A NEXT STEP

Part of Canada's Radioactive Waste Review

CANADA'S INTEGRATED STRATEGY FOR RADIOACTIVE WASTE

Technical Workshop

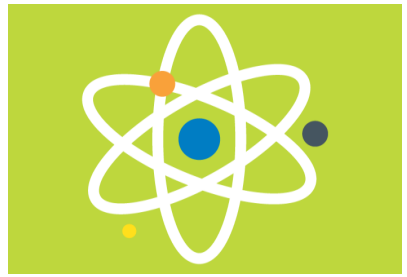
2021

WELCOME

AGENDA

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



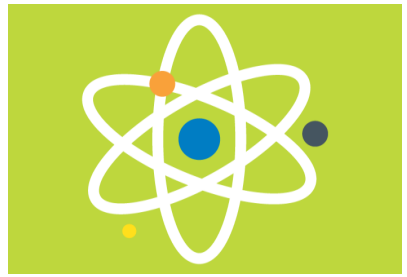


ISRW PROJECT

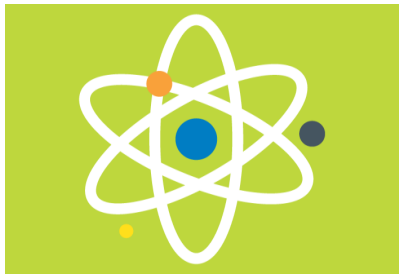
In November 2020, the Minister of Natural Resources Canada asked the NWMO to lead the development of an **integrated strategy on radioactive waste (ISRW)**

- 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

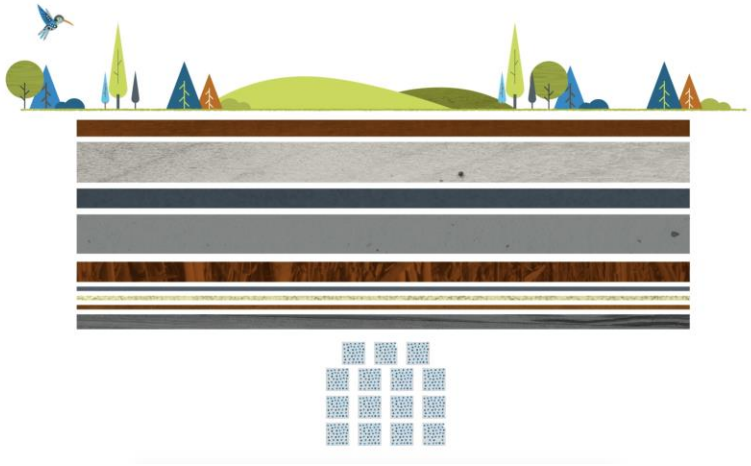
GAPS:

- 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

FALL 2020

- NRCan Asks NWMO to Develop ISRW
- Planning Process

WINTER 2021

- Research
- Launch Website
- Seek Input on Process Design

SPRING 2021

- Summit
- Outreach
- Engagement with Youth
- Community Engagement
- What We Heard Report

SUMMER 2021

- Indigenous Engagement
- Survey
- Roundtables
- **Technical Workshops**

FALL 2021

- What We Heard Report
- Review
- Analysis

WINTER 2021/2022

- Submit ISRW

ENGAGEMENT FOCUS

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

GUIDING PRINCIPLES

Safety as overarching principle

Informed by the
best available knowledge

Environment is protected

Respect Indigenous rights and treaties

Security must be **ensured**

Be **transparent** and **inform** and **engage the public**

Make use of
existing projects

Fiscally responsible

Meets or exceeds
regulatory requirements

GUIDING PRINCIPLES – FULL TEXT

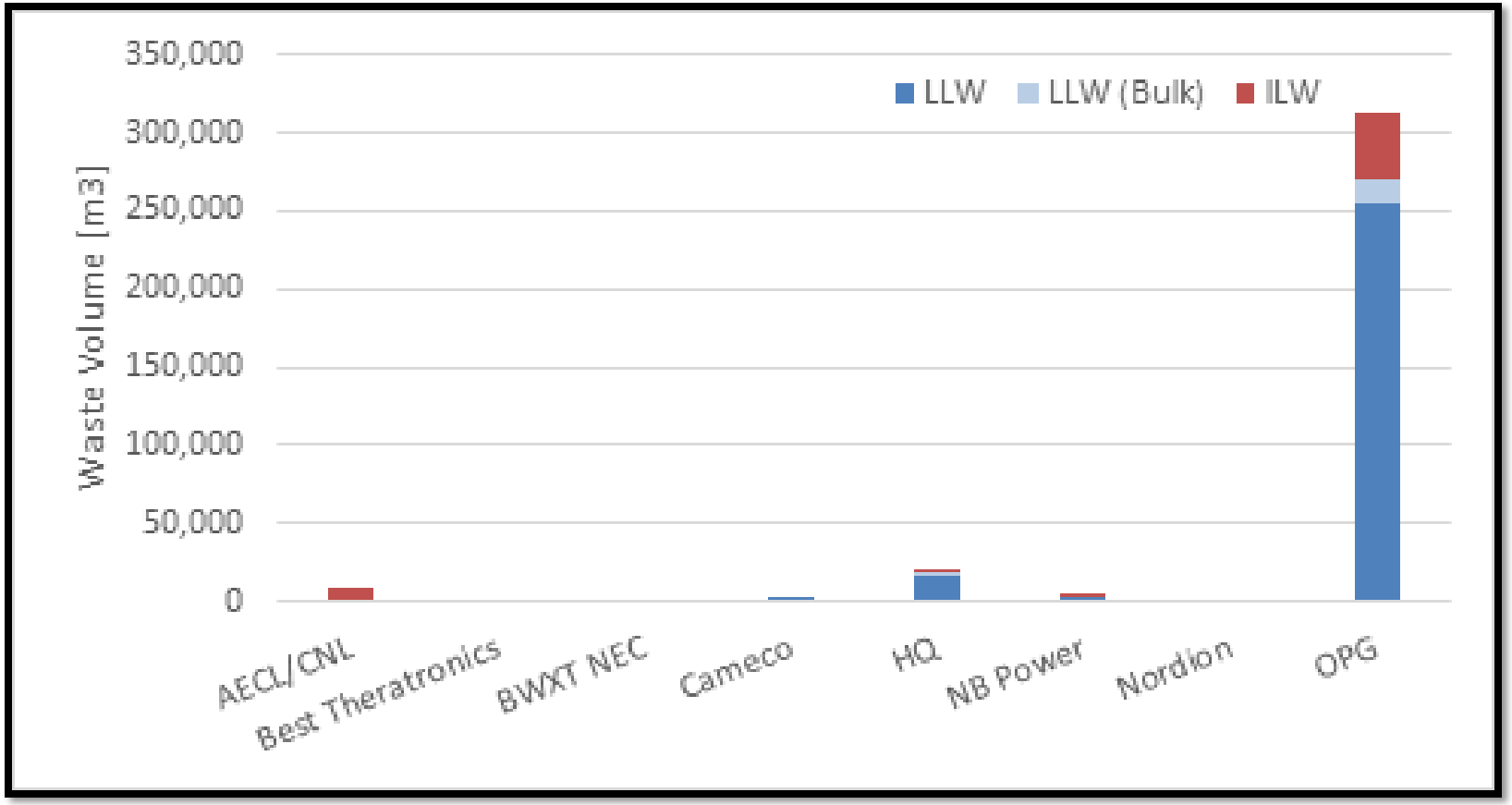
1. The Strategy must have **safety as the overarching principle** guiding its development and implementation. Safety, including the protection of **human health**, must not be compromised by other considerations.
2. The Strategy must **ensure the security of facilities, materials, infrastructure and 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 r**espect 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:

INTERMEDIATE 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

ILW Volumes- No Long-Term Plans

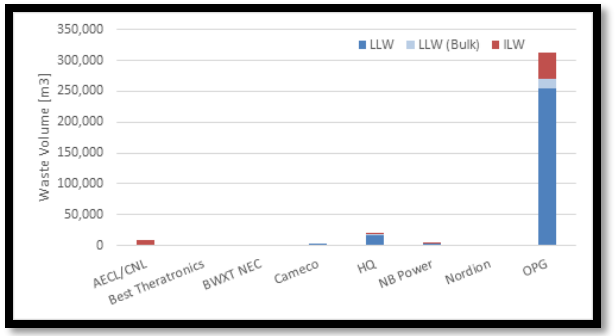


Canadian I & LLW with no current long-term management plans (current and anticipated)

Reference: Report on Technical Options Figure 3.2

ILW Volumes- No Long-Term Plans

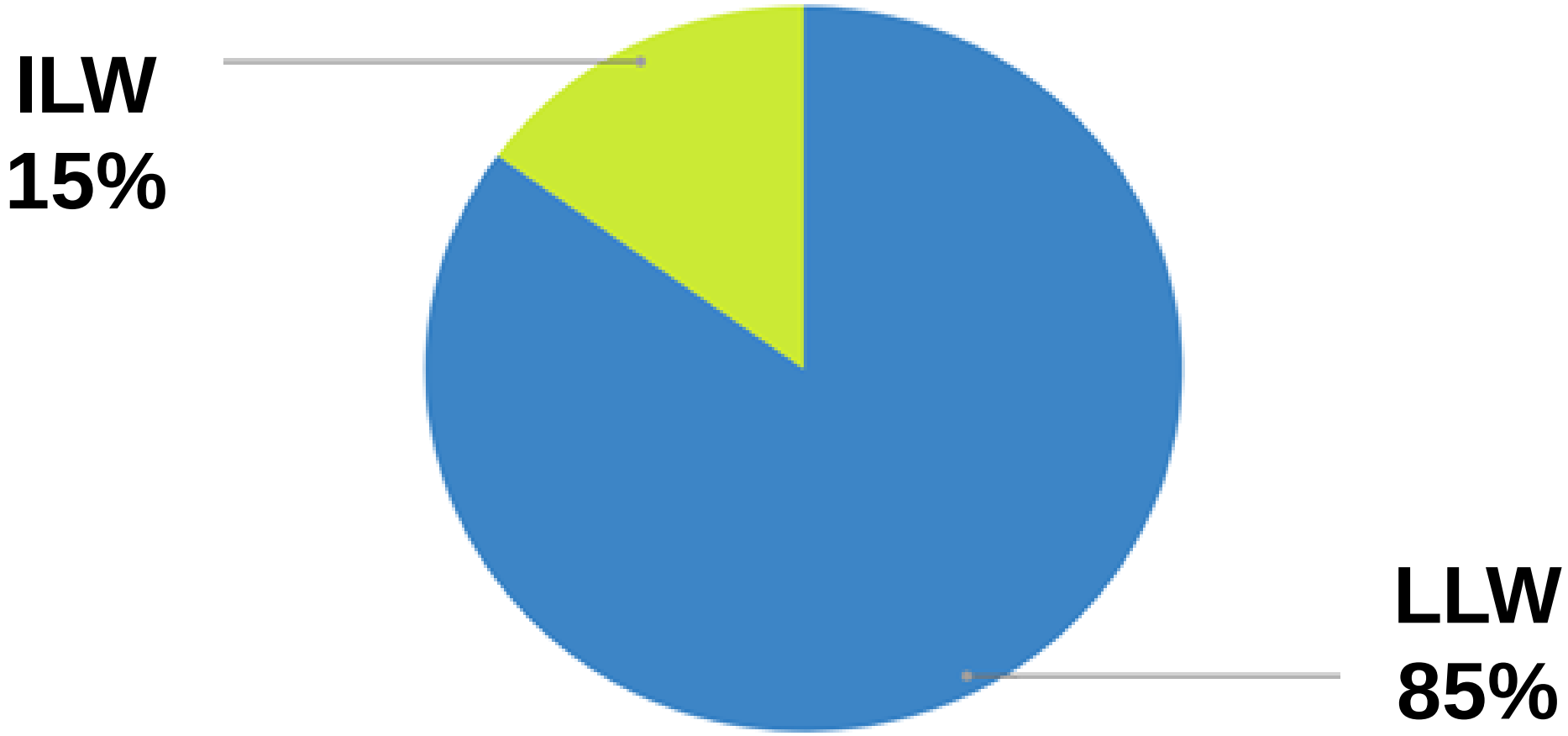
Waste Owners	ILW Volume m^3	Percentage of Total ILW
OPG	40,000	78.46 %
AECL / CNL	8,200	16.08 %
Hydro Québec	1,000	1.96 %
Other	1,000	1.96 %
NB Power	780	1.53 %



Reference: Report on Technical Options Figure 3.2

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

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

% ILW Volume by Physical Configuration

Characteristic	Percentage of Total LLW Waste
Packaged	74.7 %
Large Object Irregular	24.4 %
Unpackaged	1.1 %

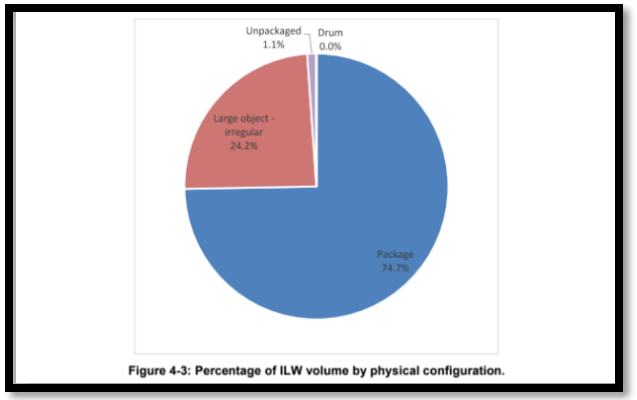


Figure 4-3: Percentage of ILW volume by physical configuration.

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

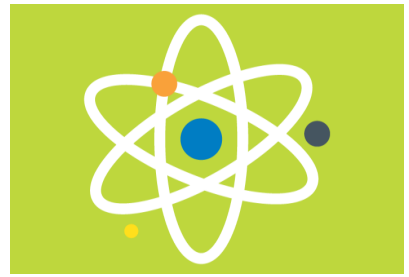
Q&A

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.

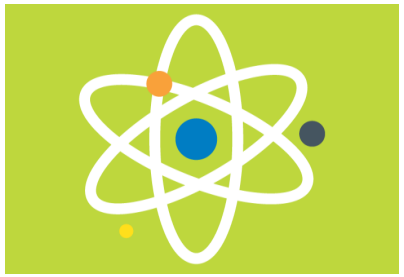




Potential Technical Options Considered

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



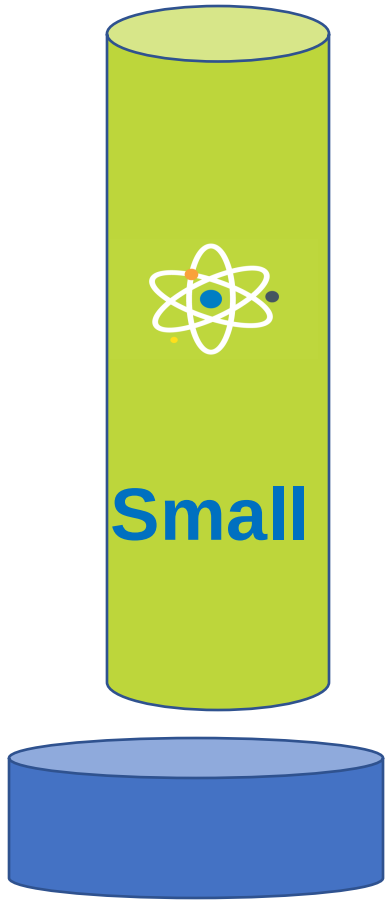


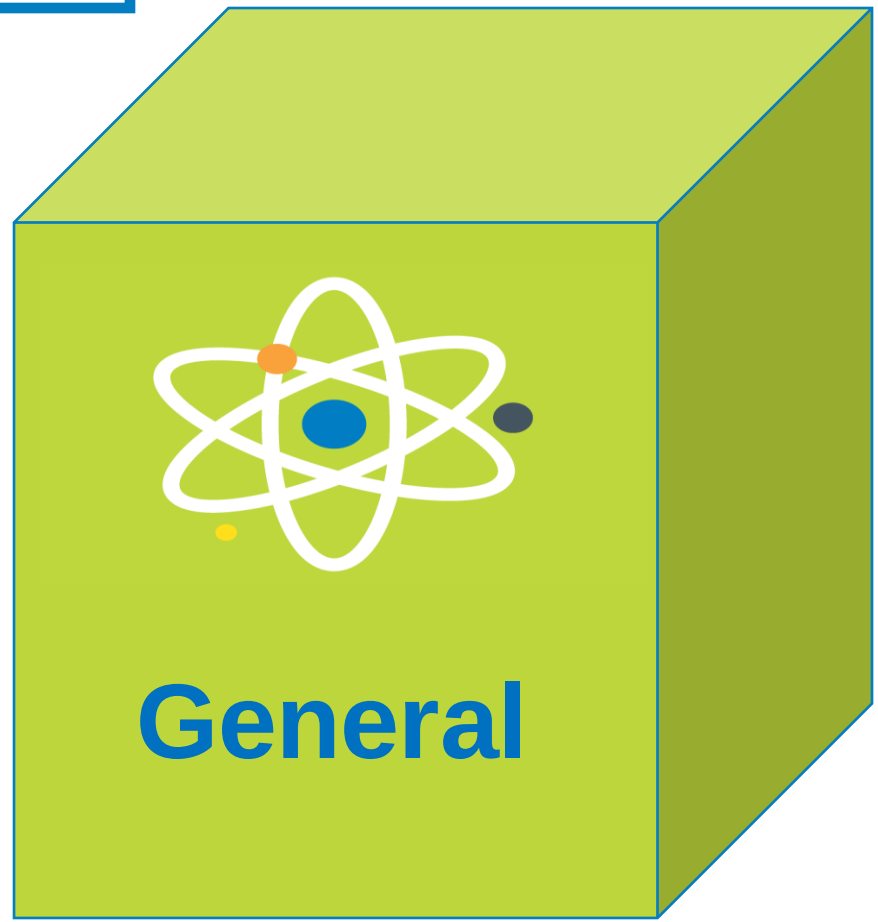
MATRIX OF APPLICABILITY

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.

ILW Grouping

1. ILW General
2. ILW Small
   - can physically fit into a 40cm wide hole





REPOSITORY TYPE	ILW GENERAL	ILW SMALL
Engineered Containment Mound	N	N
Concrete Vault	N	N
Shallow Rock Cavern	N	N
Deep Geological Repository	Y	Y
Deep Borehole	N	Y2
Rolling Stewardship	N	N

REPOSITORY TYPE	ILW GENERAL	ILW SMALL
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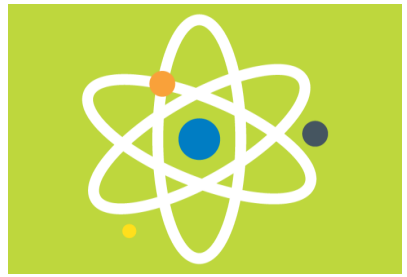
Rolling Stewardship	N	N

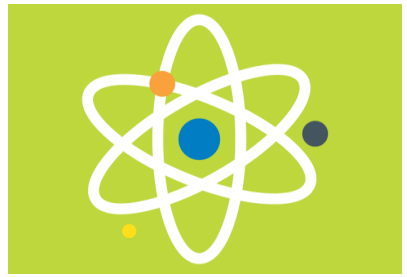
ILW Technical Options – Ranked Order

1. Deep Geological Repository
2. Deep Borehole



OBJECTIVE

Obtain the feedback of participants on the order of the recommendations



Q&A

BREAK

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

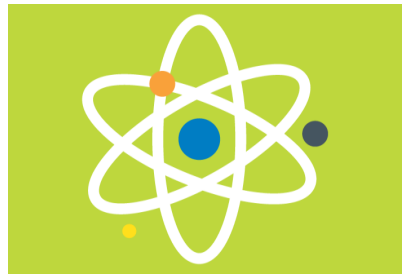
POINTS OF DISCUSSION

- 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?

ILW – ASSUMPTIONS

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





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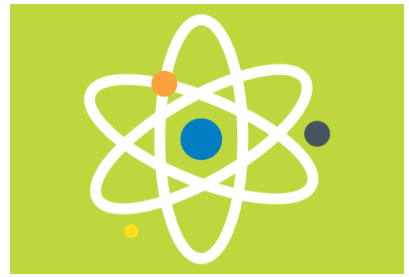
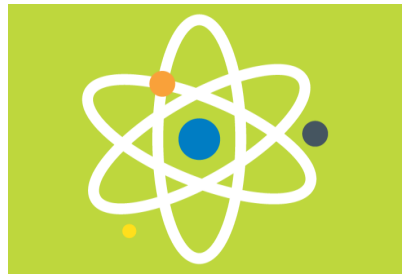


ILW – RECOMMENDED OPTIONS

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





REPOSITORY TYPE	ILW GENERAL	ILW SMALL
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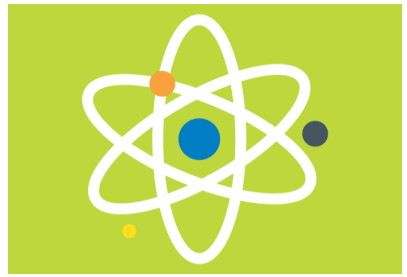
Shallow Rock Cavern	N	N
Deep Geological Repository	Y	Y
Deep Borehole	N	Y2
Rolling Stewardship	N	N

ILW – TECHNICAL REPORT OTHER

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





ILW – ORDER OF RECOMMENDATIONS

1. Deep Geological Repository
2. Deep Borehole

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

CLOSING

GET INVOLVED

Register for updates

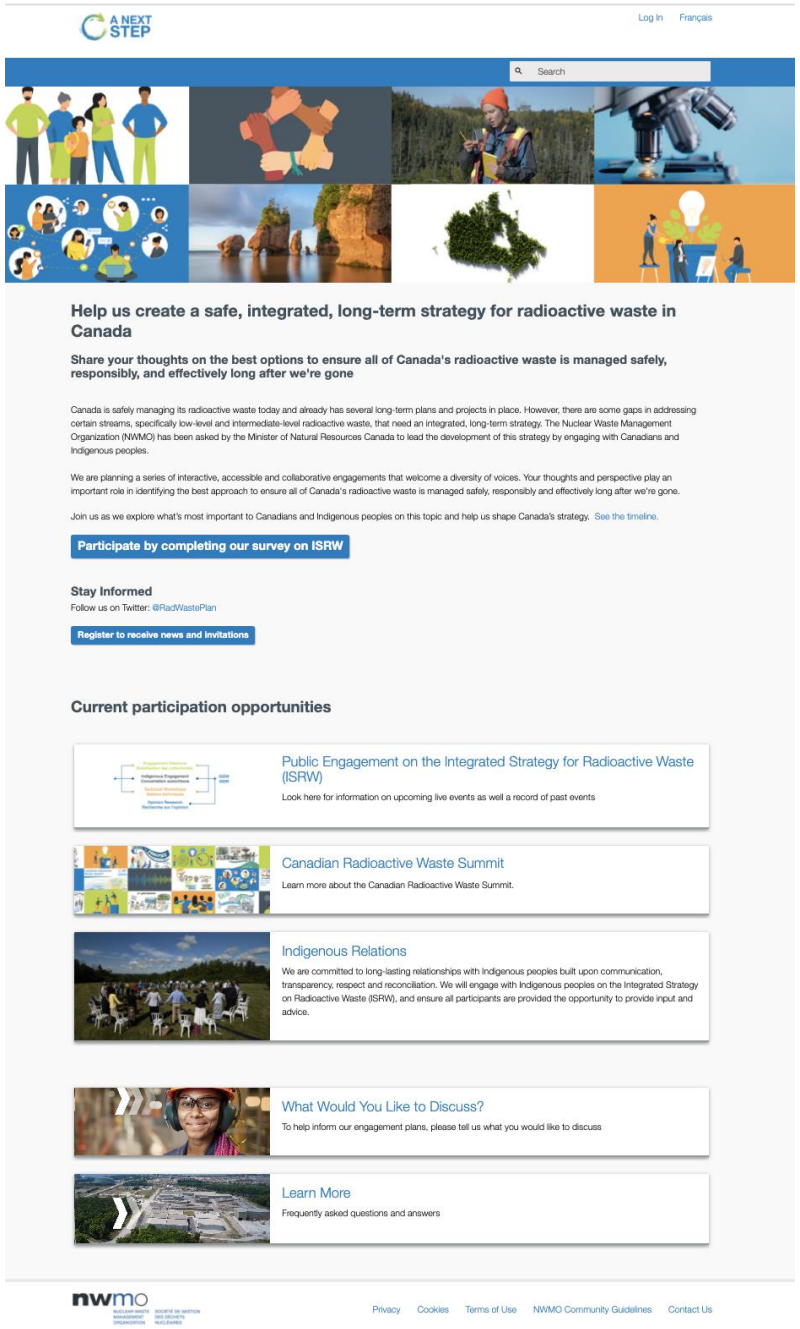
Make a formal submission

Learn More

FAQ

Take our Survey

www.radwasteplanning.ca



THANK YOU

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