



CANADA'S INTEGRATED STRATEGY FOR RADIOACTIVE WASTE

Technical Workshop

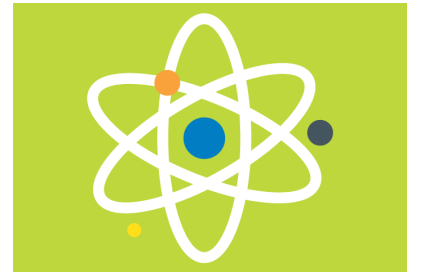
2021



WELCOME

AGENDA

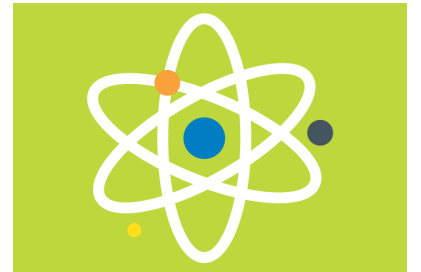
1. Welcome
2. Presentation of background information
3. Q+A
4. Technical Assessment
5. Q+A
6. Workshop discussion
7. Closing



ISRW PROJECT

In November 2020, the Minister of Natural Resources Canada asked the NWMO to lead the development of an **integrated strategy on radioactive waste (ISRW)**

- Radioactive waste safely managed today
- Several long-term plans and projects exist
- Some gaps exist
- This strategy represents a **next step**



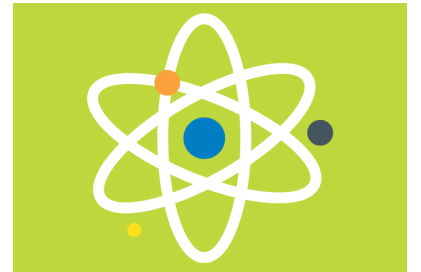
FOCUS IS ON GAPS IN EXISTING PLANS

NO GAPS:

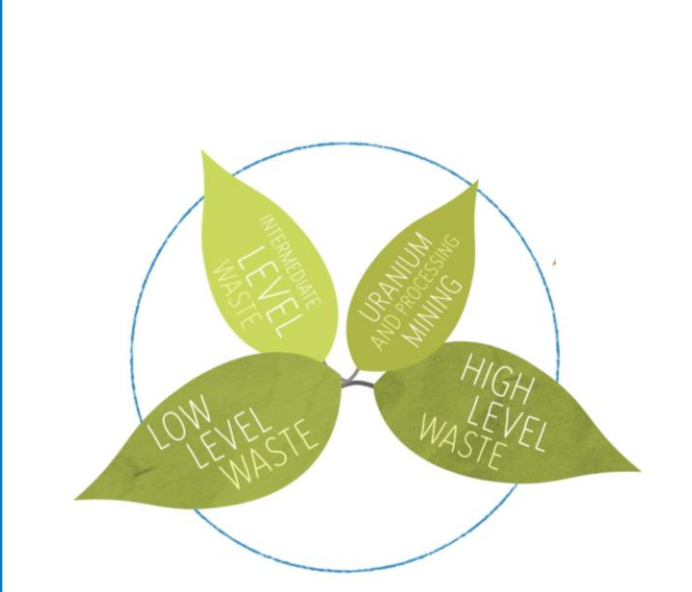
- **High level radioactive waste** - a long-term plan is in place through the NWMO's DGR project
- **Uranium mine and mill waste** - disposal facilities are in operation

GAPS:

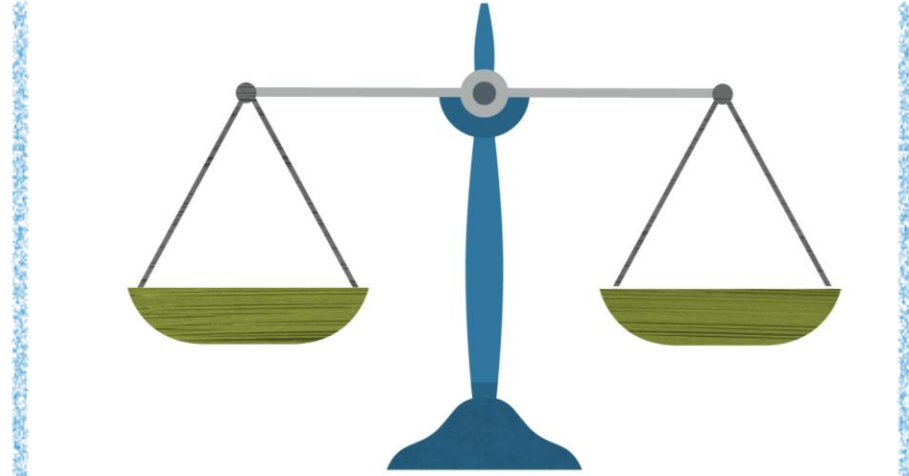
- Some long-term planning is underway for **low-level radioactive waste**, but several gaps exist
- **No long-term management plans in place for any of Canada's intermediate-level waste** - this is also a gap in the system.



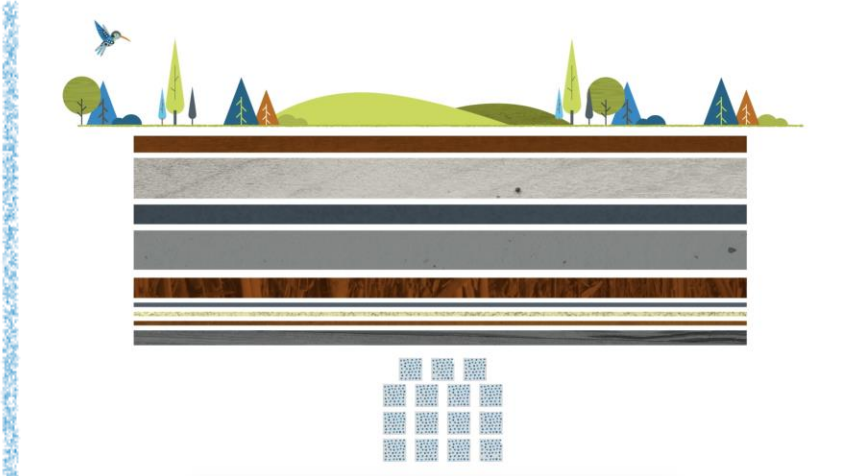
WHAT WILL IT INCLUDE?



Taking Stock of Current Waste Management Situation

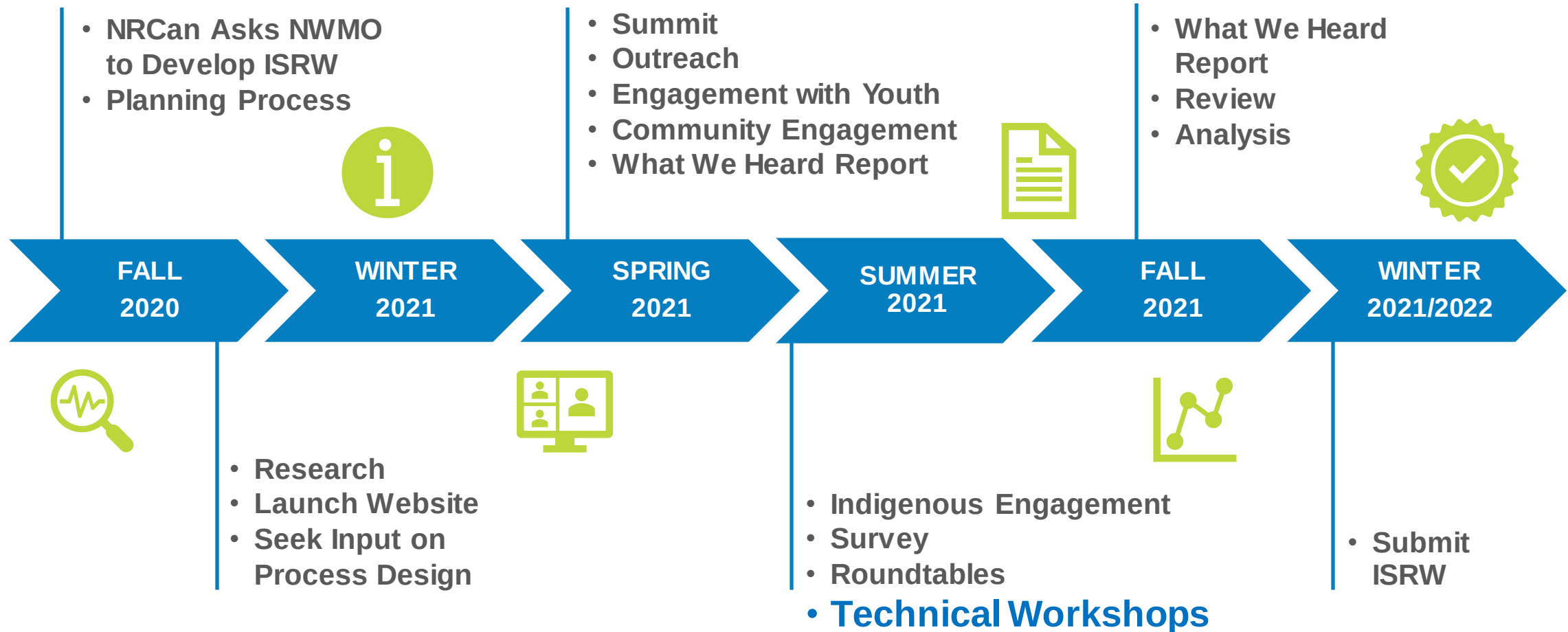


Engaging on Options to Address the Gaps



Making Recommendations for Long-Term Management Solutions

TIMELINE



ENGAGEMENT FOCUS

Principles	Trade-offs	Responsibility for Implementation	Technical
• Indigenous Engagement • Community Engagement • Summit • Survey	• Indigenous Engagement • Community Engagement • Roundtables • Survey	• Indigenous Engagement • Community Engagement • Roundtables	• Technical Workshops

A Cost Report is being prepared and will be available on the ISRW website www.radwasteplanning.ca



Safety as overarching principle



*Informed by the
best available knowledge*

Environment is protected



Security must be ensured

GUIDING PRINCIPLES



*Respect Indigenous rights
and treaties*



*Be transparent and inform and
engage the public*



*Make use of
existing projects*



Fiscally responsible



*Meets or exceeds
regulatory requirements*

GUIDING PRINCIPLES – FULL TEXT

1. 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.
2. The Strategy must **ensure the security of facilities, materials, infrastructure and information**.
3. The Strategy must ensure that the **environment** is protected, including the protection of the air, water, soil, wildlife and habitat.
4. 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.
5. 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.
6. The Strategy must **respect Indigenous rights and Treaties** and consider that there may be unresolved claims between Indigenous peoples and the Crown.
7. 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.
8. 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.
9. Where possible, the Strategy should **make use of existing projects** for the long-term management of Canada's nuclear waste.

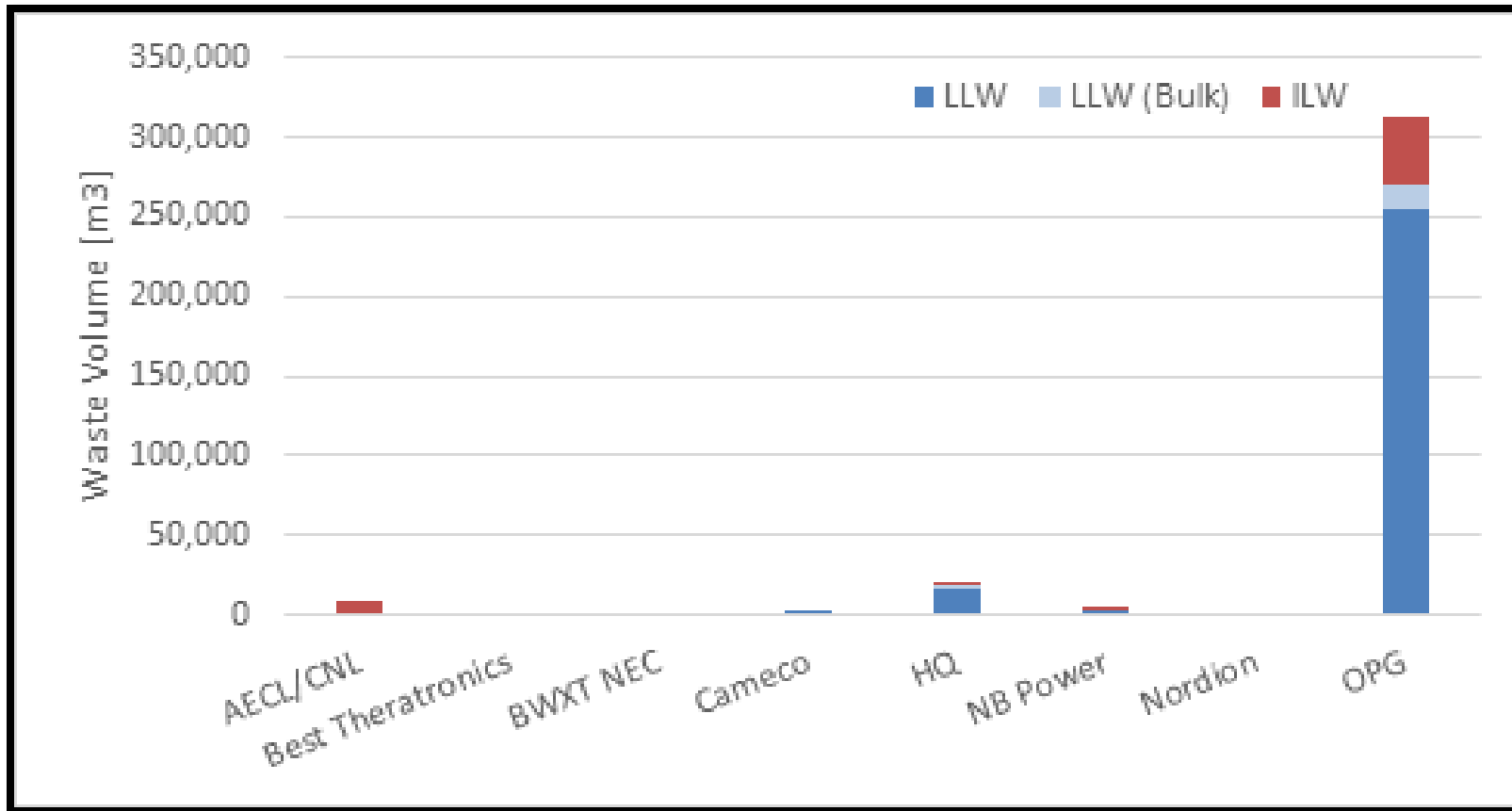


FOCUS TODAY:

LOW LEVEL WASTE

Uranium Mine & Mill Waste	Low Level Waste	Intermediate Level Waste	High Level Waste
Tailings and waste rock generated by the mining and milling of uranium ore	Mop heads, rags and paper towels. Medical Isotopes	Filters, resins and used reactor components Medical / Industrial Sources	Primarily used nuclear fuel
No Heat Generated	No Heat Generated	No or Little Heat Generated	Significant Heat Generated
Long-lived radioactivity does not decrease significantly over extended time periods	Isolation and containment up to a few hundred years (less than 300 years)	isolation and containment for periods greater than several hundred years	Isolation and containment Hundreds of thousands of years
Near Surface Repository	Near Surface Repository	Deep Geological Repository (DGR)	Deep Geological Repository (DGR)
Only practical option for these wastes, given the large volumes of waste generated	More radioactive than clearance levels & exemption quantities	Generally requires a higher level of containment and isolation than can be provided in near surface repositories.	Significant quantities of long-lived radionuclides necessitating long-term isolation

LLW Volumes- No Long-Term Plans



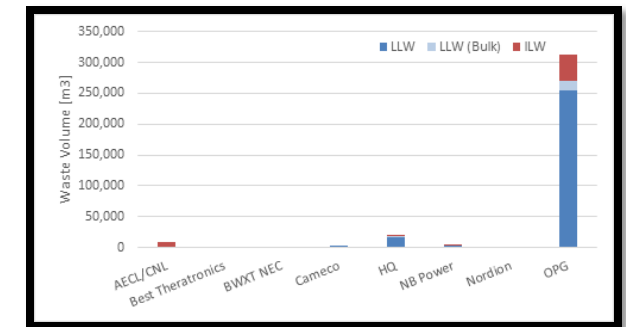
Reference: Report on Technical
Options Figure 3.2

**Canadian I & LLW with no current long-term management plans
(current and anticipated)**

LLW Volumes- No Long-Term Plans

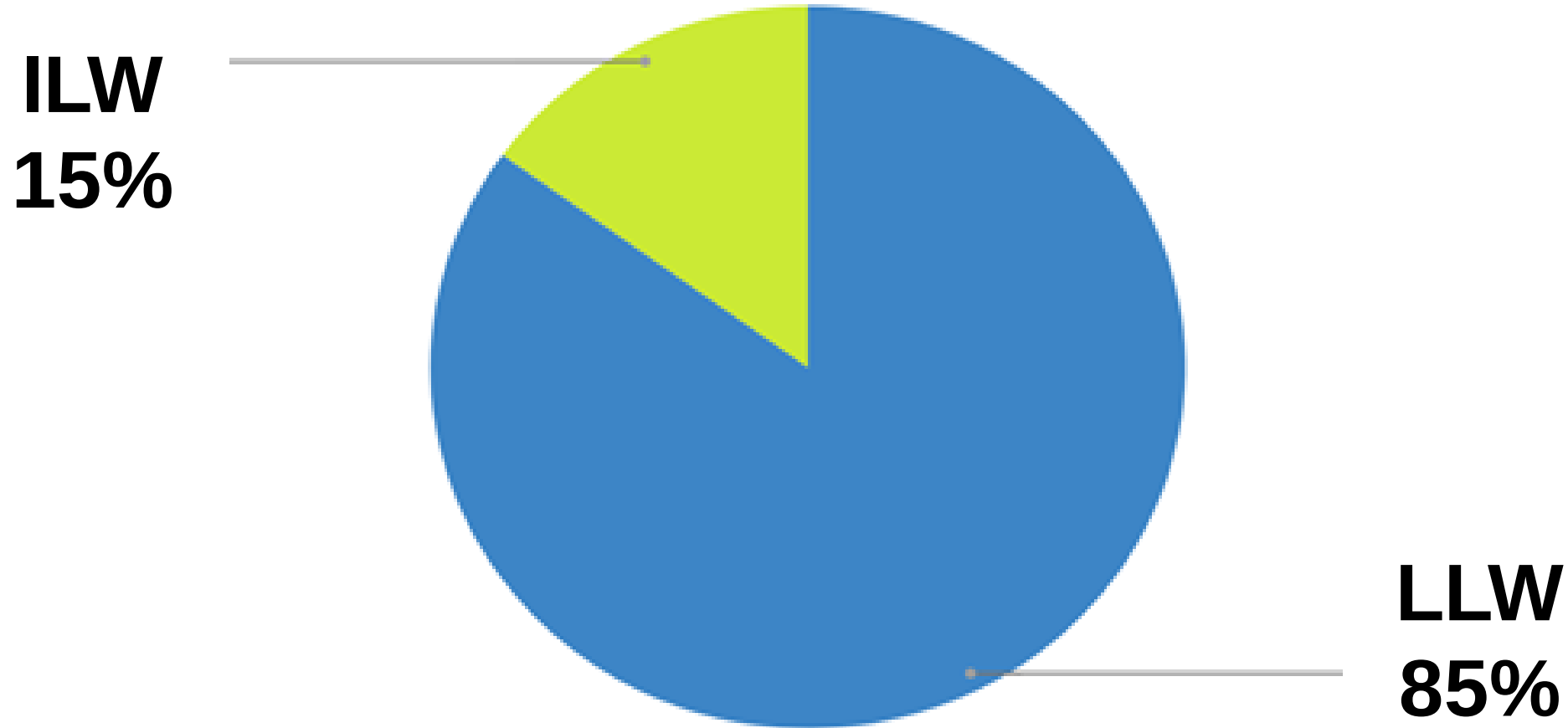
Waste Owners	LLW Volume m ³	Percentage of Total LLW
OPG	270,000	91.83%
Hydro Québec	18,000	6.12%
NB Power	2,270	0.77%
Cameco	2,000	0.68%
Other	1,740	0.59%

Canadian LLW with no current long-term management plans
(current and anticipated)



Reference: Report on
Technical Options Figure 3.2

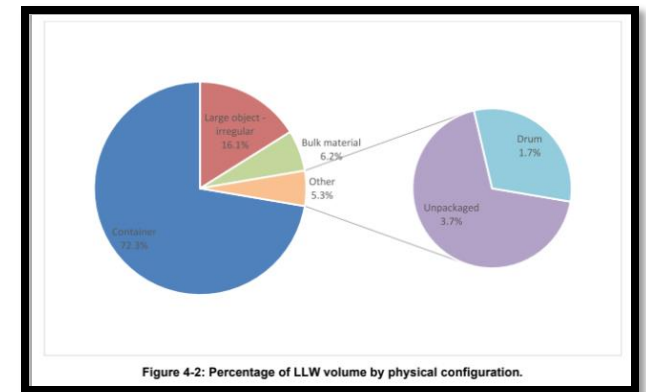
L&ILW With No Current Long-Term Plans



Reference: Technical Options Report Figure 4.1:
Lifecycle L&ILW with No Current Long-Term Management Plans Organized by Radioactive Classification

% LLW Volume by Physical Configuration

Characteristic	Percentage of Total LLW Waste
Container	72.3 %
Large Object Irregular	16.1 %
Bulk Material	6.2 %
Unpackaged	3.7 %
Drum	1.7 %



Reference: Report on
Technical Options Figure 4-
2 Page 18



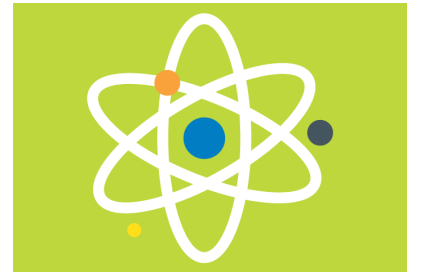
Q&A



TECHNICAL ASSESSMENT

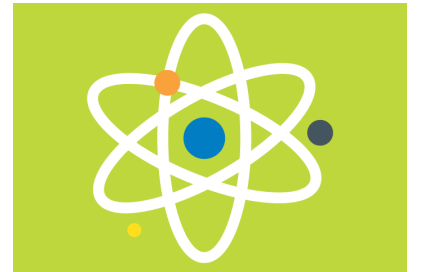
Assumptions – Technical Options Report

1. All liquid waste assumed to be solidified.
2. Unless quantified by the waste owner, additional decontamination and volume reduction practices were not assumed in this study.
3. Projected operational waste assumed to be packaged in same physical configuration as existing waste of same source.
4. All long-term management options can accept nuclear waste with non-nuclear hazardous properties
5. Waste owner inventory volumes have been rounded, given the level of uncertainty present at this time.



Potential Technical Options Considered

1. Engineered Containment Mound
2. Concrete Vault
3. Shallow Rock Cavern
4. Deep Geological Repository
5. Deep Borehole
6. Rolling Stewardship



MATRIX OF APPLICABILITY

Y

APPLICABLE and RECOMMENDED for the allocated waste group.

Y2

MAY BE APPLICABLE to the waste group but is NOT PREFERRED or requires further study.

Y3

CONCEPTUALLY FEASIBLE but, after considering risk factors, is IMPRACTICAL.

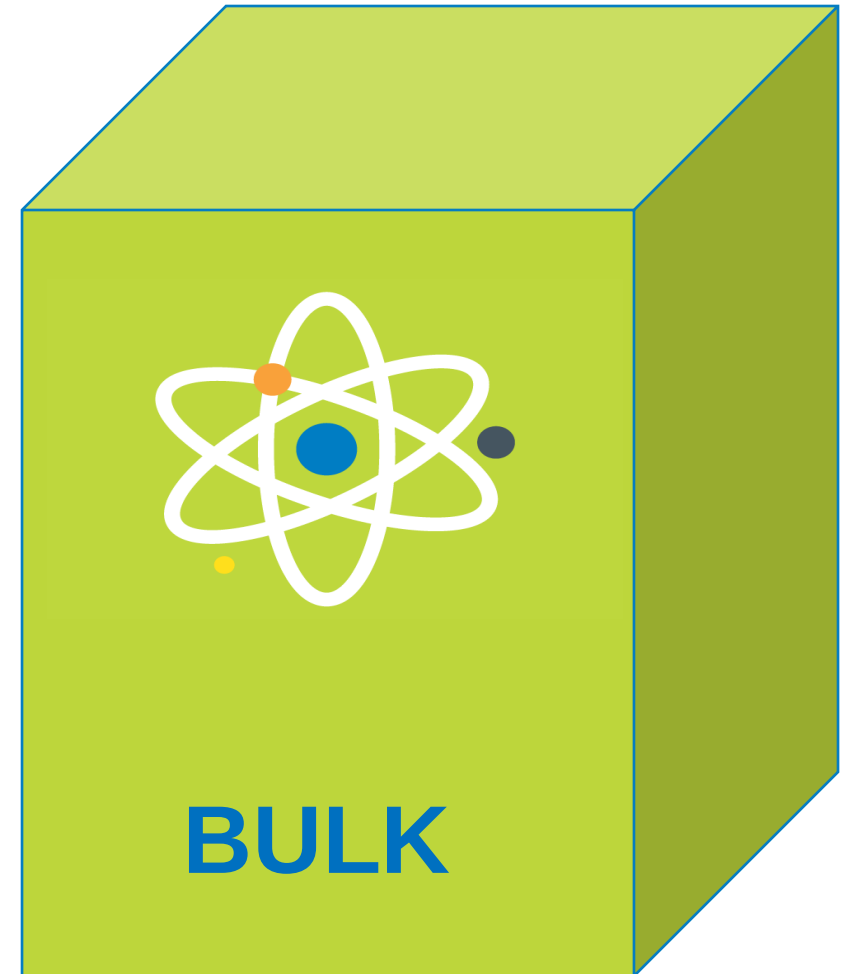
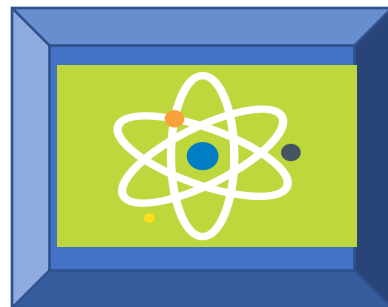
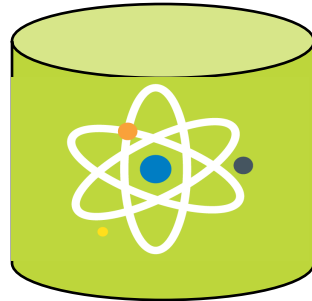
N

NOT SUITABLE for the allocated waste group.



LLW Grouping

1. LLW Bulk Material
2. LLW Other



REPOSITORY TYPE	LLW BULK MATERIAL	LLW OTHER
Engineered Containment Mound	Y	Y2
Concrete Vault	Y2	Y
Shallow Rock Cavern	Y2	Y
Deep Geological Repository	Y3	Y2
Deep Borehole	N	N
Rolling Stewardship	Y3	Y3



REPOSITORY TYPE	LLW BULK MATERIAL	LLW OTHER
Engineered Containment Mound	Y	Y2
Concrete Vault	Y2	Y
Shallow Rock Cavern	Y2	Y
Deep Geological Repository	Y3	Y2
Deep Borehole	N	N
Rolling Stewardship	Y3	Y3

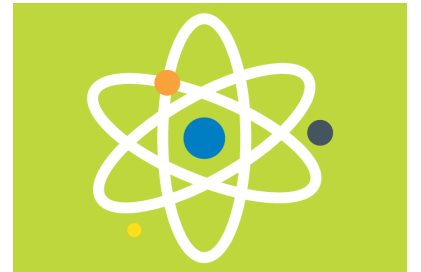


REPOSITORY TYPE	LLW BULK MATERIAL	LLW OTHER
Engineered Containment Mound	Y	Y2
Concrete Vault	Y2	Y
Shallow Rock Cavern	Y2	Y
Deep Geological Repository	Y3	Y2
Deep Borehole	N	N
Rolling Stewardship	Y3	Y3



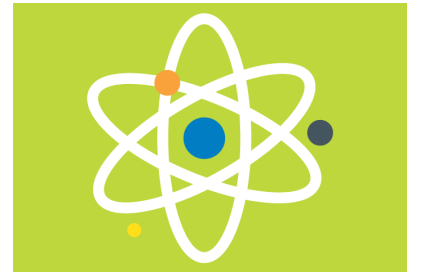
LLW Technical Options – Ranked Order

1. Engineered Containment Mound
2. Concrete Vault (tied with Shallow Rock Cavern)
3. Shallow Rock Cavern (tied with Concrete Vault)
4. Deep Geological Repository
5. Rolling Stewardship (not a disposal option)



OBJECTIVE

Obtain the feedback
of participants
on the order of the
recommendations





Q&A



DISCUSSION

GUIDELINES FOR PRODUCTIVE SESSION



Suspend judgment,
challenge your own
assumptions



Recognize and respect
diverse perspectives



Look for common
ground



Share the air time



Listen to understand

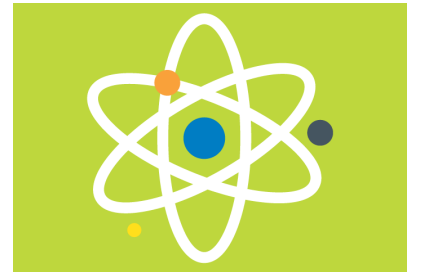
POINTS OF DISCUSSION



- With which aspects of the report do you agree?
- With which aspects of the report do you disagree?
 - Are there technical options that have been eliminated that should be brought back, and why
- What is missing from the report?
- Based on our discussion, does the Order of Recommendations still stand?

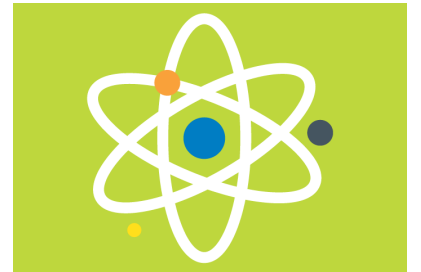
LLW – ASSUMPTIONS

- Points of Agreement & Why
- Points of Disagreement & Why
- Anything Missing from the Report
- Other



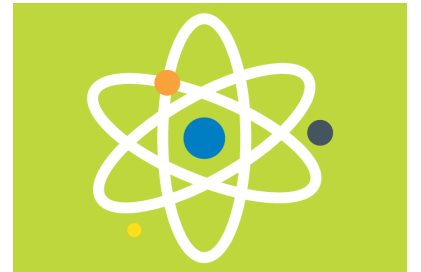
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5. Waste owner inventory volumes have been rounded, given the level of uncertainty present at this time.



LLW – RECOMMENDED OPTIONS

- Points of Agreement & Why
- Points of Disagreement & Why
- Anything Missing from the Report
- Other

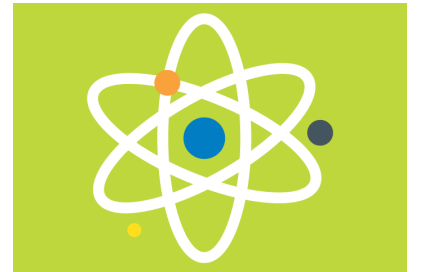


REPOSITORY TYPE	LLW BULK MATERIAL	LLW OTHER
Engineered Containment Mound	Y	Y2
Concrete Vault	Y2	Y
Shallow Rock Cavern	Y2	Y
Deep Geological Repository	Y3	Y2
Deep Borehole	N	N
Rolling Stewardship	Y3	Y3



LLW – TECHNICAL REPORT OTHER

- Points of Agreement & Why
- Points of Disagreement & Why
- Anything Missing from the Report
- Other



LLW – ORDER OF RECOMMENDATIONS

1. **Engineered Containment Mound**
2. **Concrete Vault** (tied with Shallow Rock Cavern)
3. **Shallow Rock Cavern** (tied with Concrete Vault)
4. **Deep Geological Repository**
5. **Rolling Stewardship** (not a disposal option)

Based on our discussion today,
does the order still stand?



CLOSING

GET INVOLVED



Register for updates



Make a formal submission



Learn More

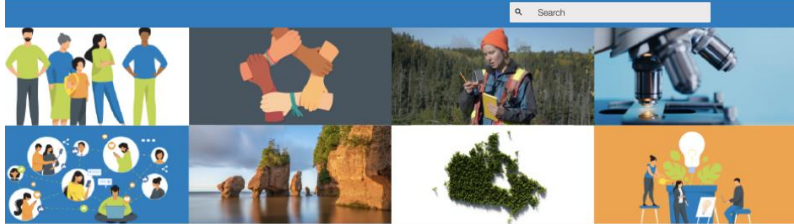


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Help us create a safe, integrated, long-term strategy for radioactive waste in Canada

Share your thoughts on the best options to ensure all of Canada's radioactive waste is managed safely, responsibly, and effectively long after we're gone

Canada is safely managing its radioactive waste today and already has several long-term plans and projects in place. However, there are some gaps in addressing certain streams, specifically low-level and intermediate-level radioactive waste, that need an integrated, long-term strategy. The Nuclear Waste Management Organization (NWMO) has been asked by the Minister of Natural Resources Canada to lead the development of this strategy by engaging with Canadians and Indigenous peoples.

We are planning a series of interactive, accessible and collaborative engagements that welcome a diversity of voices. Your thoughts and perspective play an important role in identifying the best approach to ensure all of Canada's radioactive waste is managed safely, responsibly and effectively long after we're gone.

Join us as we explore what's most important to Canadians and Indigenous peoples on this topic and help us shape Canada's strategy. [See the timeline.](#)

[Participate by completing our survey on ISRW](#)

Stay Informed

Follow us on Twitter: [@RadWastePlan](#)

[Register to receive news and invitations](#)

Current participation opportunities



Public Engagement on the Integrated Strategy for Radioactive Waste (ISRW)

Look here for information on upcoming live events as well as a record of past events



Canadian Radioactive Waste Summit

Learn more about the Canadian Radioactive Waste Summit.



Indigenous Relations

We are committed to long-lasting relationships with Indigenous peoples built upon communication, transparency, respect and reconciliation. We will engage with Indigenous peoples on the Integrated Strategy on Radioactive Waste (ISRW), and ensure all participants are provided the opportunity to provide input and advice.



What Would You Like to Discuss?

To help inform our engagement plans, please tell us what you would like to discuss



Learn More

Frequently asked questions and answers

 Nuclear Waste Management Organization

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