



Transportation Themes 2014-2017

2017 What We Heard About Transportation
Planning from Working with Communities

October 2017

nwmo

NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES

»» TABLE OF CONTENTS

| | |
|--|----|
| Introduction | 3 |
| Key Transportation Themes | 5 |
| Theme 1: Health and Safety | 6 |
| Theme 2: Transportation as a Component of Canada's Plan | 12 |
| Theme 3: Transportation and Role in Site Selection | 14 |
| Five Discussion Questions | 15 |
| Reflection on Learning to Date | 17 |
| Encouraging Conversations and Exchange of Information | 19 |
| Continuing Dialogue | 21 |

» INTRODUCTION

The safe and secure transportation of used nuclear fuel is an important component of Adaptive Phased Management, Canada's plan for the long-term management of used nuclear fuel. The ability to transport used fuel to the repository site safely and in a socially acceptable manner is a key factor that will need to be addressed in the selection of a preferred repository site, along with safety of the repository site and the ability to implement the project in partnership with those in the area.

Although the transportation of used nuclear fuel to a repository site is not expected to begin before 2040, it is a key focus of interest and conversation in dialogue with communities, interested individuals and groups about Canada's plan for the long term management of used nuclear fuel. Since 2014, the NWMO has published each year a rolling summary of the ongoing conversations with communities about this important topic. This 2017 report is intended to help fuel further discussion.

The communities involved in the site selection process are keen to explore the safety and security of the transportation of used fuel to any repository site as an integral part of exploring a project they may become involved in. Over the course of these conversations, communities express a strong sense of responsibility to all Canadians and future generations to ask and have answered the key questions important to advancing the project.

As communities, interested individuals and groups explore the basis for confidence in safety of the transportation of used nuclear fuel, the NWMO is learning about the questions that need to be addressed. It is also learning about the testing which needs to be performed, and the values, objectives and processes that need to guide planning of the transportation of used nuclear fuel as part of the APM project.

To date, the NWMO has engaged thousands of Canadians, to hear their comments, questions

and concerns, and to provide information on transportation topics as part of ongoing learning and engagement on the project and the advancement of the site selection process. Over time, these conversations are broadening and deepening.

In response to the interest of communities involved in the siting process, in late 2016 the NWMO published a discussion document to contribute to the ongoing dialogue on transportation. This document was designed to explore areas of interest being raised by communities through encouraging dialogue on five key questions.

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 focussed discussion in response to the discussion document, several key themes or touch points are emerging.

Understanding and addressing these interests and concerns will begin to chart a path to collaboratively planning and implementing a safe and socially acceptable transportation plan. This includes:

- Primary consideration is safety and the protection of people and the environment. People want to understand and be assured that people's health, drinking water, watersheds and the environment will be protected.
- People want to be confident in the procedures to secure shipments from threats such as terrorism or theft.
- People want assurance that emergency response plans are in place in the case of emergencies along transportation routes. They want to know how NWMO will equip and support first responders and other emergency response personnel.
- People want to know costs associated with the transportation of used nuclear fuel will be

fully covered, and will not fall on taxpayers and future generations.

- Transportation plans need to be independent of politics and changes in government. People want to know that jurisdictional roles, responsibilities and authorities are clearly articulated and understood.
- Education, communication and engagement are considered fundamental to overcoming people's natural tendency towards nimbyism, and fears and misconceptions about nuclear energy. These fears and concerns should not stand in the way of implementing the project and the greater public good.

Dialogue on transportation this year has also underlined the importance of grounding future transportation planning on the principles, values and objectives held by citizens for such an activity. A picture of these expectations is beginning to emerge. Community and NWMO learning and dialogue continue as we move forward together to implement Canada's plan.

The discussion that follows is organized in several sections:

Section one outlines the key transportation themes from conversations with communities, interested individuals and groups to date;

Section two outlines learning from discussions on five key questions featured in the NWMO's discussion document;

Section three is a discussion and reflection on the common ground emerging from dialogue to date and which begins to outline the path to implementing a socially acceptable transportation plan; and

Section four describes ongoing efforts to advance conversation and learning and prepare for the APM transportation program.

»» KEY TRANSPORTATION THEMES

The dialogue on transportation is ongoing and continues to focus on several key themes over the past year. Face-to-face conversations, questions, comments and other engagement reflected an interest in knowing more about the project in general, especially health and safety aspects, and the transportation of radioactive material, including how routes would be selected, security, logistics and emergency preparation.

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 transportation planning. The central themes encountered this year remain consistent with those summarized and discussed in previous reports, and for this reason we present the key transportation themes as a rolling list of questions and areas of concern to be updated annually.

Questions and Areas of Interest About APM Transportation Planning (2014-2017)

- »» Theme 1: Health and Safety
- »» Theme 2: Transportation as a Component of Canada's Plan
- »» Theme 3: Transportation and Role in Site Selection

Theme 1: Health and Safety

Plans to ensure the safety of people and the environment during transportation

There is a high level of interest in learning more about NWMO's plans to protect the safety of people and the environment during transportation and how the integrity of the used fuel containers will be ensured. Generally, there is a desire to learn more about and understand radiation, including the health effects of exposure. Once the nature of the hazard is established, people are interested in how safe transportation of used nuclear fuel would be ensured for the communities, land, and water alongside the route, as well as for staff, including truck drivers and loading and unloading personnel. People also look for information about the safety track record.

1. What is radioactivity? Where does it come from? What is a half-life?
2. How does radiation affect people? Is natural background radiation harmful to my family?
3. What is the relationship between a milliSievert (mSv) and a Becquerel (Bq)?
4. How does the radioactivity level in this waste compare to levels from other minerals? What types of radiation and doses can be expected from this waste?
5. Are low doses of ionizing radiation harmful to health?
6. How will the truck driver and loading-unloading personnel be monitored for radiation exposure? Will they receive high doses?
7. How will communities along the transportation route be affected? Will people along the route be exposed to radiation and their health be affected?
8. In the unlikely event of a breach in shielding, how much radiation would be released? Would it be harmful to my family, children, and fetus?
9. Where does radiation go when it is released into the environment? Does it accumulate on surfaces? If so, should I be concerned about this? Does it bio-accumulate?
10. What is the demonstrated track record for safe transportation in Canada, and around the world?

Theme 1: Health and Safety

The Used Fuel Transportation Package (UFTP)

Many questions focus on the design of the UFTP, such as the choice of container shape and fabricating material, the purpose of the impact limiter, and the integrity of the container in the case of an accident involving water, fire, or terrorist attack.

1. How does the design of the Used Fuel Transportation Package (UFTP) shield radiation? Why is shielding different for the transportation package than that proposed for the deep geological repository?
2. How much does each package weigh, and can they be transported by road?
3. What are the package standards? Do all the proposed APM packages meet the same safety standards?
4. Is the container certified for transporting nuclear fuel waste? Did you test the transportation containers with nuclear fuel inside them?
5. Do the package certification tests adequately reflect real-world scenarios? Are the containers robust enough to handle fires in enclosed spaces (i.e. tunnels)?
6. What independent testing has been done on the container? Has its integrity been tested against an attack using military-type weapons?
7. Why is redwood used for the impact limiter?
8. Why is the container square? Is this the strongest shape?
9. Would metal seals between the lid and body of the package be stronger than rubber ones?
10. How will the waste be placed inside? Will it be encased in anything first?
11. Would the used fuel transportation package be emplaced in the repository/go underground?
12. Will the current transportation package design be relevant in 30 years? Or might we be dealing with a different model?
13. How many times will the waste need to be packaged, de-packaged and repackaged from the nuclear power plant to the repository site? Can/will dry storage containers be transported?
14. How often can a package be re-used?
15. How many packages will be required?

Theme 1: Health and Safety

Emergency response plans and scenarios

Many want information on how the NWMO will plan for emergencies along transportation routes, especially regarding communication with local authorities and emergency response personnel. Radiation risks to first responders during the unlikely event of a breach of the UFTP are top-of-mind and people often probe to better understand the hazard and how it might be practically managed during a variety of hypothetical scenarios.

1. What accident scenarios are being planned for and how will they be addressed?
2. What would emergency response planning and training protocols look like for my community or region? Will there be evacuation plans?
3. Exactly how far would emergency workers have to stand from the UFTP to remain safe?
4. Is safety affected by extreme winter weather and road conditions in the north, e.g., snowstorms, winter road closures that often last days at a time, and sudden extreme weather?
5. What kind of contingency plans will be in place if roads are closed?
6. If an accident downed a high-voltage wire and it fell on the UFTP and shorted to ground through the container, could the electrical arc open the UFTP?
7. How will you ensure there is a “safety culture” at NWMO?
8. Where would the dispatch centre be located? When would planning for dispatch centre protocols begin?
9. How will you sort out jurisdictional mandates and organizational responsibilities among first responder organizations?
10. Can used nuclear fuel spill out of the transportation container and if it did what would be involved in cleaning it up?
11. How would a rail accident in a remote location [i.e. far away from access roads] be handled, including recovery?
12. How will the NWMO support the community with emergency response planning?
13. How will first responders be trained and how will different agencies be coordinated in the case of an emergency?
14. Will used nuclear fuel be transported with other kinds of dangerous materials, such as fuel, chemicals, etc.?

Security en route

In 2017, the security of shipments and how loads would be secured from malicious threats (e.g. terrorism or theft) emerged as a distinct area of interest separate from concerns about accidents. People wanted more information about potential security measures, albeit with the understanding that advance notice and details of security arrangements must be concealed from malicious actors.

1. What kinds of threats need to be considered and planned for?
2. How will the NWMO track vehicles en route, monitor environmental and road conditions, and train truck drivers?
3. Would an emergency “rapid response” team travel with the shipments, or be deployed along the route?
4. Would a truck convoy be accompanied by an escort, like with oversize loads?
5. How does transportation by another organization of highly enriched uranium (HEU) differ from that of the CANDU fuel that the NWMO will transport?
6. Can the UFTP survive extreme heat for short periods of time, double or triple the temperatures used in the transportation video, as would be necessary if an incident involved compressed natural gas?
7. Will there be security guards accompanying the shipments?

Theme 1: Health and Safety

Protecting water along the route

Ensuring water quality and protecting water bodies and lands of economic importance are top of mind subjects for many, with the focus of concern split between the areas near the repository and along the transportation route. People want to understand the potential for the APM project to endanger local water sources, particularly in the case of a transportation accident en route. They also want details about how the NWMO would maintain the safety of water, particularly in the Great Lakes and local sources of drinking water.

1. If the UFTP became submerged at depth during a transportation accident, would the water body and watershed be safe?
2. How would the UFTP be retrieved? What equipment would be used? Is this equipment available in my area and are people trained to use it? How would this equipment be dispatched?
3. If clean-up were necessary, how would this be done? Who would be called in to do the clean-up?

Understanding logistics: transportation modes and routes

People are interested in how the used fuel would be moved from its current location to a repository, and the kinds of logistics involved in moving these materials. Questions also include the routes and modes (e.g. road, rail, or ship) that are being considered and whether the NWMO has selected preferred routes and modes yet.

1. What modes of transportation are being considered? Is transporting over water being considered?
2. How many shipments are anticipated per day, week, and month? Will shipments occur only during daylight hours? How long will this take?
3. Will existing roads have to be upgraded, and will new roads be needed? Will four lane highways or two lane be required?
4. What impact will used fuel transportation program have on existing infrastructure?
5. What other infrastructure upgrades will be needed (i.e. communication systems in remote areas)?
6. How will traditional and environmental knowledge of the

Theme 1: Health and Safety

area be used to inform transportation mode planning, e.g., local topography and wildlife areas that might affect road and rail infrastructure improvements?

7. The roads get very dangerous during the winter. Is truck transport really the smart thing to do?
8. Can the existing rail system accommodate the NWMO's transportation requirements?
9. Will the NWMO own the trucks and employ the drivers or will they be contracted?
10. Are transportation packages inter-modal (i.e. can they be transferred from rail to road, or vice versa)?
11. Has the NWMO selected a preferred transportation route? Will there be alternate routes?
12. Why would the NWMO consider shipping the waste long distances instead of choosing a site close to where it is currently stored? How many containers will need to be shipped?
13. Would the UFTP be expected to stop at truck weigh stations?
14. Will the NWMO rebuild any highways or rail-lines?
15. Will routes be designed to avoid populated areas?

Theme 2: Transportation as a Component of Canada's Plan

Building understanding of APM and used nuclear fuel

Building knowledge and a deeper understanding of other aspects of the project is important context. This includes the design and radioactive characteristics of the used fuel bundles, the history of nuclear power in Canada, the NWMO's mandate, and how waste is currently safely managed on an interim basis at Canada's nuclear power plants.

1. Is used nuclear fuel a liquid, a gas or a solid?
2. Is the bundle still radioactive? How hazardous is it and for how long?
3. What are the effects of exposure to a fuel bundle, with or without barriers, and how will NWMO ensure that site workers and the communities along the transportation route are safe during transportation?
4. Can the bundles explode spontaneously?
5. Are the ceramic pellets durable or will they break and release radiation?
6. How many fuel bundles will ultimately be transported?
7. Can the bundles "go critical", i.e. spontaneously start a nuclear reaction?

Covering costs

People have an interest in how Canada's plan is funded, and in particular, details related to the cost and funding of transportation.

1. Who will pay for transportation of wastes?
2. Who will pay for infrastructure upgrades and maintenance? Taxpayers or the NWMO?
3. What is the cost of the transportation vehicles and Used Fuel Transportation Packages that will be used to move fuel bundles to a deep geological repository?
4. Will the cost be a major factor in selecting a preferred site?
5. How will funding be assured over the very long term?
6. Will the cost of long-term wear and tear on infrastructure be considered in determining the best mode and route for transportation?
7. Do the estimated costs of transportation consider

Theme 2: Transportation as a Component of Canada's Plan

differences in using public modes (i.e. roads) vs. private infrastructure (i.e. rail)?

8. What are the implications for taxpayers and/or electricity ratepayers, now and into the future?
9. Who will be responsible for community costs related to emergency response, and training of emergency response personnel?

Oversight

There is a strong interest in understanding the checks and balances that are in place to ensure safety, financial surety, and that all applicable laws and regulations are adhered to.

1. Who will oversee the transportation of used nuclear fuel?
2. What regulations are in place?
3. How will the NWMO respect Indigenous jurisdiction with respect to transportation?
4. How will the NWMO address the United Nations Declaration on the Rights of Indigenous People in the storage of hazardous materials in Indigenous territories?
5. What is the role of [federal and/or provincial] governments? Who are the ultimate decision-makers?

Theme 3: Transportation and Role in Site Selection

Transportation as a factor in site selection

People have questions about how transportation considerations will influence decisions on a preferred site.

1. What factors are considered in choosing routes? Is weather considered? Can one lane highways be used? What about bridges?
2. Is transporting used nuclear fuel a shorter distance safer than transporting used nuclear fuel a longer distance?
3. Considering that the risks involved with the transportation of spent nuclear fuel will be a highly controversial issue, and that it may travel through communities that derive no benefits from the nuclear industry, to what degree (big factor or small) will the geographical proximity of a possible site play in the your selection of the preferred site
4. How will transportation be addressed in regional studies?

Involving others in the conversation about transportation

People want to understand how transportation decisions will be made, who will be involved and how.

1. When and how will transportation route communities be engaged and how will this be managed?
2. What is the timing of the selection of a preferred transportation route? When will communities along the route be identified?
3. Will local first responders be engaged and be provided with opportunities to better understand the project?
4. How will you include indigenous communities along potential routes in transportation planning?
5. Will a broad used fuel transportation committee be established that would include all communities located along the used nuclear fuel transportation route and that would be responsible for communicating and disseminating information to the communities about risks and emergency response?
6. What benefits and supports will be available to these communities and how might they be involved in decision-making? Should transportation route communities receive a benefit and should they need to agree?
7. How will public outreach and support be maintained over the long term?
8. Will communities along potential route(s) have a veto?
9. Will communities have input on transportation modes?

» FIVE DISCUSSION QUESTIONS

In response to the interest of communities involved in the siting process, in late 2016 the NWMO published a discussion document to contribute to the ongoing dialogue on transportation. This document was designed to encourage discussion on five key questions, and to explore areas of interest being raised by communities.

This discussion document has been a focus of conversation among Community Liaison Committees, community working groups, Indigenous and municipal organizations and interested individuals and groups. Dialogue continues as engagement activities broaden and deepen. Input from this dialogue will be summarized in a future report, and will be used to develop a draft planning framework for further discussion.

Discussion Questions

To get the conversation started, we suggest beginning with the following five questions. We can add to these questions along the way as we reflect and discuss together.

- 1. What basic requirements or factors should form the starting foundation for the APM transportation plan?**
- 2. Which objectives, principles and key questions should guide development of an APM transportation plan?**
- 3. How can we ensure the design and implementation of the APM transportation plan is sufficiently inclusive to ensure good decisions are made?**
- 4. What information will we need from technical specialists to develop the plan and support decision-making?**
- 5. What factors should be considered in future decisions about modes and routes?**

To view the Discussion Document, go to: www.nwmo.ca/~media/Site/Files/PDFs/2016/08/25/11/44/TransportationDiscussion_EN.ashx?la=en.

As a complement to this ongoing dialogue, the NWMO commissioned Hill+Knowlton Strategies to lead a series of focus groups, workshops and a public dialogue. This work focussed on involving a cross-section of citizens from Ontario, Quebec, and New Brunswick in discussion on the five questions in the Discussion Document. Full reports from this work are available on the NWMO website at www.nwmo.ca/TransportationPlanning.

Following are some of the key highlights from this work.

Highlights from Public Attitude Research and Dialogue Project

- Basic Requirements of the APM Transportation Plan

When discussing what needs to be addressed in a future APM transportation plan, safety emerged as a foundational component and one that should guide all others. Security – associated largely with deliberate actions, e.g. terrorism or sabotage – was equally important. Effective communications, including targeted Indigenous and community engagement and public education campaigns, was also a top priority for participants. In addition, a plan should reflect lessons learned from Canadian and international experience in nuclear waste management; emphasize environmental protection; and outline oversight, accountability and clear roles and responsibilities including emergency response and regulatory oversight.

There was wide agreement that the project should be managed cost-effectively, but not at the expense of safety or security, and the plan should not impose financial liability on future generations of tax payers.

- Principles and Objectives

Upon reflection of the principles and objectives in the Discussion Document, participants reacted positively to the possible list, and recommended that future discussions consider the following: provisions for monitoring and measuring the plan's

objectives and for exceeding rather than simply meeting regulatory requirements; incorporating environmental protection as a stand-alone principle; incorporating security as a stand-alone principle (versus a sub set of safety), and challenges associated with determining who should be involved in the planning process and how.

Participants discussed at length the principle of inclusiveness, suggesting that the NWMO clearly articulate how decisions pertaining to transportation planning will be made, and by whom. Participants asked that the NWMO recognize more explicitly the role of municipalities, Indigenous communities and the federal government in the planning framework. Lastly, participants emphasized the need for flexibility in the plan to accommodate change, “new technology, regulations, and social expectations.”

- Ensuring the Development of the Plan is Sufficiently Inclusive to Facilitate Good Decision-making

Participants recognized that defining who needs to be involved in the development of the transportation plan to ensure good decisions are made is a complex exercise. Most initially indicated that “everyone” should be involved and some believed that communities along prospective routes should be granted an opportunity to “consent” to the plan. However, as discussions progressed, the majority of participants concluded that this approach was unfeasible given the nature and scope of the project, and agreed that the interest and rights of affected communities must be balanced with pragmatism and the greater public good.

Participants discussed how the transportation plan should address Indigenous rights, treaties and unresolved land claims. Participants noted that decision-making must take into consideration the Government of Canada’s duty to consult with First Nations, and that local decision-makers (Indigenous and non-Indigenous) have a duty to represent the needs and interests of their constituents. Indigenous participants emphasized the importance of “respecting First Nations’ connection to the land” through dialogue and learning from Indigenous traditional knowledge.

- The Science behind the Plan

Participants supported the research and technological program that NWMO has

committed to completing to facilitate the development of Canada’s plan. They provided suggestions for planning such as: more exhaustive, “Canadian model (e.g., extreme cold testing) container testing;” analysis of jurisdictional capacities and regulatory frameworks; and an economic impact analysis for modes of transportation.

- Considerations for the Selection of Modes and Routes

In discussions focused on the criteria for selecting transportation modes and routes, participants expressed an expectation that we thoroughly analyze the pros and cons of various modes and routes and make the best possible decisions based on science, safety and security considerations, adequacy of infrastructure and proximity to population centres.

Specific to modes, criteria included assessment of potential environmental impacts; analysis of merits and risks of operating larger loads with fewer trips and vice versa; the frequency and nature of required material handling and transfers; and adaptability to future innovations in transportation. Specific to routes, criteria included proximity to sensitive environmental areas, potential for traffic congestion and impacts on commuters, and the trade-off between longer routes that traverse less densely populated areas versus shorter routes that go through more densely populated areas. In both cases, participants recommended an assessment of political and social acceptance as part of the selection criteria.

- Right Direction?

Participants indicated that topics raised in the Discussion Document were a helpful starting point for discussion, and that the NWMO was generally heading in the right direction. Participants noted how well the NWMO’s considerations reflected their own unprompted suggestions.

And finally, participants stated that while the NWMO “has done a good job at engaging communities,” further efforts are required “now, not later” to build the NWMO’s profile, counter fear and misconceptions about used nuclear fuel, and obtain enough public “buy-in” to move efficiently through the planning phase into implementation.

» REFLECTION ON LEARNING TO DATE

Through thousands of conversations over the course of this and previous years, there is general alignment on an emerging set of themes and issues across different communities, groups, and individuals, and regions.

Based on what we are hearing, we can consider a number of emergent thematic ‘touch points’ in the course of engagement going forward. These themes, and the work to address them, begin to chart a path to collaboratively planning and implementing a safe and socially acceptable transportation plan.

Safety measures – both for protecting people and the environment - continue to be the primary focus of concern in early conversations. For those familiar with the process, the safety case is well-understood, and considered to be a cornerstone of all aspects of the APM process. That said, in the context of transportation, we are learning that people are more and more distinguishing safety measures in regards to protecting people’s health, security of shipments, emergency response, and the protection of waterways and the environment.

Generally, people new to the process want to learn more about safety associated with the transport of used nuclear fuel from interim storage locations to a repository. Interests range from learning more about: radiation associated with used nuclear fuel; where used fuel is currently stored; used fuel container packaging; measures to protect residents of inhabited areas along the route, truck drivers or rail personnel, workers loading and unloading used fuel transportation packages, and emergency responders; and measures to protect land, waterways, and wildlife along-side the route. Others familiar with the process are asking more specific and pragmatic questions such as, - “what would emergency response planning and training protocols look like in my community?”, “what consideration will be given to weather conditions in the selection of a transportation mode or route?”, and “if the UFTP became submerged at depth during a transportation accident, what would the

response plan look like in a remote area?”

People are interested in the practicalities of transporting used fuel securely. People express interest in understanding procedures to secure shipments from threats such as terrorism or theft. People appreciate the complexities that arise in the context of sharing advanced information on a shipment schedule or route. For example, people noted, “tensions between the public’s desire to be informed about used fuel shipments, and the need to keep advanced notice and details of shipment arrangements out of the hands of malicious actors”.

That said, they further noted a distinction regarding communications plans with authorities and emergency response providers.

People want to know about emergency response plans in the case of emergencies along transportation routes. People told us that it was important that work address how we would equip and support municipal first responders and other emergency response personnel, including plans for advanced training and capacity building. People wanted assurance that additional costs associated with route emergency preparedness are not borne by the municipality or the community, and that there are plans for involving emergency response providers and other relevant specialists and authorities.

Environmental protection, and in particular water protection, emerge as important concerns for many people in conversations about transportation. People want to know that drinking water and watersheds along with other environmental aspects along a route will not be put at risk. People ask about plans to prevent environmental damage, and plans to mitigate and repair environmental damage in the unlikely event of a release of radioactive material. In addition, people told us that work should reflect the most up-to-date safety knowledge, and best practices internationally for the design of safe and secure transportation.

We heard that people want to know more about covering costs associated with the transportation of used nuclear fuel to its legacy

destination including, “who pays?”, “are we creating a burden for future tax payers?”, and “what about the cost of building and maintaining infrastructure?” We heard that people felt it was important that transportation plans are independent of politics and changes in government, and that jurisdictional roles, responsibilities and authorities are clearly articulated and understood, inclusive of independent regulatory and oversight authorities. A topic of discussion involves that of decision making and specifically, a need to understand the role of the highest order of government and its authority to make a decision on behalf of current and future generations of Canadians.

We heard that people consider education, communication and engagement to be fundamental to gaining public acceptance of the transportation of used nuclear fuel. People felt that all Canadians should have some measure of awareness and understanding of Canada’s plan, and that those who are more directly affected by transportation have the opportunity to understand potential impacts on them. We heard that the involvement of experts such as emergency response providers, transportation specialists, scientists, and the various levels of government are important in the process of developing the plan. People also expressed an interest in learning more about how Indigenous peoples would be involved in decisions related to transportation.

We heard that people consider that future success relies on social acceptance of transportation, and that this requires overcoming people’s natural tendency towards nimbyism, the public’s inherent fear and misconceptions about nuclear energy, and the fact that most Canadians do not know the NWMO very well, or at all. Looking forward to future engagement on the topic of transportation planning, it appears that exposure to fact-based information, combined with the opportunity to ask questions and discuss the issues with others, can significantly increase comfort and confidence levels in Canada’s ability to transport used nuclear fuel safely and securely. People have

said that early and ongoing engagement and education on the transportation of used nuclear fuel is of prime importance to successfully building social acceptance of a future plan and that we should consider how to engage the public at large to know more about Canada’s plan for dealing permanently with used nuclear fuel.

These and other thematic ‘touch points’ are emerging as common ground over the course of conversations and are beginning to chart a path to collaboratively planning and implementing a safe and socially acceptable transportation plan

» ENCOURAGING CONVERSATIONS AND INFORMATION EXCHANGE

The NWMO continued to encourage active dialogue and learning on transportation throughout the course of 2017.

Ongoing engagement on safety

In 2017, engagement activities designed to share information on the basis of confidence in safety continued. Information exchange and dialogue on transportation safety was promoted through the Used Fuel Transportation exhibit, standing exhibits in community offices, and a multi-module exhibit used at open house events, along with community visits by transportation specialists and other engagement staff who answer questions from visitors. These tools were used extensively in siting areas, and in Métis, First Nation, and municipal community and association events in which the NWMO participated. In addition, formal presentations were made to local municipal Community Liaison Committees, and the Municipal Forum, and staff attended dozens of community events and learning and sharing gatherings with First Nation communities. A complete list of transportation engagement activities is found in Appendix A.

In 2017, the NWMO's mobile Used Fuel Transportation (UFTP) exhibit and transportation specialists visited 15 Métis, First Nations, and municipal events. Five of these were inaugural events that provided well-received opportunities to expand knowledge of transportation safety beyond siting communities. The UFTP exhibit offers an opportunity for visitors to view and touch a CNSC certified transportation package, to hear from and ask questions of the NWMO's transportation experts, and to see videos demonstrating how used fuel transportation packages have been tested to withstand various accident scenarios. In 2017, we hosted nine tours of the NWMO's demonstration and testing facility in Oakville, which houses the UFTP mobile exhibit when it is not on the road.

To facilitate dialogue with municipal representatives beyond the siting regions, 3D

models of the UFTP and Used Fuel Container were featured at various municipal association conferences throughout the year. A full list of municipal association conferences and trade shows attended by the NWMO in 2017 is included in Appendix A.

We provided technical briefings, answered questions, and talked about transportation planning with community leaders, the Municipal Forum, and interested individuals, and groups. Specialized audiences, such as first responders and road supervisors, and inter-jurisdictional government committees were also engaged. The safety of transportation continues to be featured in exhibits in community offices, at open house events, and at community events in which the NWMO participates. Conversations continue in each these venues. In 2017, we added to our inventory of engagement tools, a transportation-themed tabletop display to emphasize transportation themes when paired with our existing inter-active kiosk. The kiosk and tabletop display were deployed at various community events, especially at trade-shows and conferences of numerous municipal associations with whom we regularly engage. This allowed us to focus discussion on the topic of transportation within the context of the broader NWMO mandate to site and construct a safe and secure deep geological repository in a willing and informed host community.

The combination of multimedia-enabled exhibits and kiosks and the transportation-themed display helped promote conversations with elected officials from around the provinces involved in Canada's nuclear fuel cycle (Ontario, Quebec, New Brunswick and Saskatchewan). These were also used in conjunction with the UFTP mobile exhibit to help facilitate discussions with municipal and county road staff, as well as first responders and emergency management personnel who attended transportation-themed conferences held by groups like Ontario Good Roads Association and the Association of Ontario Road Supervisors. Both the interactive kiosk and UFTP mobile exhibit

feature videos, fact-sheets, backgrounders and other materials that were used extensively to put transportation planning into context and carry on conversations prompted by the discussion document.

Generally, conversations and learning about transportation safety are broadening as the overall engagement program expands to include neighbouring communities in the siting areas.

Implementing Public Opinion Research on Transportation Planning

In 2017 we implemented a public attitude research project that engaged a cross-section of citizens in discussions about the five key questions outlined in the discussion document, as part of the following engagement activities:

- 20 two-hour long focus groups sessions in Ontario, Quebec and New Brunswick;
- Two workshops involving representatives of Indigenous and municipal communities participating in the siting process;
- A 45-person public dialogue session, held in Toronto, ON.

Perspectives and feedback from these discussions, as well as continuing conversations with communities involved in the siting process and others with an interest, will help guide development of a draft transportation planning framework for APM which will also be a subject of future engagement.

Building understanding through media and publications

We continue to make use of a range of information and engagement tools to deepen the conversation. This includes the Assessing Radiological Dose to Members of the Public and Workers during UFTP Transportation. This publication was originally developed in response to commonly-posed questions about effects of radiation along transportation routes. It describes comparative exposure times, distances and frequencies between workers and members of the public, and a passing used fuel transportation package along a hypothetical transportation route. For example, transport crew members receiving the highest dose would still receive only about 15% of the dose of a

typical jet airplane flight crew.

We also share the Safe and Secure Transportation of Canada's Used Nuclear Fuel report. This covers the concept of used nuclear fuel transportation, current storage, the Canadian regulation and oversight regime, and future risk management strategies along a transportation route. And finally, we use the Questions & Answers: Safe and Secure Transportation of Canada's Used Nuclear Fuel report, a compact review and response to some of the most common questions we hear about transporting used nuclear fuel. Questions relate to public safety, security and emergency response, the different modes of transportation, and public involvement in transportation planning.

A range of short videos are also available through the NWMO website, including on international experience transporting used nuclear fuel, regulations for transportation of used nuclear fuel, and modes of transporting used nuclear fuel.

Public questions and comments have also been shared through the NWMO and CLC websites, and, on other websites, and through social media sites. We monitor social media conversations as well, and find the focus of interest congruent with what we hear from in-person exchanges, though sometimes with a broader focus on international events. For example, the shipment of Highly Enriched Uranium (HEU) from Chalk River, Ontario to the Savannah River Site in South Carolina generated significant interest online. These international shipments of HEU were critiqued by some social media users as "unnecessary" and a source of concern due to the secrecy behind the routes ("first responders have no clue of what they're up against if there's an accident on the highway"), and the shipments' proximity to civilian traffic.

The NWMO has added answers to commonly-posed transportation questions on our website which is designed to facilitate user-friendly searches for specific information such as brochures, technical reports, or answers to their questions. A dedicated Frequently Asked Question search-box is available from the www.nwmo.ca homepage, and there are more than two-dozen transportation-related questions and answers for visitors to review, such as "What sorts of security measures will be in place?" and "What type of vehicles will be needed to transport used nuclear fuel?"

» CONTINUING DIALOGUE

Dialogue continues on transportation safety and future planning. The NWMO has observed that bringing accurate and balanced information into the discussion is important as there is substantial misunderstanding and misinformation on this topic. It also invites deeper conversation and greater reflection on the choices which face us as a society, and how we will ensure safety at every point in the long term management of used nuclear fuel.

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 transportation planning. However more conversation is needed to establish the social foundation for Adaptive Phased Management transportation.

The NWMO looks forward to continuing with this dialogue. We invite all interested Canadians to become involved by attending an open house, drop by a community Learn More office, provide input to the questions posed in the transportation discussion document, or share your thoughts through visiting the NWMO website (nwmo.ca).



The NWMO uses published material, its web site, open houses and displays to encourage ongoing conversation. The transportation mobile exhibit (shown here) travelled to a variety of First Nation, Métis and municipal communities in 2017.

Appendix A: 2017 Transportation Engagement Schedule

| Date | Community reached | Event | UFTP exhibit |
|-----------------------|---|---|--------------|
| January 29-31 | All siting areas | Rural Ontario Municipal Association Annual Conference | |
| February 3-4 | Ignace and area | Kenora District Municipal Association | |
| February 26 – March 1 | All siting areas | Ontario Good Roads Association Annual Conference | |
| March 1-2 | Ignace, ON | NWMO Open House | |
| March 2 | Village of Wabigoon, ON | Community Update | |
| March 22 | Blind River, ON | Community Liaison Committee meeting | |
| April 11-13 | Dryden, ON | – transportation presentation by Canadian Nuclear Safety Commission | |
| April 12 | Hornepayne, ON | Northwest Emergency Response Forum | |
| April 18 | Huron-Kinloss | Community Liaison Committee meeting | ☆ |
| April 24-25 | Elliot Lake, ON | Huron-Kinloss CLC tour of the NWMO Proof Test Facility | |
| April 24-25 | Spanish, ON | NWMO Open House | |
| April 25 | Ignace, ON | NWMO Open House | |
| April 26-28 | All siting areas and Thunder Bay, ON | Community Liaison Committee meeting | |
| April 27-28 | Blind River, ON | Northwestern Ontario Municipal Association Annual Conference | |
| April 27-28 | North Shore, ON | NWMO Open House | |
| May 3-5 | Town of the Blue Mountains, ON | NWMO Open House | ☆ |
| May 7-8 | Huron Shores and Iron Bridge, ON | Ontario Small Urban Municipalities Annual Conference | ☆ |
| May 10 | Ignace, Dryden and Sioux Lookout, ON | Municipal Conference / Municipal Staff Learn More and UFTP tour | |
| May 10 | Lac Seul First Nation | Ignace and area tour of the NWMO Proof Test Facility | |
| May 10-12 | North Bay, ON | Tour of the NWMO Proof Test Facility | ☆ |
| June 1-4 | Ottawa, ON | Federation of Northern Ontario Municipalities Annual Conference | |
| June 7-8 | Milverton, ON | Federation of Canadian Municipalities Annual Conference | ☆ |
| June 7-9 | Blind River, ON | Association of Ontario Road Supervisors Annual Public Works Tradeshow | ☆ |
| June 15 | Sagamok Anishnawbek First Nation | Blind River Community Days | |
| June 20 | Elliot Lake | Transportation Workshop | |
| June 21 | Blind River | Community Liaison Committee meeting | |
| June 23 | Huron-Kinloss, ON and | Community Liaison Committee meeting | |
| June 27 | South Bruce, ON | Community Liaison Committee - Regional Transportation Workshop | ☆ |
| July 11 | Ignace, ON | Community Liaison Committee meeting | |
| | Ignace and Aboriginal Peoples of Wabigoon | Visit to Ignace Learn More Centre, UFTP exhibit and community BBQ | |
| July 11-12 | Hornepayne, ON | NWMO Open House | |

| Date | Community reached | Event | UFTP exhibit |
|--------------------------|--|--|--------------|
| July 12 | Wabigoon Lake Ojibway Nation | Learning and Sharing Gathering | ☆ |
| July 13-14 | Manitouwadge, ON | NWMO Open House | |
| July 14-15 | Manitouwadge, ON | Manitouwadge ATV Jamboree | ☆ |
| July 20 | All siting areas | NWMO Municipal Forum tour of the NWMO Proof Test Facility | ☆ |
| July 21 | Ignace, ON | NWMO Open House | |
| July 22 | Dymont, ON | NWMO Open House | |
| July 25-26 | Blind River, ON | NWMO Open House | |
| July 26-27 | Elliot Lake, ON | NWMO Open House | |
| August 10 | Sagamok Anishnawbek First Nation | Tour of the NWMO Proof Test Facility | ☆ |
| August 10 | Probus Group of Kinkardine | Tour of the NWMO Proof Test Facility | ☆ |
| August 13-16 | Ottawa, ON | Association of Municipalities of Ontario Annual Conference | |
| August 19-21 | All Siting Areas and Kenora, ON | Métis Nation of Ontario Annual General Assembly | ☆ |
| August 23 | Wabigoon, ON | NWMO Open House | |
| August 24-26 | Dryden, ON | Dryden Fall Fair | ☆ |
| August 30 | Seine River First Nation | Community Engagement events | ☆ |
| September 9 | South Bruce, ON | Mildmay Fair | ☆ |
| September 11 | Bind River, Elliot Lake, Huron Shores, Spanish and North Shore, ON | Tour of the NWMO Proof Test Facility | |
| September 16 | Huron-Kinloss, ON | Lucknow Fair | ☆ |
| September 19-23 | Communities in Bruce siting area | International Ploughing Match | ☆ |
| September 26 | Hornepayne, ON | Community Liaison Committee Meeting | |
| September 26-27 | Hornepayne, ON | Community UFTP Exhibit | ☆ |
| September 27 | Manitouwadge, ON | Community Liaison Committee Meeting | |
| September 29 – October 1 | Fredericton, NB | Union of Municipalities of New Brunswick Annual Conference | |
| October 16 | Hornepayne, Manitouwadge and White River, ON | Tour of the NWMO Proof Test Facility | ☆ |
| October 18 | Toronto, ON | Interjurisdictional Transportation Planning Group meeting | ☆ |
| October 26-28 | Thunder Bay, ON | Thunder Bay District Municipal League (TBDML) Annual General Meeting | |
| November 2 | All siting areas | NWMO Municipal Forum meeting – Presentation on transportation public attitude research | |
| November 15 | South Bruce, ON | Tour of the NWMO Proof Test Facility | |
| November 24 | All siting areas and London, ON | Ontario West Municipal Conference | |

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