

# TRANSPORTATION THEMES 2014-2015

## What We Heard about Transportation Planning from Working with Communities

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### INTRODUCTION

The safe and secure transportation of used nuclear fuel is an ongoing area of interest and conversation in dialogue with communities, interested individuals and groups about the long term management of used nuclear fuel. Interest in understanding how used fuel can be transported safely and securely, and the importance of transportation in implementing the Adaptive Phased Management (APM) project, leads to questions and active discussion interwoven throughout the broad dialogue about the project. Through this dialogue communities, interested individuals and groups are exploring the basis for confidence in safety of the transportation of used nuclear fuel. The NWMO is learning about the questions which need to be addressed, the testing which needs to be performed, and the values, objectives and processes which need to guide planning of the transportation of used nuclear fuel as part of the APM project.

In 2015, we met and talked with communities and interested individuals and groups at meetings and briefings, interim storage facility tours, monthly meetings of community liaison committees (CLC), community open houses, and festivals, and events organized by communities and groups. Questions and comments are also expressed to the NWMO through its website or directed through CLC websites, municipal conferences, and public comment on websites, newspapers, and social media pages such as Facebook and Twitter. This year, NWMO outreach broadened as events began to take place beyond the communities which entered the site selection process, including First Nation and Metis communities and other neighbouring communities.

As dialogue broadens and deepens, interest has continued to grow in understanding the specifics of project implementation, scheduling, how NWMO will put needed capacities and safeguards in place, and the expected outcomes for communities and their surrounding areas. The 2016 – 2020 Implementation Plan, which was published for discussion in draft form in Fall 2015, provided additional information which helped further fuel discussion. The safe and secure transportation of used nuclear fuel is one of the eight NWMO strategic objectives outlined in the plan. As community members not previously involved begin to become aware of and learn about the project, conversations also continue on the nature of used nuclear fuel, the details of the APM project, how the siting process works, and how decisions will be made. Transportation planning is a key theme in these conversations.

The discussion which follows outlines highlights of what we are hearing about transportation of used nuclear fuel as part of ongoing dialogue and engagement activities. It is a continuation of the dialogue initiated earlier and the central themes of conversation which were a focus this year remain consistent with those summarized and discussed in our 2014 report, although this discussion is deepening with time in detail, scope and complexity and is broadening to include new communities, individuals and

groups. The discussion which follows builds on the earlier 2014 report, which can be viewed on the NWMO website ([http://www.nwmo.ca/sitingprocess\\_transporting-used-nuclear-fuel](http://www.nwmo.ca/sitingprocess_transporting-used-nuclear-fuel)).

Importantly, as discussions broaden and deepen, and new communities, individuals and groups join in, it is becoming clear there is a common set of questions and concerns which need to be addressed in transportation planning. This set of questions and concerns are important irrespective of the particular community, individual or group. This provides a strong framework from which to begin to develop transportation plans which will meet the requirements of citizens.

This discussion which follows is organized in two sections: the first outlining the key transportation themes from conversations with the public and the second a general context setting discussion and reflection on how the dialogue may evolve into the future. A list of public engagements conducted by the NWMO in 2015 for which transportation was a key discussion point is also outlined.

### **KEY TRANSPORTATION THEMES**

The dialogue on transportation is ongoing and continued 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 transportation routes, security, logistics and emergency preparation. As mentioned, the central themes we have encountered this year remain consistent with those summarized and discussed in our 2014 report and for this reason we present the key transportation themes as a rolling list to be updated yearly.

In order to advance conversations in these areas, and to begin to address these questions and concerns and build understanding, the NWMO continues to prepare and share a wide variety of printed and web based materials as well as displays and exhibits. This includes a booklet outlining many of the components of the transportation system and the regulatory framework in place. This also includes a booklet providing additional information in a "Q and A" format. The mobile transportation exhibit, accompanied by NWMO transportation specialists and which includes an actual used fuel transportation package (UFTP), has proven very helpful in communicating the breadth and depth of work to ensure the safe transportation of used nuclear fuel. People also find videos showing the extent of testing of transportation containers very informative. This same information is available at open house events, community briefings, and on the NWMO website including through a virtual exhibit.

## Questions and Areas of interest about APM transportation planning (2014-2015)

### Theme 1: Health and Safety

<p>Plans to ensure the safety of people and the environment during transportation</p>	<p>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. 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.</p> <ol style="list-style-type: none"> <li>1. How does the design of the UFTP shield radiation? Why is shielding different for the transportation package and that proposed for the deep geological repository?</li> <li>2. How will the truck driver and loading-unloading personnel be monitored for radiation exposure? Will they receive high doses? Are low doses also harmful?</li> <li>3. How will communities along the transportation route be affected? Will people along the route be exposed to radiation and their health be affected?</li> <li>4. 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? Exactly how far would emergency workers have to stand from the UFTP to remain safe?</li> <li>5. How would safety be ensured, and what would be NWMO response, under a variety of hypothetical scenarios or 'worst case scenarios'?</li> <li>6. 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?</li> <li>7. What is the demonstrated track record for safe transportation in Canada?</li> <li>8. What is the demonstrated track record for safe transportation around the world?</li> </ol>
<p>The Used Fuel Transportation Package (UFTP)</p>	<p>Many questions focus on the design of the UFTP, such as 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. Underlying these questions is a strongly held view that people and the environment, including land, potable water, and water bodies must be protected during transportation.</p> <ol style="list-style-type: none"> <li>1. What is the purpose of the container and all its components, e.g., why is redwood used for the impact limiter, what is the purpose of the hole in the container?</li> <li>2. Why is the container square? Is this the strongest shape? Wouldn't a triangular shape be better?</li> <li>3. Would metal seals between the lid and body of the package be stronger than rubber ones?</li> <li>4. How will the waste be placed inside? Will it be encased in glass first?</li> <li>5. What accident scenarios are being planned for and how will they be addressed?</li> </ol>

	<ol style="list-style-type: none"> <li>6. What independent testing has been done on the container? Has its integrity been tested against an attack using military-type weapons, e.g., guns, rocket launchers, and so on?</li> <li>7. Is the container licensed for transporting nuclear fuel waste? Did you test the transportation containers with nuclear fuel inside them?</li> <li>8. Would the used fuel transportation package be emplaced in the repository/ go underground?</li> <li>9. What are the package standards?</li> <li>10. Will the transportation container only be used to carry used nuclear fuel/ NWMO cargo?</li> </ol>
<p>Safety en route, emergency response plans, and scenarios</p>	<p>Many want information on how the NWMO will deal with emergency planning, what security measures might look like, and what the program will look like on the ground in their community. There is interest in the radiation risks to workers, the public, and the environment during transport, and during the extremely unlikely event of a breach to the UFTP as a result of an accident. People probe to better understand the hazard and how it might be practically managed during a variety of hypothetical worst-case accident scenario. Often the questions reflect misunderstandings that the used fuel is a liquid and can “spill” and contaminate land and water. The importance of communicating with first responder agencies about when the UFTP is likely to pass through their boundaries is raised. The security of shipments and how loads would be secured from malicious threats, including terrorism incidents and theft, are also of interest.</p> <ol style="list-style-type: none"> <li>1. How can we be confident that this waste can be transported safely and securely, that the UFTP will not open during transport?</li> <li>2. I heard from an NGO that the UFTP will release a significant amount of radiation en route as part of normal operations. Is this correct?</li> <li>3. How will transportation and the UFTP be regulated? Has the UFTP already been licensed?</li> <li>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?</li> <li>5. 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 accident involved compressed natural gas?</li> <li>6. If an accident downed one of the large voltage wires that can be seen all around communities and this wire fell to drape across the UFTP and shorted to ground through the container, could the electrical arc open the UFTP?</li> <li>7. What would an emergency response planning protocol look like for my community or region?</li> <li>8. What would training protocols look like for my region?</li> <li>9. Where would the dispatch centre be located? When would planning for dispatch centre protocols begin?</li> <li>10. How will you sort out jurisdictional mandates and organizational responsibilities among first responder organizations?</li> <li>11. How will the NWMO track vehicles en route, monitor environmental and road conditions, and train truck drivers?</li> </ol>

	<ol style="list-style-type: none"> <li>12. What kinds of threats need to be considered and planned for?</li> <li>13. Can used nuclear fuel spill out of the transportation container and if it did what would be involved in cleaning it up?</li> <li>14. How would an accident in a remote location be addressed?</li> <li>15. How will the NWMO support the community with emergency planning and in case of an emergency?</li> <li>16. How will first responders be trained and how will different agencies be coordinated in the case of an emergency?</li> </ol>
<p>Protecting water along the route</p>	<p>Ensuring water quality and protecting water bodies and lands of economic importance are top of mind subjects for many, and the focus of concern has been split between the environment 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, and want to understand details about how the NWMO would maintain the safety of water, especially the Great Lakes and local sources of drinking water.</p> <ol style="list-style-type: none"> <li>1. If the UFTP became submerged at depth during a transportation accident, would the water body and watershed be safe?</li> <li>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?</li> <li>3. If clean-up were necessary, how would this be done? Who would be called in to do the clean-up?</li> </ol>
<p>Understanding transportation logistics</p>	<p>People are interested in how the waste would be moved from its current location to the repository. They wonder where the waste is currently located, and want to know how it would be loaded onto and unloaded from the truck. Questions also include the routes and the modes (e.g., road, rail, or ship) that are being considered and whether the NWMO has selected preferred routes and modes yet.</p> <ol style="list-style-type: none"> <li>1. Why would 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?</li> <li>2. How many shipments are anticipated per day, week, and month? Will shipments occur only during daylight hours? How long will this take?</li> <li>3. Who will pay for transportation of wastes?</li> <li>4. What modes of transportation are being considered?</li> <li>5. Has NWMO selected a preferred transportation route? Will there be alternate routes?</li> </ol>

	<ol style="list-style-type: none"> <li>6. Will roads in the North have to be upgraded, and will new roads be needed? Will four lane highways or two lane be required because four lane highways are rare in Northern Ontario?</li> <li>7. What impact will the transportation program have on the roads in the area?</li> <li>8. What other infrastructure upgrades will be needed, e.g., the satellite on the North shore of Lake Superior is spotty?</li> <li>9. What precautions will be taken to ensure the used fuel transportation package, truck and trailer, will not be stolen en route?</li> <li>10. 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?</li> <li>11. How might road and rail systems be used?</li> <li>12. Would the UFTP be expected to stop at truck weigh stations?</li> <li>13. How will traditional and environmental knowledge of the area be used to inform transportation mode planning, e.g., local topography and wildlife areas that might affect road and rail infrastructure improvements.</li> <li>14. During a recent transportation of nuclear material incident at a port on Canada's east coast there seemed to be a comprehensive response plan in place even though there was no release of nuclear materials, would something similar be in place for NWMO's program?</li> <li>15. Will there be security guards accompanying the shipments?</li> <li>16. The roads get very dangerous during the winter. Is truck transport really the smart thing to do?</li> <li>17. Will the NWMO rebuild any highways or rail-lines?</li> </ol>
<p>Understanding radiation</p>	<p>A desire to learn more about and understand radiation often underlies discussions about transportation. There is an interest in understanding radiation better, including what is known about the radiation hazard associated with transporting used fuel to the repository, the health effects of exposure, the ways in which we can measure this exposure and protect humans, animals, and the environment from unnecessary exposure, and the emergency response measures that would be used in the unlikely case of radiation release.</p> <ol style="list-style-type: none"> <li>1. What is radioactivity? Where does it come from? What is a half-life?</li> <li>2. How does radiation affect people? Is natural background radiation harmful to my family?</li> <li>3. What is the relationship between a Millisievert (MSv) and a Becquerel (Bq)?</li> <li>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?</li> <li>5. Are low doses of ionizing radiation harmful to health?</li> </ol>

## Questions and Areas of interest about APM transportation planning (2014-2015)

### Theme 2: Transportation as a component of Canada's plan

Used Nuclear Fuel (UNF)	<p>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. In relation to transportation specifically, there is interest in knowing more about radiation safety related to the used fuel bundles when they are ready to be transported to the repository.</p> <ol style="list-style-type: none"><li>1. Is used nuclear fuel a liquid, a gas or a solid?</li><li>2. Is the bundle still radioactive? How hazardous is it and for how long?</li><li>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?</li><li>4. Can the bundles explode spontaneously?</li><li>5. Are the ceramic pellets durable or will they break and release radiation?</li></ol>
Covering costs	<p>People have an interest in how transportation will be funded.</p> <ol style="list-style-type: none"><li>1. What is the cost of the transportation vehicles and Used Fuel Transportation Packages (UFTP) that will be used to move fuel bundles to a deep geological repository?</li><li>2. Will the cost be a major factor in selecting a preferred site?</li><li>3. How will funding be assured over the very long term?</li></ol>
Oversight	<p>There is a strong interest in understanding the checks and balances that are in place to ensure safety.</p> <ol style="list-style-type: none"><li>1. Who will oversee the transportation of used nuclear fuel?</li><li>2. What regulations are in place?</li></ol>

## Questions and Areas of interest about APM transportation planning (2014, 2015)

### Theme 3: Transportation and role in site selection

Transportation route selection and planning	<ol style="list-style-type: none"><li>1. What factors are considered in choosing routes? Is weather considered? Can one lane highways be used? What about bridges? Can used fuel be transported like other commodities and at the same time other vehicles are on the road?</li><li>2. Is transporting used nuclear fuel a shorter distance safer than transporting used nuclear fuel a longer distance?</li><li>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?</li><li>4. How will transportation be addressed in regional studies?</li></ol>
Involvement of transportation route and regional communities in the conversation	<ol style="list-style-type: none"><li>1. What is the timing of the selection of a preferred transportation route? When will communities along the route be identified?</li><li>2. When and how will transportation route communities be engaged and how will this be managed?</li><li>3. 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?</li><li>4. What benefits and supports will be available to these communities and how they might be involved in decision-making? Should transportation route communities receive a benefit and should they need to agree?</li></ol>

## DISCUSSION

Through ongoing conversations with NWMO staff, people living in and around communities involved in the siting process have told us they have been able to explore these transportation themes in more depth, building on previous understanding and formulating a more detailed picture of how NWMO might transport Canada's used nuclear fuel to a repository site.

In 2015, NWMO engaged in dialogue with people living in and around potential siting communities as part of our ongoing preliminary assessment studies. Hundreds of thoughtful discussions took place in community offices, at open house events at local community centres, and through resident interviews with third-party consultants hired to conduct well-being assessment studies. Community Liaison Committees and other discussion groups set up in potential host communities also forwarded their community's questions and comments to the NWMO for public response on CLC websites.

In addition, NWMO continued to build relationships and the opportunity for dialogue with local emergency management authorities, and at higher levels of government through meetings with ministries and departments responsible for transportation safety. To ensure we are taking a broad and inclusive approach to understanding public perspectives, NWMO also scanned traditional and social media channels for substantive public input and to be aware of and consider the perspectives of local, provincial and national environmental and non-governmental organizations.

We observe that questions and concerns about transportation are very consistent among different communities, groups and individuals. However, NWMO has also observed that conversations have evolved and become more specialized and detailed, especially when talking with people who have maintained an ongoing interest and participation in this topic.

For example, public interest in the associated Used Fuel Transportation Package exhibit trailer, which has accompanied NWMO Open Houses in interested communities, is high and a focus of attention in communities it visits. Repeat visitors to NWMO events have found the trailer display helpful in contextualizing current and planned transportation methods, and the ability for visitors to see and touch an actual transportation container has allowed for a more comprehensive discussion of emergency planning and response. Dedicated NWMO transportation specialists have had many conversations with those interested in physically inspecting a real transportation package, and people continue to consistently note the size and robustness of the 30 tonne steel package. Many people tell us that following their visit to the UFTP they had a greater understanding of how the package is designed to keep used fuel safe while being transported. This exhibit has now visited many of the communities involved in the siting process more than once, allowing the conversation and engagement to continue to develop in those communities.

Continuing dialogue has also allowed the NWMO to listen, learn, and build a stronger understanding of key concepts surrounding transportation safety from the public perspective, and clarify potential misconceptions about NWMO plans.

At the local level, as conversations have advanced over the course of the siting process, concerns about how transporting used nuclear fuel might impact waterways along transportation routes have grown in prominence. NWMO has engaged in many conversations with residents about risk and management strategies, and discussed the overall potential effects of hosting a long-term management facility for used nuclear fuel on waterways, and people are eager to explore this in depth.

Many have spoken with the NWMO about their own knowledge and experience in moving commodities along long stretches of rural highway, or by railroads that traverse isolated natural environments that can experience intense weather. This often includes discussion of transportation incidents involving other commodities that have happened in the area. With this experience as a backdrop, there is strong interest in knowing more about transportation planning, as well as the potential effects of an accident on the local environment including creeks, rivers or lakes. Concerns about the effect on the Great Lakes, and similar concerns about water safety (especially in the Great Lakes Basin) have also been the recent focus of some environmental and non-governmental organizations. This includes groups and individuals opposed to building any repository for nuclear materials who have drawn the attention of the public and lawmakers through protests, letter-writing and social media campaigns, as well as petitions circulated around the world via social media.

## **CONTINUING DIALOGUE**

Over the course of 2014 and 2015, and as dialogue continues on this important topic, NWMO has observed that bringing accurate and balanced information in to the discussion is appreciated by those involved 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 in how we will ensure safety at every point in the long term management of used nuclear fuel.

NWMO has also 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.

Looking forward, it is apparent that learning and dialogue about transportation planning will need to advance in a dynamic social environment. Discussion about transportation may well be influenced and even aided by broader discussions on matters such as evolving approaches to ecosystem health and well-being with respect to implementation of large projects, and how respect should be shown for Indigenous rights and the role of First Nations and Metis communities in decision-making.

As we continue to implement Canada's plan for the long term management of used nuclear fuel, into 2016 and beyond, dialogue on transportation planning is expected to broaden and deepen. 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, or share your thoughts through visiting the NWMO website ([www.nwmo.ca](http://www.nwmo.ca)).

## APPENDIX: NWMO Transportation Engagements in 2015

The following table highlights engagement activities where transportation was an important component of discussion.

Date	Community	Event
Jan.	Manitouwadge	Questions submitted to Manitouwadge CLC
Feb.	White River	Meeting with White River Snowmobile Club
Feb. 1-4		SUMA Conference. Saskatoon, SK
Feb. 20		NWMO Municipal Forum meeting
Feb. 22-24		OGRA-ROMA Conference. Toronto, ON
Mar. 9-12		SARM Conference. Saskatoon, SK
Mar. 9-10	White River	NWMO Open House
Mar. 11-12	Manitouwadge	NWMO Open House
Mar. 23-24	Elliot Lake	NWMO Open House
Mar. 26-27	Blind River	NWMO Open House
Mar 30-31	Huron-Kinloss	NWMO Open House
Apr. 1-2	South Bruce	NWMO Open House
Apr. 9-10	Central Huron	NWMO Open House with discussion about transportation
Apr. 15	Ignace	NWMO presentations to Ignace School classes as invited
Apr. 22-24		NOMA Conference. Thunder Bay, ON
Apr. 28	Sudbury	NWMO Briefing to Sudbury City Council
Apr. 28-May 1		OSUM Conference. Belleville, ON
May 1-3	Elliot Lake	UFTP visit to Elliot Lake Chamber of Commerce Trade Show
May 6-8		FONOM Conference. Sudbury, ON
May 15	Schreiber	CLC monthly meeting
May 29	Elliot Lake	CLC monthly meeting
Jun. 1-3		CNS Conference. St. John, NB with UFTP exhibit
Jun. 5-8		FCM Conference. Edmonton, AB
Jun. 12		NWMO Municipal Forum meeting
Jun. 22	Hornepayne, White River, Manitouwadge	Dry Storage Tour (PWMF) and Learn More Briefing
Jun. 22	Hearst	Project Briefing to Board of Directors, Nord-Aski Regional Development Corporation
Jun. 26	Chapleau Cree FN	UFTP visit
Jun. 27	Sagamok FN	UFTP visit
Jul. 9-12	Blind River	UFTP visit to Blind River Community Days
July 14	White River	UFTP visit
Jul. 15	Hornepayne	UFTP visit to Hornepayne Fishing Festival
Jul. 17-18	Manitouwadge	UFTP visit to Manitouwadge ATV Festival
Jul. 20	Ginoogaming FN	UFTP visit
Jul. 22	Dryden/Ignace	Learn More visit to PWMF. Pickering, ON
Aug. 11	Huron-Kinloss	UFTP visit to CLC monthly meeting

Aug. 14-15	Central Huron	UFTP visit at Point Clark
Aug. 14-15	Huron Kinloss	NWMO Open House
Aug 14-15	Central Huron	Community reps travelled to Point Clark to visit UFTP exhibit
Aug. 16-19		AMO Conference. Niagara Falls, ON
Aug. 20		Email question received by Communications Team
Aug. 22	Huron-Kinloss	UFTP visit to Teeswater Fall Fair
Aug. 25	Elliot Lake	CLC monthly meeting, transportation presentation
Aug. 27-29	Dryden	UFTP visit to Dryden Fall Fair
Sept. 23-25		Northwestern Ontario Regional Conference (NORC) and Thunder Bay Chamber of Commerce "Prosperity Northwest" Tradeshow. Thunder Bay, ON
Oct. 2-4		Union of Municipalities of New Brunswick (UMNB). Fredericton, NB
Nov. 20		Ontario West Municipal Conference (OWMC). London, ON
Dec. 10		NWMO Municipal Forum meeting