
- 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?
- What happens if an unauthorized individual really intended on opening the Used Fuel Transportation Package? Can the package be opened?



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