A NEXT STEP
Part of Canada's Radioactive Waste Review

Integrated Strategy for Radioactive Waste

What We Heard Report (3)

Roundtable Sessions

Held Between July 15th, 2021 & November 12th, 2021

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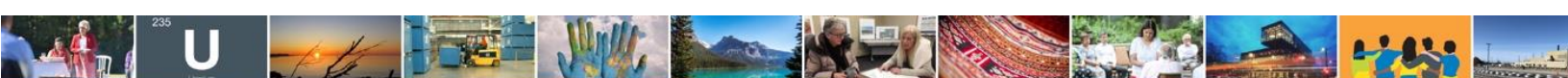


Executive Summary

In the fall of 2020, the Minister of Natural Resources Canada tasked the Nuclear Waste Management Organization (NWMO) with leading an engagement process with Canadians and Indigenous peoples to inform the development of an integrated long-term management strategy for all of Canada's radioactive waste, in particular low- and intermediate-level waste (radwasteplanning.ca), as part of the government's radioactive waste management policy review.

The NWMO was asked to lead this work because it has close to 20 years of recognized expertise in the engagement of Canadians and Indigenous peoples on plans for the safe long-term management of used nuclear fuel. The ISRW is distinct from the work that the NWMO is leading on the deep geological repository for used nuclear fuel, which will continue as planned.

In 2021, the NWMO began engaging with Canadians and Indigenous peoples, conducting public opinion research, hosting a Summit to hear from diverse voices, listening to citizens in a series of engagement sessions in communities where waste is stored today, and hosting roundtable discussions and technical Workshops. This report summarizes what we heard from our virtual roundtable discussion sessions which took place from July to November 2021.

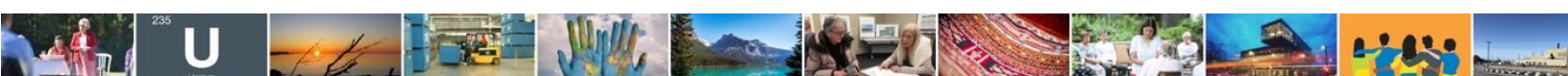
The intent of the ISRW is to identify next steps to address gaps in Canada's current radioactive waste management strategy, in particular for low- and intermediate-level radioactive waste, and to look further into the future. We stipulated at the start of each session that our focus is on engagement, information sharing and gathering, not consultation.

Through these roundtable sessions we engaged with interested participants from various sectors including civil society organizations, academia, industry, municipal officials, and government officials. We invited participants to discuss the long-term strategy for managing Canada's low- and intermediate-level waste. Multiple sessions were held for each sector, offering several opportunities for attendees to participate, give feedback and ask questions about topics that were important to them. There were also open sessions that provided for participants from all sectors to dialogue together.

This What We Heard Report presents the commonly heard themes that arose over the course of the 27 roundtable sessions, and a series of one-on-one or small group qualitative interviews with provincial and federal officials. This report includes a chapter dedicated to each sector, with a summary of ideas and themes arising; it is not a reflection of each of the individual comments that were made.

Input from our engagement efforts will be considered in the drafting of the recommendations for the ISRW. This strategy will be based on public input, Indigenous Knowledge, international scientific consensus, and best practices from around the world. Draft recommendations will be published later this year, after Natural Resources Canada publishes their revised radioactive waste management policy so that, too, can be taken into account in informing the recommendations.

Refer to **Appendix A – Roundtable Schedule** to see the dates of the various Roundtable Sessions, and the sectors / focus areas of each session.



Roundtables were one of the methods used to engage on key questions related to the development of an Integrated Strategy for Radioactive Waste. Roundtables were held with interested participants from multiple sectors. This document is structured into chapters that summarize what we heard from each of these sectors, identifying the themes that emerged.

This executive summary contains the themes that were common across sectors, as well as highlighting some of the ideas that are distinct or opposing between groups.
Refer to **Appendix B – Promotion of Roundtable Sessions** for more details on how we promoted these sessions.

A consistent methodology was used to structure each of the Roundtable sessions. The general format for the sessions was as follows:

- Participants received a presentation on the topic by a NWMO representative
- Participants had an opportunity to ask questions of clarification from the NWMO representative
- For civil society organizations roundtable sessions, and for industry roundtable sessions, there was an opportunity for participants to make a presentation to the group, to inform the subsequent roundtable discussion.
- Following the presentations, participants were guided by a facilitator through a series of questions to obtain their views on the topic of 'How should we best deal with Canada's low-level waste and intermediate-level waste over the long-term?'
- Participants had another opportunity ask any final questions of the NWMO representative.
- The NWMO representative provided additional information on other engagement opportunities for the Integrated Strategy for Radioactive Waste and ended the session with thanks.

The sessions were not recorded but notes were taken; these formed the basis of this report.

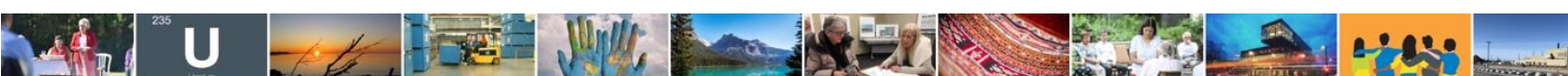
Refer to **Appendix C – Methodology** for more detail.

At a Glance - Key Themes from the Roundtable Sessions

This What We Heard Report represents the commonly heard themes that arose and is not a reflection of all the individual comments that were made. These conversations gave participants the opportunity to express their ideas, questions, and concerns, provide feedback, and engage in discussions that would reveal what considerations should be given toward long-term radioactive waste management.

At the start of the presentation, we clarified that our focus was on engagement, information sharing and gathering -- not consultation. We emphasized that this was not a siting process and that at this time, we were inviting Canadians and Indigenous people to provide input to the approaches that we should consider for the long-term management of radioactive waste.

Attendees had some preliminary questions and comments to share after viewing our educational videos, and considering the principles developed to guide the ISRW. Overall, we heard from participants who believed that the guiding principles were comprehensive, clear, and well-rounded. Refer to **Appendix D – ISRW Guiding Principles** for the full text of the principles.



A summary of common key findings is below, and these are addressed in more detail in the following sections of this report, which are sector specific.

Key Finding 1 – Safety is Paramount

The most prominent theme that emerged throughout these roundtable sessions was the importance of safety in every aspect of the development and implementation of the Integrated Strategy for Radioactive Waste. We heard from participants that **safety** was important in every aspect of the nuclear waste strategy; protecting the environment was a key consideration across all sectors.

Key Finding 2 – Communication and Transparency

Participants were adamant that clear, fact-based, inclusive communication that provides context is essential. We heard that we need to be completely transparent about the waste and any potential risks associated with it, and that we need to communicate effectively and provide context when necessary. Some participants expressed the importance of having more visibility of waste inventories, as they exist today, and what could be expected in the future.

Key Finding 3 – Education and Engagement

We heard from these roundtable sessions that participants wanted to learn more about all aspects of the strategy to make better informed decisions that could contribute toward the overall strategy. We heard that learning from science-based best practices internationally is an important pathway to ensuring both public safety and cost effectiveness, which are both important, now and in the long-term.

We heard that engagement should continue to be an important aspect of this strategy, and any plans going forward. We also heard that education needs to be further integrated into our discussions. Participants shared that they want to contribute to the strategy, but sometimes need more information. Participants also recognized the importance of expertise but had a strong desire to personally learn more to contribute to the strategy and noted that experts were required to educate and provide options.

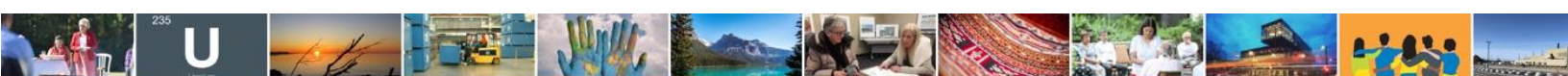
Education is vital to enable potentially impacted people and communities to be appropriately informed and will help Canadians and Indigenous peoples understand the unique challenges posed by radioactive waste, and how safety is assured.

Key Finding 4 – Sustainability and the Environment

In addition to the safety of the community and its residents, we heard that minimizing the carbon footprint and protecting the environment, in particular water, over the long-term were important. Participants shared that we needed to be mindful of the climate emergency to ensure that every aspect of this strategy is sustainable, considers the risks posed by climate change, respects the environment, and protects water sources for all future generations.

Key Finding 5 – Transportation

We heard from participants that transportation is a particularly important aspect of the long-term plan and that, when radioactive waste is transported, it must be done safely. We heard that people have many questions about the risks associated with transportation, and the



consequences of transportation accidents on the safety of the radioactive waste being transported. We heard that people generally preferred to minimize the transportation of radioactive waste, to reduce any associated risks. Participant views on the relative risks of transportation influenced their views on having one central repository for low-level waste and for intermediate-level waste or having multiple disposal facilities closer to where the waste is produced.

Key Finding 6 – Rolling Stewardship and Waste Disposal

We heard differing views on rolling stewardship versus ultimate disposal of radioactive waste. Most participants supported the idea of finding solutions to permanently dispose of the waste now, and not leaving the decision for future generations. However, some individuals expressed a preference for rolling stewardship, where the waste remains above ground where it is today, so that monitoring of the waste would be assured over the long-term and the location of the waste would not be forgotten.

Some of the concerns cited by those who preferred disposal to rolling stewardship included uncertainty of impacts arising from climate change, and whether changes to government or society in the long term could leave waste vulnerable under indefinite storage arrangements. For those who saw rolling stewardship as the preferred strategy, some of the considerations included the possibility of future technology innovations, ensuring that the waste was not forgotten, and the ability to constantly monitor the waste to ensure that any environmental impacts could be identified and remediated before causing significant harm, especially to the water table.

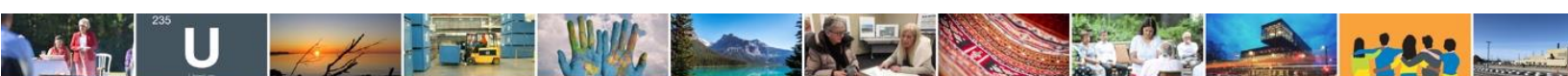
Key Finding 7 – Co-location and Centralization

We heard a range of responses from participants who felt co-locating waste could have advantages. Participants acknowledged the difficulty in finding willing and informed host communities, and that obtaining the free, prior, and informed consent of Indigenous peoples made multiple sites more challenging. However, there were concerns about the impact of a single location on the transportation of waste. Some participants cautioned about the importance of ensuring appropriate technical arrangements for different waste types located in the same facility, while others noted the cost advantages of consolidating expertise and facilities in a single location.

The idea of co-location and centralization was more broadly supported for intermediate-level and high-level waste than it was for low-level waste and intermediate-level waste. The volumes of low-level waste are greater, and participants generally felt that leaving it nearer to the sites where it was generated or stored, rather than transporting it vast distances, was a fairer option, and preferable.

Key Finding 8 – Shared Responsibility Framework / Independence of Accountable Entity

There were varying perspectives regarding who should be responsible for the waste. There were differences of opinion about the role of industry, but there was a general preference for a single entity with appropriate expertise that is independent from government and industry, but subject to regulated safety and environmental oversight. The governance of such an entity was subject to different ideas, with industry advocating for its responsibility as waste owners to manage the waste throughout the lifecycle, while others explored the idea of a shared responsibility framework given the reality that long-term waste management has implications for



waste owners, government, waste managers, the current and future public, Indigenous communities, etc.

Key Finding 9 – Trust and Relationships with Indigenous Communities

There was support expressed by participants to ensure trust and relationships are built with Indigenous communities in developing the plan and implementing it.
Ensuring that Indigenous Knowledge was considered along with western science was identified as important to a strategy that would address the far future, as well as more immediate considerations.

Key Finding 10 – Sense of Urgency

We heard that an integrated strategy was needed, and the approach to the long-term management of low-level and intermediate-level waste should be determined. There was general agreement that it was the right thing to do to have and to implement a plan for all of Canada's radioactive waste, and to do so with a sense of urgency rather than leaving this to future generations.

Supplemental Input

In addition to roundtable sessions, the NWMO commissioned independent qualitative research consisting of interviews with a cross section of elected officials, their staff, and senior civil servants at the municipal and provincial levels. What we heard from those discussions is described in **Appendix E: Interviews with Municipal and Provincial Officials**. Many of the same themes emerged from the interviews as from the Roundtable sessions.

The NWMO also hosted roundtable sessions with youth. The summary of what we heard from youth, through roundtable discussions and other engagement mechanisms is the subject of its own What We Heard Report.

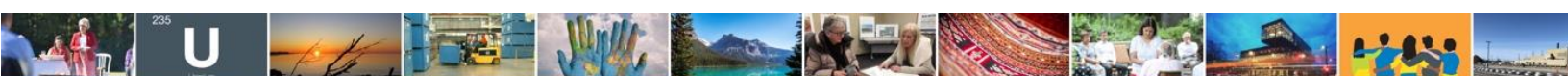
Conclusion

We have heard various opinions, feedback, and thoughts from sectors with an interest in the development of an Integrated Strategy for Radioactive Waste, including civil society organizations, industry, academia, and municipal, provincial, and federal government officials.

There is a wide range of sentiment regarding this nuanced issue.
It was our intention to collect and present these views in a manner that reflects the voices of the people we engaged with and integrate this invaluable feedback as we proceed with recommending the next steps towards managing low- and intermediate-level waste in Canada for which there are currently no long-term plans.

This is an ongoing conversation, and inclusion is an essential aspect of our project as this will be a decision affecting future generations of Canadians and Indigenous peoples.

The NWMO's recommendations will also be informed by the revised policy on radioactive waste, which was published for public comment in February 2022.



What We Heard from the Roundtables

Civil Society Organization Roundtables – What We Heard

The NWMO hosted three Roundtable Sessions for Civil Society Organizations (CSOs). These were preceded by two information sessions for CSOs to provide context about the Integrated Strategy for Radioactive Waste and invite CSOs to make a presentation at a planned Roundtable session. Participants from CSOs had the opportunity to request to be included on the agenda and to deliver a presentation to participants on behalf of their organization. These presentations would not be attributable to the presenter unless they requested it.

Despite reaching out on a national level to CSOs active on nuclear waste files but also more broadly to those focused on the environment and climate change, these sessions were poorly attended. This section summarizes the input and comments provided by those who attended but may not be representative of the broader opinions of those who did not attend.

A focus of the input from Civil Society Organizations was environmental impacts and public safety. This extended to feedback provided on who should be responsible with participants pointing towards the federal government and more specifically Environment and Climate Change Canada.

Although there were different views on rolling stewardship versus disposal as the correct approach, there was a strong desire to ensure effective continued monitoring of the waste in perpetuity.

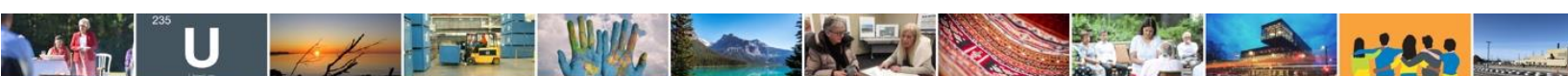
There was a sense of urgency to dealing with the waste, combined with a feeling of uncertainty about how much waste exists in inventory, and its characteristics resulting from changes in reporting over time. Participants expressed a need for the strategy to address future waste from small modular reactors, while advocating for a cessation of nuclear power production. Overall, participants expressed a general mistrust of industry, and concerns over historic issues of transparency.

The following are the key discussion points and themes that emerged from the roundtable discussions with CSOs:

Communication and Transparency

We heard participants speak about the perceived uncertainty of the quantity of intermediate-level-waste, and they identified that reasons for changes to the reported volumes of intermediate-level waste inventory were not clear. Similarly, we heard that recent changes to the definitions of waste types, together with the proliferation of regulatory documents from the Canadian Nuclear Safety Commission, made it difficult to have a full understanding of how much of each waste type exists, and the waste's actual characteristics.

We heard participants express interest in the waste arising from small modular reactors (SMR). Participants expressed a need for more details about the nature of the potential waste to be addressed early in the regulatory process for these modern technologies, rather than later in licensing stages.



Sustainability and the Environment

Protection of the environment emerged as an important theme for CSOs.
We heard proposals and concerns about low-level-waste from participants who would like to see it placed far from potable water sources.

We heard from participants who thought it was important that we cease generating nuclear waste altogether, which they believed, consists of a continual risk for humanity on earth.

We heard that it was important to consider the future impacts of climate change when developing an integrated strategy. The worsening climate crisis could introduce new risks that need to be addressed in the design of future facilities. Risks highlighted include severe weather impacts, and social disruption that could impact institutional control of facilities in the longer term.

Transportation

We heard that the waste should be kept as close as possible to where it was produced, to minimize its transportation.

We also heard that in deciding where to locate disposal facilities, there should be consideration for equality and ethical justice – for example, if the waste is produced in Saskatchewan, it should remain in Saskatchewan and not be transported over long distances to other provinces.

Rolling Stewardship and Waste Disposal

We heard different perspectives from participants, with some strongly advocating for rolling stewardship and other participants strongly advocating against rolling stewardship, in favour of disposal.

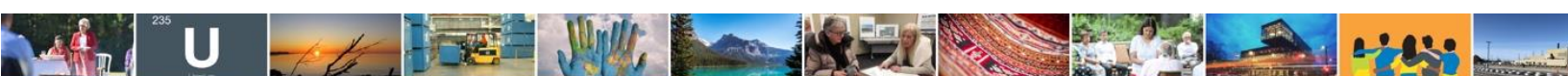
We heard that it was important to be able to monitor the waste for the long-term, and for that reason, some participants supported rolling stewardship, where ongoing monitoring could occur, for as long as the waste remained hazardous.

We heard from some participants who were interested in exploring container technology that would have a longer life span than 50 years for above ground storage. Some noted that in other jurisdictions, waste containers had been developed that may last for significantly longer periods.

Regardless of whether the approach was rolling stewardship or disposal, we heard participants support the concept of defence-in-depth or having multiple barriers to eliminate potential impacts if one barrier fails to perform as expected.

We also heard support expressed for disposing of intermediate-level waste in a deep repository rather than on the surface with rolling stewardship, because the nature and duration of the hazard was well beyond our planning horizons, making deep disposal the more prudent approach for the long-term.

We heard that it could be acceptable for intermediate-level waste to go into the same deep geological repository as used nuclear fuel.
Regardless of the option preferred, participants emphasized the need to ensure effective continued monitoring of the waste in perpetuity.



Co-location and Centralization

We heard feedback from participants on low-level waste and intermediate-level waste and if they should be separate or together, or one facility or several. There were differing perspectives, with various risks, benefits and considerations identified.

We heard there were concerns about the limited choices highlighted in the material and suggestions that looking internationally could provide more solutions, such as the potential of using shallow rock cavern disposal for intermediate-level waste.

We heard from some participants who expressed a desire that there should be one central facility for managing low- and intermediate-level waste so it is easily accessible. Some participants identified the risk of an event occurring when there was only one single repository for all of Canada's radioactive waste. They expressed concern that if all the waste were in a single location, the impact of an event could be more significant. As a result, some participants expressed support for multiple locations. Others preferred multiple facilities because they would result in less transportation.

We also heard that having several waste sites would contribute to social justice; waste should be stored near to where it is produced. Some participants expressed concern with economic incentives for small communities to take waste, when that community has not generated the waste.

We heard that it was important to ensure cumulative effects are considered for any project, rather than simply looking at the individual project impacts, while recognizing the complexity of the issues.

Shared Responsibility Framework / Independence of Accountable Entity

We heard from participants who supported the idea of having an organization that is independent of industry and CNSC, a single entity who has the means to do the work.

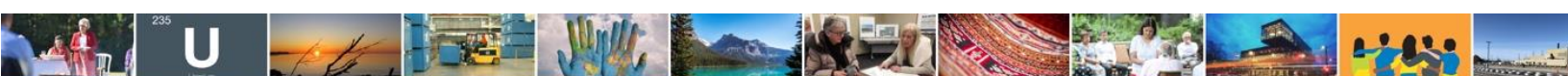
Some participants preferred government – Environment and Climate Change Canada was specifically mentioned, to be responsible for long-term waste management. Some participants proposed that the governance of the accountable organization should be made up of environmental organizations who have biologists, and other knowledgeable specialists, with the appropriate expertise.

Sense of Urgency

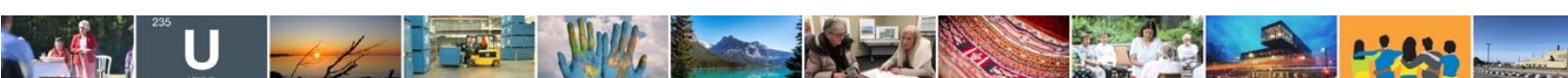
We heard from participants who thought that disposal of the most hazardous wastes should occur on an accelerated timescale, and that the lack of an integrated strategy for low-level and intermediate-level waste to date has enabled various projects to proceed, which were not perceived as employing best practices, and which could have been avoided had there already been an established disposal plan for all of Canada's radioactive waste.

Importation of Nuclear Waste

Some participants indicated that there should be a prohibition on the storage or disposal of radioactive waste from other countries. At minimum, participants expressed a desire for a public



debate on the appropriateness of repatriating the waste from radioisotope products made in Canada and sold to other countries.



Industry Roundtables – What We Heard

The NWMO hosted eight roundtable sessions for nuclear industry organizations, each aimed at a specific aspect of the industry, such as nuclear power plant (NPP) operators, small modular reactors (SMRs), nuclear suppliers, isotope producers, research & research reactors, and industry associations, including a special session with Women in Nuclear members. These were preceded by two information sessions for Industry to provide context about the Integrated Strategy for Radioactive Waste and invite nuclear industry participants to make a presentation at a planned roundtable session. Participants from the nuclear industry had the opportunity to request to be included on the agenda and to deliver a presentation to participants on behalf of their organization. These presentations would not be attributable to the presenter unless they requested it.

In addition to the roundtable sessions, three additional information sessions were held with individual SMR vendors.

One of the important themes that emerged is that of public education and engagement and the need to be critical in developing the plan but also in its implementation as there is a perceived low level of nuclear power / radioactive waste literacy. Related to but separate from this is relationship and trust building with Indigenous communities in developing the plan and implementing it.

Another idea that emerged strongly was learning from science-based best practices internationally; this was seen as an important pathway to ensuring both public safety and cost effectiveness, which are both important, now and in the long-term.
There were many different perspectives when it came to who should be responsible for implementing the strategy, with no clear consensus. Participants expressed that a shared responsibility framework is likely needed given the reality that long-term waste management has implications for waste owners, government, waste managers, and the public, now and in the future.

The following are the key discussion points and themes that emerged from the Roundtable discussions with Industry:

Safety is Paramount

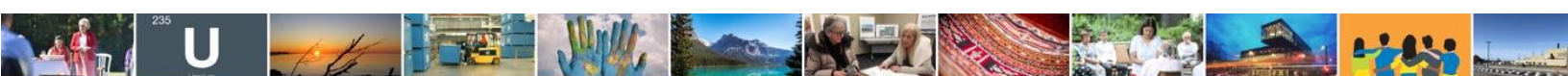
We heard that the strategy must protect people and the environment for years to come.
We also heard that any decisions should be based on sound science and best practice.

Communication and Transparency

We heard that public perception of radioactive waste is incredibly important. Some participants shared that many in the public are shocked and scared when they hear about radioactive waste, because they do not fully understand nuclear technology, so communicating simply and clearly is important.

Education and Engagement

We heard that the dominant success factor for the implementation of the strategy is not technical but rather public acceptance, which needs to come from effective community and Indigenous engagement.



We heard that it was critical that public education and engagement was considered when developing the strategic plan as they expressed that there is generally a low level of nuclear knowledge and waste literacy. Some participants expressed the importance of deepening the dialogue with Indigenous communities on whose territories the waste could be stored.

We heard that learning from science-based best practices internationally is an important pathway to ensuring both public safety and cost effectiveness, which are both important, now and in the long-term.

Sustainability and the Environment

We heard that minimizing waste was an important part of any strategy. Participants noted the waste hierarchy concept. Some participants described any repository as a precious resource.

Transportation

We heard that the strategy must consider the perceived risk of transporting waste. Participants from industry noted that reducing volumes of waste and compacting the waste before shipping was an effective and safe way to minimize the overall amount of waste that would require to be transported.

Some participants suggested that having three disposal sites, one in the east, one in central Canada, and one in the West, could strike a good balance, considering the vast distances over which waste would be transported.

Rolling Stewardship and Waste Disposal

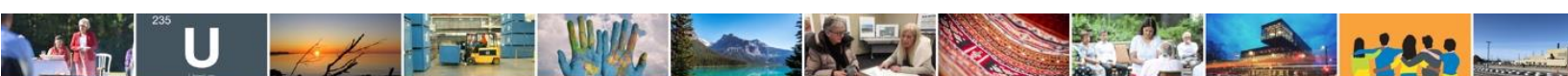
Most industry participants advocated for waste disposal, rather than rolling stewardship. We heard that rolling stewardship only passes on the waste burden to future generations and results in continued public discomfort.

We heard from participants that rolling stewardship should not be seen as a means of permanent disposal for intermediate-level waste, although some participants felt it could be a feasible alternative to disposal for some types of low-level waste.

We heard that it is not feasible or tenable to do rolling stewardship in perpetuity or even for periods exceeding a few hundred years. We heard that the costs to do so would be extremely high and these would need to be included in financial guarantees, which would impact ratepayers. In addition, we heard that storage at the surface entails risks in the long-term.

There was general agreement among the participants that rolling stewardship was not an appropriate strategy for intermediate-level waste. Given the exceptionally long timescales during which intermediate-level waste remains hazardous, there would be no way of guaranteeing that the waste will be monitored and protected for millennium, making rolling stewardship much less desirable than disposal.

We heard from some participants that rolling stewardship was not a reasonable option for low-level waste either. However, we also heard from some participants that, for certain kinds of low-level waste with shorter-lived radionuclides like those from medical isotope production, rolling



stewardship could be a cost effective and safe option. Some participants thought that different types of low-level waste could have distinct kinds of facilities.

Co-location and Centralization

We heard support for co-location of facilities, and that there should be more than one facility, although some waste types could be co-located. We also heard from some participants that waste should be centrally stored in a few key sites across Canada.

We heard that waste did not need to be located at the sites where the waste is produced. An example cited was of the United Kingdom, where there is one low-level waste disposal facility, but it is centrally located within 300-400 miles of all nuclear facilities. However, because Canada is so vast, a single facility may not be the right answer because the waste would have to be transported thousands of kilometers.

We heard that because near surface disposal is appropriate for low-level waste, which has lower risk and a shorter period in which it is hazardous, a single repository may be possible. We also heard that it could make sense to have several facilities for low-level waste for the same reasons.

We heard from some participants that it did not make economic sense to co-locate low-level and intermediate-level waste because the low-level waste did not need the same design considerations.

For intermediate-level waste, participants stated that co-location with high-level waste makes sense financially and is currently done in other parts of the world. We also heard that because of the low volume of intermediate-level waste in Canada (less than 1% of the total waste volume), it should be combined with high-level waste for permanent disposal rather than at a separate disposal facility. We also heard that, based on international best practice, a deep geological repository is the best option for the disposal of intermediate-level waste, but that the development of a disposal facility would require broad engagement across multiple sectors.

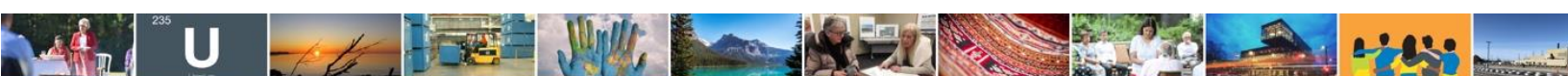
We also heard that there could be more than one technical solution for intermediate level waste. Some participants indicated the importance of flexibility in the disposal options for the diverse types of packages and wastes, so long as the design is commensurate with the hazards.

Shared Responsibility Framework / Independence of Accountable Entity

We heard that waste owners today are operating or planning for waste disposal facilities, but that over the long-term, having a single entity responsible for implementing the plan could be a satisfactory solution. Regardless, participants noted that Canada has a strong regulatory framework to safely manage the waste.

We heard from some participants that waste owners should be responsible for their strategy and that proponents must select the specific technology for the disposal of their waste; this must consider the inventory, siting, geology, and waste characteristics.

We heard that key producers of small to modest volumes of waste are unlikely to have the capacity to implement the requisite waste facilities, so it is crucial that whoever implements the strategy must provide access to the small/modest volume producers. Participants felt that this will be especially important for the small modular reactor sector to have equal access to disposal. We heard that currently, producers of medical isotopes do not have the same access



to disposal as power producers and are reliant on commercial arrangements rather than having guaranteed access to disposal.

Some participants expressed the need for everyone to collaborate on the implementation of the strategy, and that it may not be ideal for a single entity to be responsible; if everyone is involved that would assure accountability. We heard that government, province, and utilities must ensure that all the parties are accountable to do their part, and together achieve a common goal. We also heard that it was important to avoid administrative burden when considering the structure of the entity or entities responsible for the implementation of the strategy.

We heard that there needs to be a coordinated approach with those who currently manage the waste. We heard suggestions from participants that the NWMO, or an organization with a similar structure, should be responsible to lead the implementation of the integrated strategy for all the waste as a single crown corporation. In this scenario, some participants expressed that this would be one way to achieve synergy, consistency, and transparency.

We also heard from some participants that the federal government should play an active role, but that the government's role should be separate from political cycles with no impact from elections. In this scenario, government would work with the waste producers and owners and act on their recommendations.

We heard from some participants that either the provincial or federal government should be responsible, for example Natural Resources Canada. However, the implementation of the strategy would require the rigor and determination of the private sector. Some participants recommended that waste owners should pay into a single organization to manage the waste.

We heard that whatever organization was responsible for the implementation of the strategy, they must have effective stakeholder relations, community relations, and relationships with Indigenous peoples.

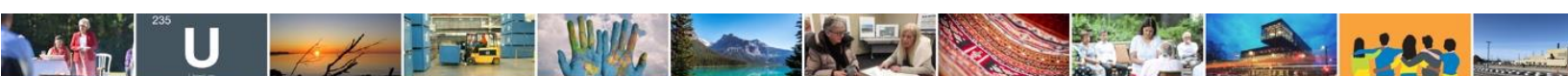
Trust and Relationships with Indigenous Communities

Participants expressed support in ensuring trust and relationships are built with Indigenous communities in developing the plan and implementing it.

We heard that Indigenous engagement is extremely important for the nuclear industry, and any strategy must ensure that positive relationships built on mutual trust are fostered.
We also heard from participants that the knowledge and expertise that Indigenous peoples have should be brought to the table.

Sense of Urgency

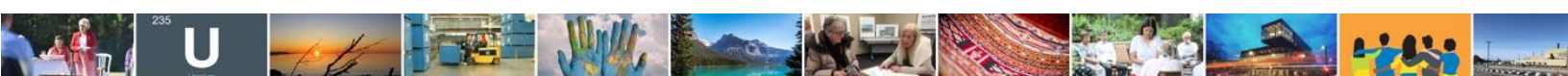
When we asked what is important to get right, we heard that it was vital for Canada to find a solution for all the waste, sooner rather than later. Industry participants expressed the importance of getting this right, and acting with a sense of urgency, both because this was a long-standing issue for industry and because of the opportunity presented by modern technology such as SMRs to contribute towards Canada achieving its net-zero climate goals.



Cost and Efficiency

We heard that we must account for costs of interim storage that would result from rolling stewardship. The cost of this for hundreds of years would be astronomical and it was not deemed to be socially responsible to add to electricity costs and have ratepayers shoulder this burden. We heard that future generations should not be responsible for the costs or the decision.

We also heard that safety and efficacy of the technology is important, as well as ensuring the public has confidence that the design of any storage or disposal facility is robust. Participants noted that technology will change over 300 years, the time over which low-level waste remains hazardous, so industry needs to be prepared for technological innovations.
We heard that scalable, flexible, practical, and industry-led solutions for an integrated strategy for radioactive waste would be most efficient and effective.



Academia Roundtables – What We Heard

The NWMO hosted three roundtable sessions for academia.
Public safety was seen as a top priority from most participants and there was recognition that it is difficult to provide feedback on safety without understanding the risks involved. Many participants trusted experts to evaluate the risks but expressed that public education was key.

We heard from most participants that there is a need for further education and public engagement with a focus on terminology. Many felt it was important to have an increased literacy on the diverse types of nuclear waste and volumes that Canada will be storing in the future.

We also heard that economic impacts were important to consider, and that the lack of an integrated strategy was a barrier to Canada's position as a world leader in radioisotope production.

Participants also felt that shared responsibility is important and needs to be nationally aligned. The following are the key discussion points and themes that emerged from the roundtable discussions with academia:

Safety is Paramount

Public safety was seen as a top priority from most participants and there was recognition that it is difficult to provide feedback on safety without understanding the risks involved.

Participants agreed, once there is a priority for safety and public engagement, there would be some interest in conducting an economic impact study.

Communication and Transparency

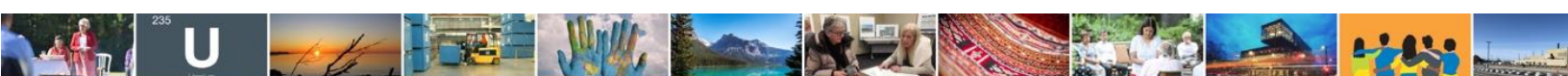
We heard participants describe the general public's lack of understanding on nuclear industry terms such as "low dose radiation;" industry terminology does not resonate with the public. We also heard participants identify the need to develop a shared language around health and safety risk including the safety limits, to establish if something is acceptable or not acceptable in the eyes of the public.

We heard that to move toward consent for waste projects, it was essential to build trust between communities and regulators. We also heard there is a lack of transparency and a need for up to date and accurate information available to the public to help overcome the fear of radioactive waste in Canada.

Education and Engagement

We heard that it is important to have an increased literacy on the diverse types of nuclear waste and volumes that Canada will be storing in the future.

Many participants trusted experts to evaluate the risks but expressed that educating the public now will increase comfort levels and will ensure future generations can understand the decisions made. We heard from most participants that there is a need for further education and public engagement with a focus on terminology (e.g., people confuse low dose radiation with non-ionizing radiation).



We heard a desire to better understand what happens to hospital-medical radioactive waste. The radioactive waste arising from nuclear medicine is extremely short-lived and can be held at the hospital-medical facility until the radiological hazard is eliminated, and the waste can then be disposed of using conventional methods.

Sustainability and the Environment

We heard from participants that the environment and its safety are the most important aspects to get right.

We heard that sorting and minimizing waste is an important way to reduce the amount of radioactive waste that requires storage or disposal.

We also heard there needs to be adaptability in the design, to take advantage of future innovations in technical approaches, such as wastewater management.

Transportation

Participants wanted to learn more about transportation risks for low-level and intermediate-level waste.

We heard that storing waste locally would be preferable to transporting it.

Participants felt that, although transportation has been occurring safely for many years, the increased volumes of waste being transported in future, if there were repositories away from where the waste is generated, could increase the likelihood of accident.

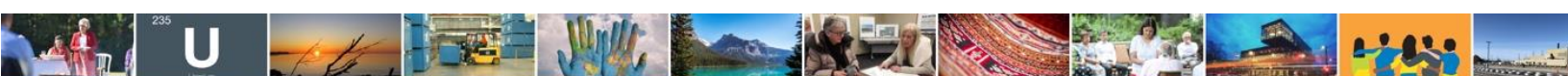
Rolling Stewardship and Waste Disposal

We heard that the type of facility for low-level waste and for intermediate level waste is something that should be left to technical-engineering experts and that Canada should consider best international practice in determining the approach.

We also heard that the organizations producing waste today would be best placed to make recommendations on how it should be managed in the future, including who should be responsible for implementing the strategy.

We heard differing views around rolling stewardship versus permanent disposal of radioactive waste. We heard from participants who had concerns around the idea of rolling stewardship for low-level and intermediate-level waste because there is no guarantee who the stewards will be in the long term; this was seen to be risky, and those participants felt it was wrong to burden future generations with this accountability. We also heard that it was not prudent to depend on governments being benign and protective over the many centuries; societal changes can occur quicky and the waste should be disposed of to avoid reliance on existing forms of governance as the basis for safely managing the waste.

We heard from some participants that there is no likely future value in intermediate-level waste, and that it should proceed to disposal, rather than rolling stewardship.



We also heard the viewpoint from other participants that storing the waste on the surface near the source with a rolling stewardship plan in place would be best for both low- and intermediate-level waste. We heard that if the waste is safely managed today, this was an acceptable approach for the future.

Participants expressed that it would be difficult to justify the cost of deep geological disposal for low-level waste. We heard that near surface disposal for low-level waste is an acceptable approach, and that there are lessons to be learned from the management of conventional waste, where Canada's expertise in low hazard landfills is recognized. We heard that there is generally no value in low-level waste so it should be in a disposal stream; where some small amount could have future potential, this should be retained for storage using rolling stewardship.

Co-location and Centralization

We heard some participants express that we should adopt a regional approach for low-level waste, with smaller more localized facilities requiring less transportation, while others expressed support for one central facility built with adaptability.

For intermediate-level waste, some participants expressed a preference for having multiple facilities across Canada.

We heard some participants who favoured separating low-level waste disposal facilities from intermediate-level waste facilities. Some participants expressed a preference for a single community hosting a single site for low-level waste, and another community hosting a single site for intermediate-level waste. We heard that having separate long-term facilities for low-level waste and for intermediate-level waste would be favourable, as it would create jobs in multiple communities. We heard different perspectives on having one single facility for all of Canada; some participants identified advantages such as finding one host community would be simpler, and a single facility could be better secured, and have economies of scale, whereas some participants expressed that a single facility would increase transportation costs and risks and that having multiple facilities would be a fairer approach to host communities who would share the burden of hosting waste.

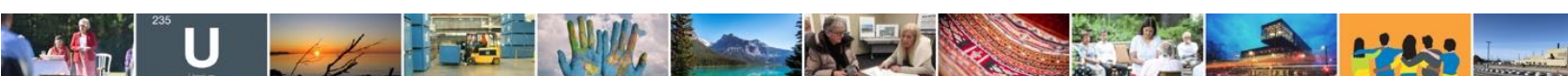
Some participants wanted the long-term disposal sites located near the areas where waste is generated, for both low-level and intermediate level-waste.

We heard that participants felt that there were more options for low-level waste (arguments for centralization and decentralization, multiple facilities or only one), compared to intermediate-level waste (single, centralized facility) because of the more onerous technical requirements for an intermediate level waste repository.

We heard that the strategy should also consider that facilities that currently take hazardous waste could be licensed for low-level radioactive waste. This would take advantage of the stewardship and governance arrangements already well established, as well as the technical expertise related to environmental management of waste facilities.

We heard it could be acceptable for some of the intermediate level waste to go into the high-level deep geological repository. Some participants felt having a separate deep-disposal site was the best option for high-level waste and intermediate-level waste.

We heard different perspectives on the amount of flexibility versus prescriptiveness in the integrated strategy. Some participants favoured flexibility to allow waste owners to choose from



multiple approaches, whereas other participants favoured a more prescriptive strategy with a degree of adaptability for future innovations.

We heard that whatever approach is adopted should consider cost as well as technical considerations, for example the cost of transportation needs to be factored into the integrated strategy.

Shared Responsibility Framework / Independence of Accountable Entity

We heard from participants who felt that shared responsibility is important and needs to be nationally aligned. We heard different ideas about the possible structure of governance for the responsible organization(s) and that any organization needs to be established as a service provider to the nuclear industry.

We heard some participants suggest a hybrid model of stand-alone single entity established by the federal government. The federal government would then work independently with the provincial, local, and community governments to implement the approach.

We also heard support for the idea of a new responsible organization for each category of waste, for example, waste owners could be responsible for low-level-waste, a single purpose organization could be responsible for intermediate-level-waste, and the NWMO could continue to be responsible for used nuclear fuel / high-level-waste.

Some participants suggested that the federal government should explore a Government Owned Contractor Operated (GOCO) model like that established by AECL for operation of Canadian Nuclear Laboratories sites.

We also heard that the governance structure for conventional landfills and waste disposal facilities should be explored as a model for the governance and stewardship of radioactive waste disposal facilities.

We heard support for the federal government to continue to be responsible for the regulation of radioactive waste. The federal government and current regulatory framework were described as fair and trusted, and participants identified radioactive waste as a significant issue that should not be left to the provinces.

Finally, we heard that, before the Integrated Strategy for Radioactive Waste is finalized, that the federal government and the provincial governments should agree on it.

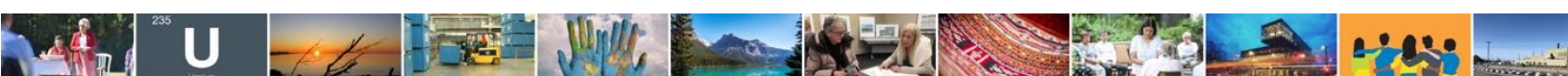
Trust and Relationships with Indigenous Communities

We heard that establishing and maintaining relationships with Indigenous peoples, and respecting treaties was as important as safety and environmental considerations.

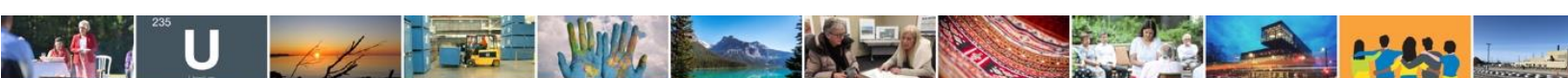
Canada’s Competitive Advantage

We heard participants express that there is so much societal good that can be provided from nuclear technology (e.g., addressing energy poverty, climate change, research on next generation materials, medical treatment, achievement of UN sustainable development goals) that an integrated strategy for radioactive waste can be an enabler to the societal good that nuclear provides.

We heard that Canada is a leader in the production of radioisotopes used internationally for medical and industrial applications, but that the lack of an integrated strategy for radioactive



waste, and the lack of operational disposal facilities reduces Canada's competitiveness. We heard that waste from Canada's university research reactors is being sent for disposal to the United States at costs which disadvantage us compared to American universities, and under arrangements which do not guarantee our long-term ability to dispose of those wastes.



Municipal Officials Roundtables – What We Heard

The NWMO hosted four roundtable sessions for municipal officials
We heard a clear message from participants that further public education on nuclear waste management is needed. Participants and that it is challenging for politicians to talk about nuclear waste management.

Public safety was another topic talked about by participants who noted this was paramount to the strategy but were unsure what the safest measures or best practices are. We also heard from participants who emphasized building relationships and trust building with Indigenous peoples was important.

The following are the key discussion points and themes that emerged from the roundtable discussions with municipal officials:

Safety is Paramount

We heard that public safety was paramount to the strategy, but participants expressed uncertainty about what the safest measures or best practices are.
Participants expressed that safety and making people feel safe must be a priority.

Education and Engagement

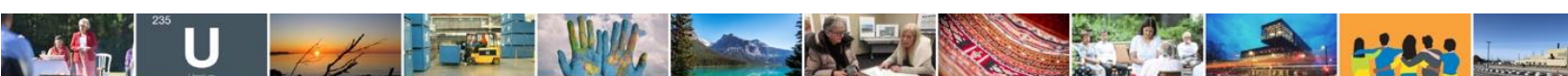
We heard a clear message from participants that further public education is needed. Participants acknowledged their own knowledge gaps, but they also gave feedback that it is challenging for politicians to talk about nuclear waste management and the impact on future generations, or nuclear power and climate change, given the prevailing sense of discomfort with nuclear waste.

We heard from some participants that they did not know that radioactive waste was already being shipped across the country and that there was a need for communities to see that the containers are safe when transported. We also heard from participants who thought there were misconceptions surrounding the fears around the nuclear industry, its regulation and management. They pointed out the safety practices of Canadian facilities and Canada's robust regulatory framework as ways to alleviate those concerns.

Some participants felt they did not understand the distinction between radioactive materials and radioactive waste. Participants expressed that general knowledge about radioactive waste was low, and that some did not know about many of the nuclear facilities. We heard that it was important to know what radioactive material was being managed and that being educated on different types of waste, waste characteristics, what is low-level-waste versus intermediate-level-waste was critical.

We heard that educating the public about radioactive waste was a crucial step toward public acceptance. Some participants felt, if the public understands what this process is, they will buy into it.

We heard it is important to continue to educate the public about nuclear technology and waste but also heard from participants that they felt governments do not always want to celebrate the benefits of nuclear power because of some anti-nuclear activists.



Transportation

We heard from participants who had a desire for nuclear waste to be stored in multiple locations to avoid long distance transportation. Participants felt that the further the waste is transported, the greater the risk of transportation accidents.

Rolling Stewardship and Waste Disposal

Some participants thought rolling stewardship in multiple locations had merit as a viable option for low-level waste because the waste would be easier to monitor if it were kept on the surface. There were also concerns from proponents of rolling stewardship that future generations may forget about the waste if it was disposed of in a repository and that transportation could be costly and more dangerous. We also heard from some participants that economically, it would make sense to keep low-level waste onsite, where it is today, as it keeps managing it front of mind.

Some participants expressed a preference for multiple small facilities close to where low-level waste is currently used. Other participants thought that keeping low-level waste in one central location seemed to be less risky.

Some participants believed that since intermediate-level waste is more dangerous than low-level waste, it should be kept more contained and isolated and the decision to store and manage the waste should be left up to the people who know what is best.

We heard from some participants that we need to build an intermediate-level waste disposal facility for the long term because we do not know how the nuclear industry will change over time; because of the long timescales involved, it does not make a difference if the hazard is eliminated over 500 or over 2000+ years.

Co-location and Centralization

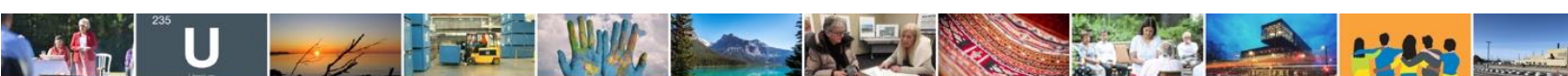
We heard from participants who were concerned about the health risks for intermediate-level-waste. If it was a health hazard, then they were in favour of a single surface level site. Some participants expressed that storing low-level-waste with intermediate-level-waste would not be any more dangerous than storing them separately.

Shared Responsibility Framework / Independence of Accountable Entity

We heard from participants who were comfortable with an independent and central agency in charge of handling all aspects of waste, a single entity that has the community's trust and federal support with a board of directors.

We heard some support from participants that the Canadian Nuclear Safety Commission or the Canadian Nuclear Association could control and manage the waste with a strong governance model.

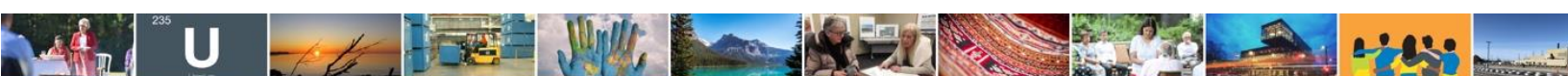
We also heard that provincial or the federal governments should play an active role and have a coordinated approach with those who currently manage the waste.



Trust and Relationships with Indigenous Communities

We heard that building relationships and trust building with Indigenous peoples was particularly important.

Participants expressed that recognizing the rights and land use of Indigenous peoples was important and that having a strategy that was flexible, something that could apply to all parts of Canada, was required.



Government Official Roundtables – What We Heard

The NWMO hosted seven roundtable sessions for provincial and federal government officials (senior civil servants and policy staff).

We heard from participants who wanted an act-now-don't-delay approach when discussing the long-term management of nuclear waste. Most participants agreed that buy-in would increase if Canadians had more knowledge on nuclear waste, which highlighted a need for further education and public engagement.

We also heard most participants vocalize their support for public safety as the overarching priority, with protecting the environment as another key factor to consider. There was no clear agreement on what is the safest way forward (e.g., single site versus multiple sites) but there was an acknowledgment that we should choose the safest option as recommended by the experts. We also heard an emphasis on balancing cost with safety and a need for shared responsibility using various options.

The following are the key discussion points and themes that emerged from the roundtable discussions with provincial and federal government officials:

Safety is Paramount

We heard staunch support for the importance of safety and protection of the environment.

We also heard that the strategy should consider physical security of any waste storage or disposal sites and that when it comes to safety, we should rely on expert recommendations.

Communication and Transparency

We heard that there is a perception among the public that the waste owners are for profit organizations, making decisions based on costs, not on safety, and that the best decisions are not being made for safety and environment.

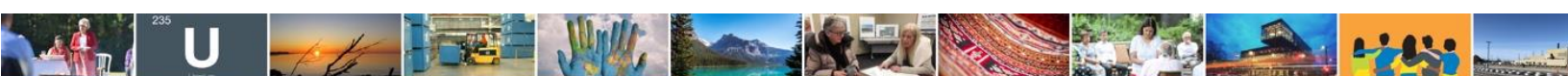
Education and Engagement

Participants expressed the importance and necessity of effective public engagement as an integral part of the strategy to ensure communities across Canada are informed about radioactive waste. They noted that the NWMO was already doing this as it relates to used nuclear fuel by holding information sessions, undertaking engagement, and presenting the public with the facts to dispel some of the misinformation that may exist.

Sustainability and the Environment

We heard the importance of good environmental stewardship, and some participants wanted to learn more about the potential for leaks and other environmental impacts to better make decisions around strategies for radioactive waste.

Participants stated the importance of accounting for cumulative environmental effects over time and space, and some urged that a ‘seven-generation’ lens be used. We heard that protection of water was important, and this included interjurisdictional impacts of pollution and other potential harms to the great lakes, which are shared with our American neighbours.



Transportation

We heard support for regional waste storage or disposal facilities to minimize transportation of waste between provinces. This was especially a consideration for new-to-nuclear provinces considering small modular reactors in the future. Given the vast distances, participants stated that it may not make sense for Saskatchewan to ship waste to Ontario, but that there may be some merit in transporting waste from Alberta and Saskatchewan to a regional location. Participants expressed that the issue of transportation is one of risk, overall cost, carbon footprint, fairness and of economic opportunity for local communities.

Rolling Stewardship and Waste Disposal

Some participants expressed that long-term safe storage (rolling stewardship) would need to be on existing nuclear sites, which may be close to population centres, and that ideally, storage or disposal should be far from heavily populated areas.

We heard that geologic disposal creates an environment that is intended to remain safe for hundreds of thousands and millions of years, when society has only existed for 12,000 years, so it is difficult to conceptualize. Participants stated that the strategy needs to look at the trajectory of society – if civilization collapses, we must ensure that the waste can never be accessed. On the other hand, if society is thriving in 1000 years, the waste could be seen as a trove of steel and resources and could be used as an asset.

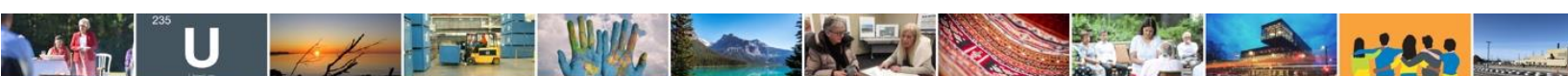
Co-location and Centralization

We heard that when deciding on co-location, and one versus multiple facilities, Canada should look to international experience to inform the strategy.
We heard from participants a variety of concerns and questions about how to store low-level waste, where to store it, and what types of facilities could work. Some participants expressed that placing low-level waste deep underground was not commensurate with the lower level of risk, technical requirements, and international practice and that over engineering facilities would not be fiscally responsible.

We heard from participants that having one central place in the country for intermediate level waste would be preferable to several regional facilities. Some participants indicated that this contributed to their belief that co-location with high-level waste (used nuclear fuel) makes sense when possible. We also heard that it is better to have only a few facilities than have many, especially from a risk, cost, and safety standpoint. Some participants had questions about the technical viability of mixing intermediate level and high-level waste.

Shared Responsibility Framework / Independence of Accountable Entity

Participants told us that getting the business model right for who is responsible to implement the strategy is a key factor. Some participants expressed that we already have a solid model for high-level-waste (NWMO) but not for low-level or intermediate-level waste. We heard that the strategy should establish a model for all the waste types including establishing who is paying for what.
We heard there was support for the NWMO model: industry pays for the organization to exist and then that organization is responsible for the waste. Some participants felt this is a better model than a taxpayer funded organization.



Some participants expressed support for joint responsibility between a federally created, arms-length federal body and waste owners, if waste owners fund the projects and the federal body oversees the regulation.

We heard some participants support the current day set up with multiple licensed storage facilities operated by the waste owner. Other participants felt that the current arrangement perpetuates storage rather than a permanent disposal solution.

Trust and Relationships with Indigenous Communities

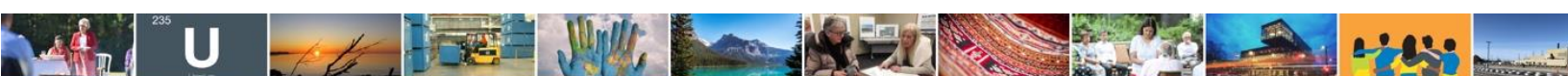
We heard that engaging with Indigenous peoples is important, as is learning from Indigenous perspectives and incorporating Indigenous Knowledge.

Cost and Efficiency

We heard that the fiscal considerations were important to include in the strategy.

Sense of Urgency

When we asked participants what is important to get right when developing an Integrated Strategy for Canada's Radioactive waste, we heard that participants wanted a safe solution sooner than later. The waste currently in inventory and future waste production volumes should not be ignored. We heard that we need action now on a long-term strategy that keeps the public and environment safe from harm, and that has community buy-in.



Open / Multiple Sector Roundtables – What We Heard

The NWMO held two roundtables that were open to participants from all sectors. These were held in English with simultaneous interpretation in French. These sessions took place at the end of the scheduled sector specific roundtables to allow for those who would like to return, or who missed their designated sector roundtable to attend.

We heard that safety was the primary concern with a focus on environmental protection, emphasizing the connection between the two areas.
We heard varied opinions and perceptions on what might be considered safe which highlighted the need for further public engagement and more education.

We also heard from participants that shared responsibility was the way forward when it comes to who is leading the strategy on waste management, although there was no agreement on who those governing parties might be. Participants felt that one entity should lead the strategy as there needs to be accountability, and that group would need to be arms-length from political levels.

The following are the key discussion points and themes that emerged from the roundtable discussions that were open to all sectors:

Safety is Paramount

Many participants expressed support for public safety as their primary concern with a focus on environmental protection, emphasizing the connection between the two areas.

We heard that there needs to be some evidence-based risk or safety goal to reach, and that Canada needs to have a specific defined, international target for these safety or risk goals.

Communication and Transparency

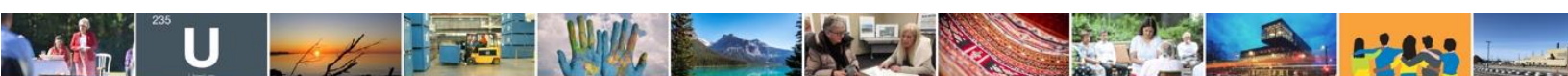
We heard some participants express uncertainty about how low-level and intermediate-level waste is defined and who wanted more transparency around current inventory volumes and estimates of future waste inventory.

Education and Engagement

We heard that increased public education and knowledge about nuclear would help Canadians provide better input into the strategy and future implementation plans, which in turn would help the management of waste now and for future generations.

We heard from some participants that investment in research to find innovative solutions is especially important along with education.
We heard that engaging the public to help understand nuclear waste and addressing the misconceptions about the dangers was important to the implementation success of the integrated strategy.

We also heard feedback about the process, with some participants stating that the amount of engagement around the strategy was insufficient and that the process was being rushed without adequate consultation.



Sustainability and the Environment

We heard that there is a need to find more ways to protect the water and to minimize the volumes of waste. We also heard from some participants that ensuring environmental safety was important because any ill effects from storing or disposing of the waste would be devastating for all life. Some participants expressed that there must be research conducted into how to transform the waste into non-hazardous materials to neutralize the impact of the radioactivity.

We also heard some participants express concerns about the danger radioactive waste poses to humans and the risk when transporting waste and housing waste near water.

Transportation

We heard that transportation risk should be minimized when considering where to store or dispose of waste.

Rolling Stewardship and Waste Disposal

We heard different perspectives on rolling stewardship versus disposal of the waste. One consideration identified by participants was the ability to monitor the site for environmental impacts.

Some participants expressed that they did not support rolling stewardship for low-level waste or intermediate level waste.

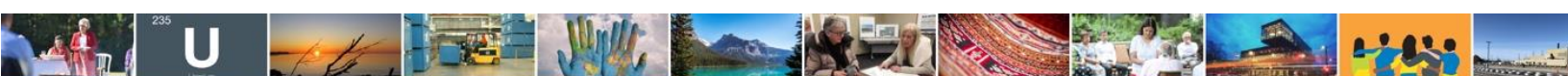
Alternatively, we also heard some participants express a preference for storing the waste on the surface near the point of generation with a rolling stewardship plan in place, for both low-level and intermediate-level waste. We heard some express that because a disposal facility for intermediate-level waste had to be built to withstand thousands of years, and we have no experience building structures that last more than 500 years, we should pursue rolling stewardship until such time as the requirements for building such long lasting structures are better understood.

Co-location and Centralization

We also heard different perspectives on having a central facility or multiple facilities for storage or disposal of low-level and intermediate-level waste. Some considerations identified by participants included cost, accessibility and minimizing the distance that waste would need to be transported.

We heard that in some communities it could be acceptable for some of the intermediate level waste to go into the high-level deep geological repository. Some participants felt having a deep-disposal site was the best option for high-level waste and intermediate-level waste.

We heard from some participants that because there was a significantly higher volume of low-level waste versus intermediate-level waste, there should be more facilities for low-level waste, and fewer facilities for intermediate level waste. Other participants felt that fewer facilities overall would be a safety advantage.



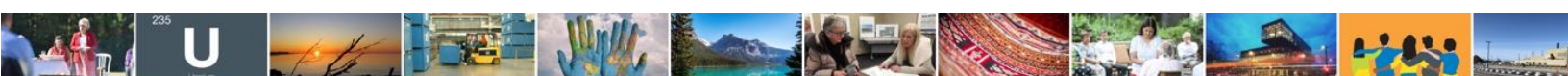
We also heard from some participants that the decision whether to combine low-level waste with intermediate-level waste should be based on cost.

Shared Responsibility Framework / Independence of Accountable Entity

We heard that industry should be responsible for the implementation of the strategy with appropriate approvals and oversight, with preference for this to be achieved through a trusted independent arms-length organization such as the NWMO. Some participants also wanted the organization to create a proper framework that is not constrained or paid by industry but should be held to the standards of safety.

We heard some participants express that there was mistrust in the NWMO by the public, because the NWMO was seen not as an independent entity, but a vehicle for the waste owners. Other participants did express trust in the NWMO, and the model used for used nuclear fuel. We heard that trust in the governance structure was important to public support and confidence.

We also heard support for a federal crown corporation taking on Canadian best practices and international best practices that would not be impacted by elections or political process.



Appendix A – Roundtable Sessions

All roundtable sessions took place in 2021. The dates of the roundtable sessions, and participant focus are below.

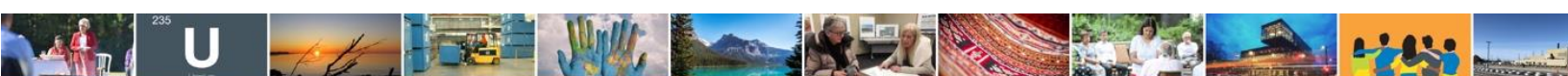
A link to the presentation used during the roundtable sessions can be found here

Pre-Roundtable Information Sessions

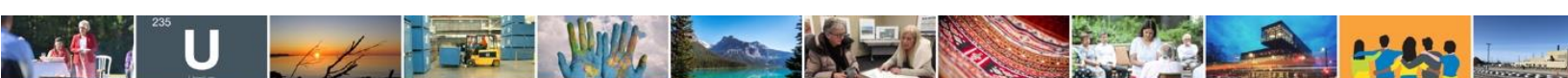
Sector	Session	Language	Date
Civil Society Organizations	Info Session CSO #1	English	12-Jul-21
Civil Society Organizations	Info Session CSO #2	Bilingual	15-Jul-21
Industry	Info Session Industry #1	Bilingual	15-Jul-21
Industry	Info Session Industry #2	English	20-Jul-21

Pre-Roundtable Information Sessions

Sector	Session	Language	Date
Municipal Officials	Municipal Officials #1	English	22-Jul-21
Academia	Academia #1	English	27-Jul-21
Civil Society Organizations	CSO #1	English	28-Jul-21
Industry	Industry #1 – Nuclear Power Plant Operators	English	09-Aug-21
Civil Society Organizations	CSO #2	Bilingual	10-Aug-21
Industry	Industry #2 – Small Modular Reactor Vendors	English	10-Aug-21
Civil Society Organizations	CSO #3	English	11-Aug-21
Industry	Industry #3 - Isotope Producers	English	12-Aug-21
Government Officials	Federal #1	English	16-Aug-21
Industry	Industry #4 - Nuclear Suppliers	English	17-Aug-21
Industry	Industry #5 Industry Associations	English	18-Aug-21
Industry	Industry #6 Open	Bilingual	19-Aug-21
Industry	Industry #7 - Research & Research Reactor Operators	English	19-Aug-21
Municipal Officials	Municipal Officials #2	Bilingual	24-Aug-21
Academia	Academia #2	Bilingual	26-Aug-21
Government Officials	Provincial #1 - Québec & Atlantic	Bilingual	30-Aug-21
Government Officials	Provincial #2 - Ontario	English	31-Aug-21
Government Officials	Provincial #3 - Central & West	English	01-Sep-21



Government Officials	Provincial #4 - any location	English	02-Sep-21
Municipal Officials	Municipal Officials #3	Bilingual	08-Sep-21
Municipal Officials	Municipal Officials #4	English	09-Sep-21
Academia	Academia #3	English	10-Sep-21
Open – multiple sectors	Open #1	Bilingual	14-Sep-21
Open – multiple sectors	Open #2	Bilingual	22-Sep-21
Government Officials	Federal #2	English	12-Oct-21
Government Officials	Federal #3	Bilingual	27-Oct-21
Industry	Industry #8 - Women in Nuclear	English	12-Nov-21



Appendix B – Promotion of Roundtable Sessions

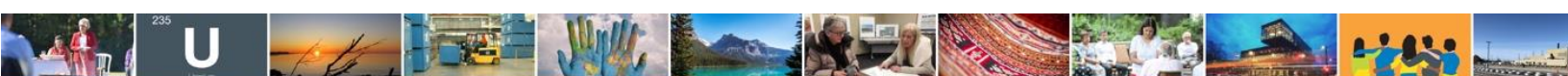
Methodology, Parameters and Results

The roundtable sessions were designed to provide a safe shared space for multiple voices to be heard and to connect participants in new and meaningful ways. The events were free of charge and open to academia, civil society organizations, nuclear industry, and federal, provincial, and municipal government officials.

As it was important to encourage wide participation, the NWMO used various outreach and promotional tools, including social media (owned) and emails to the ISRW distribution list, to reach relevant audiences to raise awareness of the roundtable sessions and stimulate registration.

Emails and Owned Social Media

The NWMO sent tailored email invitations to academia, civil society organizations, nuclear industry, and federal, provincial, and municipal government officials to encourage registration. The NWMO also shared social media posts across their owned channels. With four owned social media posts in both English and French on Facebook and Twitter, promoting the roundtables, inviting interested organizations to reach out and encouraging registration and participation.



Appendix C – Methodology

The objective of the Integrated Strategy for Radioactive Waste's (ISRW) roundtable sessions is to invite and facilitate broad dialogue to develop a strategy for managing Canada's radioactive waste, in particular low- and intermediate-level waste. We approached this goal by listening to the perspectives of attendees across multiple Canadian sectors including civil society organizations, industry, academia, and municipal, provincial, and federal officials.

The development of the strategy is grounded in a range of guiding principles and objectives as we explored key questions and issues discussed at our events. A consistent methodology was used during each session, with the exception that the roundtables sessions for civil society organization, and those for industry included an opportunity for participants to make presentations on behalf of their organizations.

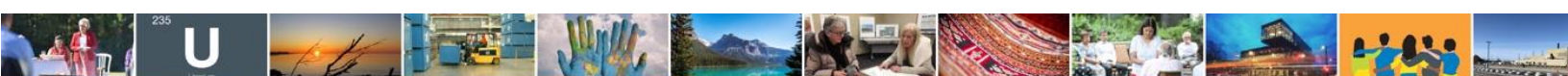
Civil society organizations and nuclear industry sectors were each offered the opportunity to attend one of two pre-roundtable information sessions for their sector in advance of the roundtable dates to provide context for the ISRW project, and to outline how these groups could request a place on a roundtable agenda to deliver a prepared presentation on the topics being discussed. Those who requested to be on the agenda were all accommodated.

Each roundtable session began with a land acknowledgement, recognizing and expressing gratitude for the land we are on. This was followed by an introduction and an overview of logistics for the event.

Before addressing the topics for discussion, the roundtable sessions started with an opening context-setting presentation from Karine Glenn, Strategic Project Director for the NWMO, which covered the following:

1. Information on radioactive waste such as:
    a. Information on the different levels of radioactive waste
    b. How other countries are managing their radioactive waste
    c. How waste is currently regulated in Canada
    d. How was is transported
    e. How waste is managed now and how it could be managed over the long-term
2. Information on the ISRW project such as:
    a. Gaps in existing plans (e.g., low- and intermediate-level radioactive waste)
    b. Timeline of the project including key milestones and deliverables (from Fall 2020 to Winter 2021/2022)
    c. The strategy's guiding principles, including: 1) safety as an overarching principle, 2) security must be ensured, 3) environment is protected, 4) informed by the best available knowledge, 5) meets or exceeds regulatory requirements, 6) be transparent and inform and engage the public, 7) respect Indigenous rights and treaties, 8) make use of existing projects, and 9) fiscally responsible.

Throughout the presentation, participants had the opportunity to watch several informative videos that helped re-emphasize information on Canada's radioactive waste as well as the purpose of the ISRW project. Following the NWMO presentation, there was a question-and-answer opportunity.
For the roundtable sessions with civil society organizations and those with industry, participants could request the opportunity to make a presentation on behalf of their organization. For those



participants who requested to do so, the session producer gave them the ability to share their screen with all participants, so that they could deliver any material they had prepared to support their presentation. The presentations were not gathered by the NWMO, unless the presenter requested that it be considered as a formal submission.

Following the presentation(s), attendees participated in the discussion-based portion of the session. Joining the attendees was an independent facilitator, and NWMO ISRW project team members who were taking non-attributable notes for this What We Heard Report. NWMO representatives were on hand to answer questions from participants during the discussion.

At the beginning of the discussion part of the roundtable session, participants were asked to participate in a top-of-mind icebreaker exercise where they were asked to share what comes to mind when they think about the future of Canada's radioactive waste.

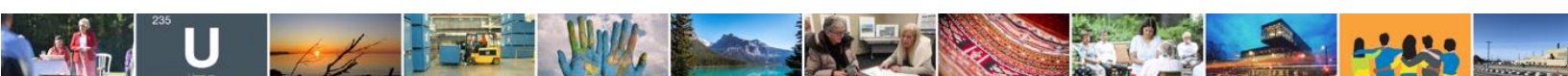
Following the icebreaker, participants were invited to take part in a discussion on three key topics that would help inform the development of an Integrated Strategy for Canada's Radioactive Waste:

1. The first focused on identifying **what is most important to get right** when developing an Integrated Strategy for Canada's Radioactive Waste.
2. The second focused on **how we best deal** with Canada's low- and intermediate-level waste over the **long-term** (considered separately).
3. The third focused on **who should be responsible** for implementing the strategy.

These discussion topics helped identify key considerations that participants view as being necessary to include in a strategy.

Following the discussions, participants were provided with ways to further be involved in the strategy development process, such as, registering for updates through the project's radwasteplanning.ca website, partaking in the project's online survey, visiting the learn more page on the project's website, and were provided additional resources, such as an email address, to continue the engagement, ask questions and share comments.

The session ended with thanks to those participating and to those supporting the session, such as translators, notetakers and production team. The NWMO representative offered to remain on the virtual platform until all participants signed off, should participants have any final questions or feedback. The NWMO representative and production team remained on the virtual platform until all participants signed off.



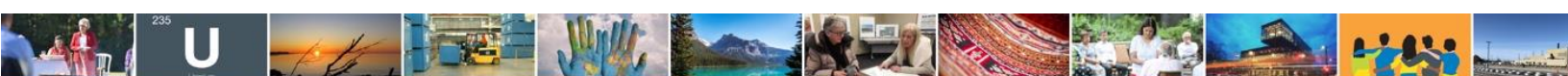
Appendix D – ISRW Guiding Principles

We described the principles that guide every aspect of the ISRW project and asked the participants to review these principles and tell us if anything is missing or should be modified. We asked if the attendees thought that the guiding principles addressed or reflected the most important aspects that a Canadian strategy for the long-term management of radioactive waste should include and what we need to ensure.

The NWMO developed a set of principles that are comprised of what the organization had heard previously from Canadians and Indigenous peoples. These initial principles were included in public opinion research and refined by participants at the Canadian Radioactive Waste Summit — the first of the engagement events for the development of an Integrated Strategy for Radioactive Waste (ISRW), held from 30 March to 1 April 2021. The principles that emerged from the Summit were used as the basis for discussion in the roundtable sessions.

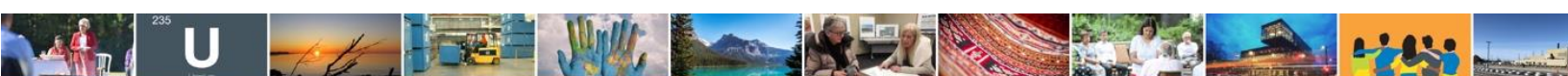
The guiding principles are:

- **Safety as an overarching principle**
- **Informed by the best available knowledge**
- **Respect Indigenous rights and treaties**
- **Be transparent and inform and engage the public**
- **Meet or exceed regulatory requirements**
- **Fiscally responsible**
- **Make use of existing projects**
- **Security must be ensured**
- **Environment is protected**



The full text of the guiding principles is as follows:

- **The strategy must have safety as the overarching principle** guiding its development and implementation. Safety, **including the protection of human health**, must not be compromised by other considerations.
- The strategy must **ensure the security of facilities, materials, infrastructure, and information**.
- The strategy must **ensure that the environment is protected**, including the protection of the air, water, soil, wildlife, and habitat.
- The strategy must be developed and implemented to **meet or exceed regulatory requirements** for the protection of health, safety and the security of people and the environment.
- The strategy must be **informed by the best available knowledge**. **This includes Indigenous Traditional Knowledge**, science, social science, local knowledge, and international best practices. Ensuring that Traditional Knowledge and ways of life are interwoven throughout is important for a strong strategy. This includes knowledge about the land and environment. It also includes values and principles about developing and maintaining effective and meaningful relationships.
- The strategy must **respect Indigenous rights and Treaties** and consider that there may be unresolved claims between Indigenous peoples and the Crown.
- The strategy must be **developed in a transparent manner that informs and engages the public, including youth and Indigenous peoples.** It is important to proactively provide easily understandable information to those most likely to be affected by implementation of the strategy. Questions and concerns must be heard, acknowledged, and addressed. Information used to develop the strategy will be readily available to the public**.**
- The strategy must be **developed and implemented in a fiscally responsible way** to ensure that the cost of the project does not become a burden to current electricity ratepayers, taxpayers, or future generations.
- Where possible, the strategy should **make use of existing projects** for the long-term management of Canada's nuclear waste.



Appendix E – Interviews with Municipal and Provincial Officials

As part of the NWMO's engagement efforts related to the development of an Integrated Strategy for Radioactive Waste (ISRW), in-depth interviews were conducted with government officials between November and December 2021.

The NWMO's outreach included directly contacting (via emails and telephone calls) 25 government officials, focusing on energy and environment portfolios. In total, 13 municipal and provincial officials were interviewed from New Brunswick, Alberta, Saskatchewan, Ontario, and Quebec. Interview participants included elected officials and senior level government officials. Interviews lasted approximately 20 to 30 minutes and covered a range of topics, including:

- Awareness of the types of radioactive waste across Canada and plans for the safe, long-term management of that material
- What is considered important as the NWMO develops recommendations for an integrated strategy for Canada's radioactive waste
- Who should be responsible for an integrated strategy

General awareness

Of those we spoke with, there is a relatively low awareness of the different types of nuclear waste across Canada. Among provinces where there are active nuclear generating facilities, such as Ontario and New Brunswick, there is a general awareness of radioactive waste, but a lack of understanding of the nuances between waste types. However, several interview participants mentioned how the development of Small Modular Reactor (SMR) technology has brought renewed focus to the issue of how to deal with radioactive waste.

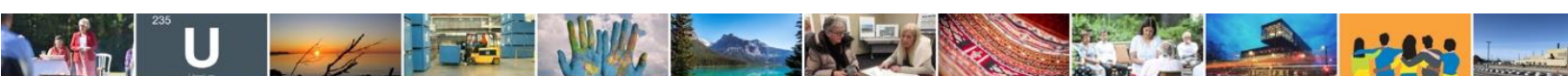
What is important to get right

Safety and security were paramount for most interview participants. Safety for human and animal health was the most cited consideration, while other participants highlighted concerns around the need to consider protection for the environment, vulnerable water sources and public health. For instance, as one participant noted understanding the local safety infrastructure, such as emergency services and local road infrastructure, is critical to the success of the project.

Education and outreach are integral components of any communications plan for an integrated strategy. Interview participants described how a robust education campaign would go a long way to counter misinformation and common stereotypes that exist about the nuclear industry. Specifically, education on the safety components of the plan is important to assuage the common misconception that anything related to nuclear waste is presumptively high risk.

Communications and outreach efforts also need to include clear information and rationale around the strategy. According to participants, making sure that the science and rationale behind the plan is digestible, accessible, and understandable is important to counter opposition and foster public trust.

Participants also noted that outreach could focus on:



- The importance of nuclear energy in Canada and its role in combatting climate change
- The types of waste involved so that people understand the differences being used nuclear fuel, low-level waste (LLW) and intermediate-level waste (ILW)

What is important for decision making

Most participants alluded to the need for the development of federal standards to help guide the disposal of LLW and ILW. For instance, according to one participant, this could include pan-Canadian safety standards based on current science and international best practices. However, despite the call for national standards, there was broad support for provincial implementation and control over how disposal occurs. According to participants, this is because provincial jurisdictions understand their landscape and unique circumstances the best.

Engagement and consultation are also essential elements of the decision-making process. As one participant mentioned, it will be important to "be up front with all information" and "be comfortable being uncomfortable" in the face of opposition.

Engagement efforts should ensure that they "dig deeper" and reach out to communities and people not normally engaged on these types of issues, such as youth and children. Several participants also highlighted the importance of engaging and "co-managing" the plan with Indigenous communities.

Other types of engagement, as called for by interview participants, include with researchers and universities, fire, and other emergency service providers, as well as residents close to sites where waste is currently stored.

How to best deal with ILW and LLW over the long term

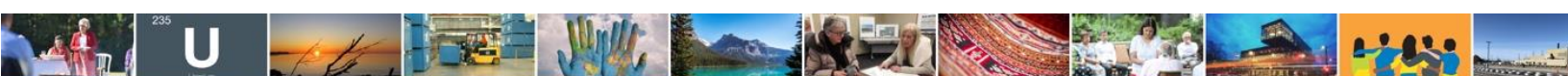
Among interview participants, there was no clear consensus on how to best deal with Canada's ILW and LLW over the long term. However, participants reinforced the need for a permanent approach to instill public confidence and guarantee the security and safety of Canada's plan for LLW and ILW. Participants also noted that any planning should consider the safety implications of transportation of waste over long distances and the ability to dispose of waste locally.

There was broad support for a decentralized approach to disposal, including keeping the waste close to existing interim storage sites. Participants noted that local storage of LLW could be acceptable for most people, would help to limit opposition over transportation and is more fiscally responsible. Moreover, participants also raised safety and cost related concerns with the potential for transportation of waste across long distances if a centralized location is chosen. However, there were still concerns over the localized disposal of ILW, with one participant calling for it to be stored in a deep geological repository (DGR) type facility with high-level waste (HLW).

Another set of participants voiced significant support for the burial of ILW and LLW in a DGR type facility as "deep as possible." However, even if the waste is buried, it was noted that it is important that the plan is amenable to future potential applications for the waste.

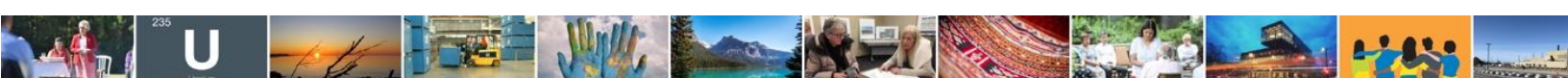
Responsibility for implementing the strategy

While participants did not necessarily have authority over nuclear disposal in their respective provinces, there was a general agreement among interview participants that industry and waste



producers should be responsible for funding the disposal of the waste. Participants felt strongly that a single unifying agency, with a national scope, should be responsible for implementing the strategy. Some participants said this could be a department or agency of the federal government, while others were supportive of an agency not seen to be in the auspices of government control to reinforce public trust. In particular, the Canadian Nuclear Safety Commission (CNSC) was mentioned by a few participants. While there was support for federal coordination, participants were also wary that whatever agency or body is chosen should be aware of the needs and issues of individual jurisdictions and provinces.

Whatever approach is chosen, waste producers should be responsible for financial and environmental obligations. This includes the need to have a backup or safeguard mechanism in case one of the waste producers ceases operation over the lifetime of the waste disposal.



Glossary of Terms (Nuclear Waste Management)

Bulk Material: Material that is granular in nature, such as soil, demolished concrete, or construction/demolition waste.

Concrete Vault: Concrete vaults are a type of engineered near surface disposal facility widely used around the world for the disposal of low-level radioactive waste (LLW). Concrete vaults look like large concrete boxes and a repository would be made up of a series of these. Each one would have its own drainage system and an 'earthen cover system' engineered from multiple layers of soil and with grass or other plants growing on top. This disposal method can be used in a wide variety of soil conditions. It is also modular in its design, which means that additional vaults can be added to increase its capacity as needed.

Deep Borehole: Deep borehole disposal is an emerging technology for waste that requires isolation for more than a few hundred years. It may be suitable for the disposal of small volumes of intermediate-level waste (ILW). The series of narrow boreholes are created to a depth of about 500 to 1000 metres into which waste packages would be lowered, creating a stack deep underground.

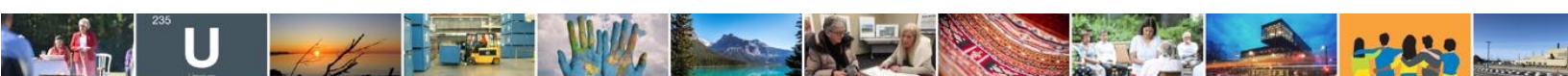
Deep Geological Repository (DGR): A deep geological repository typically consists of a network of underground tunnels and placement rooms for radioactive waste constructed several hundred meters below the surface. Repositories are designed to use a system of multiple barriers: engineered barriers such as waste containers and natural barriers like the rock itself work together to contain the waste and isolate it from people and the environment.

Disposal: The placement of radioactive waste without the intention of retrieval.

Engineered Containment Mound (ECM): Engineered containment mounds are a type of engineered near surface disposal facility that sees waste packages placed on a waterproof base and then covered over with thick layers of natural materials such as clay and soil. Layers of synthetic materials such as high-density polyethylene are also incorporated to prevent release of radiation to the environment. These facilities usually have wastewater collection and treatment systems as well. ECM is suitable for low-level waste which will not reduce in volume or compact over time.

High-Level Waste (HLW): High-level radioactive waste is primarily used nuclear fuel and/or is waste that generates significant heat via radioactive decay. HLW is associated with penetrating radiation, thus shielding is required. HLW also contains significant quantities of long-lived radionuclides necessitating long-term isolation. Placement in deep, stable geological formations at depths of several hundred metres or more below the surface is recommended for the long-term management of HLW.

Intermediate-Level Waste (ILW): Intermediate-level radioactive waste is generated primarily from power plants, prototype and research reactors, test facilities, and radioisotope manufacturers and users. ILW generally contains long-lived radionuclides in concentrations that require isolation and containment for periods greater than several hundred years. ILW needs no provision, or only limited provision, for heat dissipation during its storage and disposal. Due to its long-lived radionuclides, ILW generally requires a higher level of containment and isolation than can be provided in near surface repositories. Waste in this class may require disposal at greater intermediate depths of the order of tens of metres to a few hundred metres or more.



Long-Term Management: The long-term management of radioactive nuclear waste by means of storage or disposal.

Low-Level Waste (LLW): Low-level radioactive waste comes from operating reactors and from medical, academic, industrial, and other commercial uses of radioactive materials. LLW contains material with radionuclide content above established clearance levels and exemption quantities (set out in the *Nuclear Substances and Radiation Devices Regulations*), but generally has limited amounts of long-lived activity. LLW requires isolation and containment for periods of up to a few hundred years. An engineered near surface disposal facility is typically appropriate for LLW.

Radionuclide: A material with an unstable atomic nucleus that spontaneously decays or disintegrates, producing radiation. Nuclei are distinguished by their mass and atomic number.

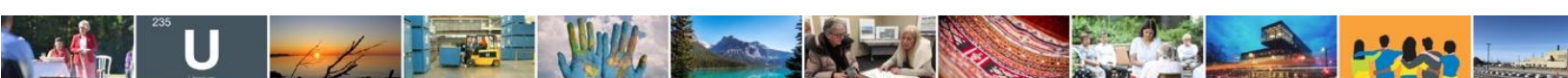
Rolling Stewardship: Rolling stewardship is an approach to managing radioactive materials for which there is no disposal solution in the near term. Under rolling stewardship, the radioactive waste is stored on the surface where human controls can safely contain, isolate, monitor, and secure it for many generations indefinitely i.e., roll the radioactive waste forward from generation to generation (a succession of stewards). This concept assumes that technology will eventually resolve the problem for the long-term management of the waste, potentially by destroying or neutralizing it.

Shallow Rock Cavern: The shallow rock cavern is an engineered near surface disposal method sometimes used for the disposal of low-level waste, or low- and intermediate-level waste (LLW or L&ILW). A series of rock caverns are excavated at a nominal depth of 50 to 100 meters below the surface in low permeability rock. They are accessed from the surface by a small system of ramps and tunnels

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

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

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



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