



Proposed Process for Selecting a Site



NWMO Multi-party Dialogues

nwmo

NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES

Agenda

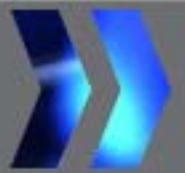


- » Introduce the Nuclear Waste Management Organization (NWMO), the national dialogue and Final Study
- » Adaptive Phased Management
- » Timelines for implementing Adaptive Phased Management
- » Review NWMO engagement activities in 2009
- » Review key input from 2008 Fall Dialogues
- » Describe the proposed site selection process



The Nuclear Waste Management Organization **NWMO**

What is the Nuclear Waste Management Organization (NWMO)



» **Mission Statement**

The purpose of the NWMO is to develop and implement collaboratively with Canadians a management approach for the long-term care of Canada's used nuclear fuel that is socially acceptable, technically sound, environmentally responsible and economically feasible

The Nuclear Waste Management Organization (NWMO) - Overview



- » The Nuclear Waste Management Organization (NWMO) is working on behalf of Canadians, under a federal mandate, to protect the interests of future generations through the safe and secure, long-term management of Canada's used nuclear fuel.
- » Today, Canada's 2 million used fuel bundles are safely stored, on an interim basis, at nuclear reactor sites.
- » Canadians have clearly expressed that we, as a society, have an obligation to take action now and use international best practices.

- » NWMO is a not-for-profit organization, federally registered
- » Funded by waste owners (OPG, NBP, HQ, AECL)
 - ◆ Federal government approved funding formula for cost-sharing
 - ◆ Trust funds in place
- » Nine-member Board of Directors
 - ◆ Seven appointed by Ontario Power Generation (OPG)
 - ◆ One each for Hydro-Québec (HQ) and NB Power (NBP)
- » Advisory Council chaired by Hon. David Crombie
- » NWMO staff: 100 employees and growing to approx. 200

Extensive Study of Options (2002-2005)

- » *Nuclear Fuel Waste Act (NFWA)* required NWMO to engage Canadians in review of different approaches for managing used fuel

- » NWMO study process engaged nation-wide:
 - ◆ 18,000 Canadians contributed to 3-year study between 2002-2005
 - ◆ 120 information & discussion sessions – every province and territory
 - ◆ 2500 Aboriginal people participated in dialogues

- » What Canadians told us:
 - ◆ **Safety and security** is top priority
 - ◆ This generation must **take action now**: we owe it to future generations
 - ◆ Approach must be **adaptable**: allow improvements based on new knowledge or societal priorities



Adaptive Phased Management

Adaptive Phased Management: Canada's Plan for the Long-Term Management of Used Nuclear Fuel

Plan proposed by NWMO and approved by Federal government June 2007

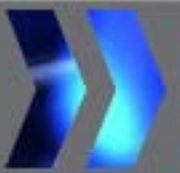
A Technical Method

- » Centralized containment and isolation of used nuclear fuel in deep geological repository
- » Continuous monitoring
- » Potential for retrievability
- » Optional step of shallow underground storage

A Management System

- » Flexibility in pace and manner of implementation
- » Phased and adaptive decision-making
- » Responsive to advances in technology, research, Aboriginal Traditional Knowledge, societal values
- » Open, inclusive, fair siting process - seek informed, willing host community
- » Public engagement and site selection focused in 4 nuclear provinces (NB, ON, QC, SK)

Why Adaptive Phased Management?

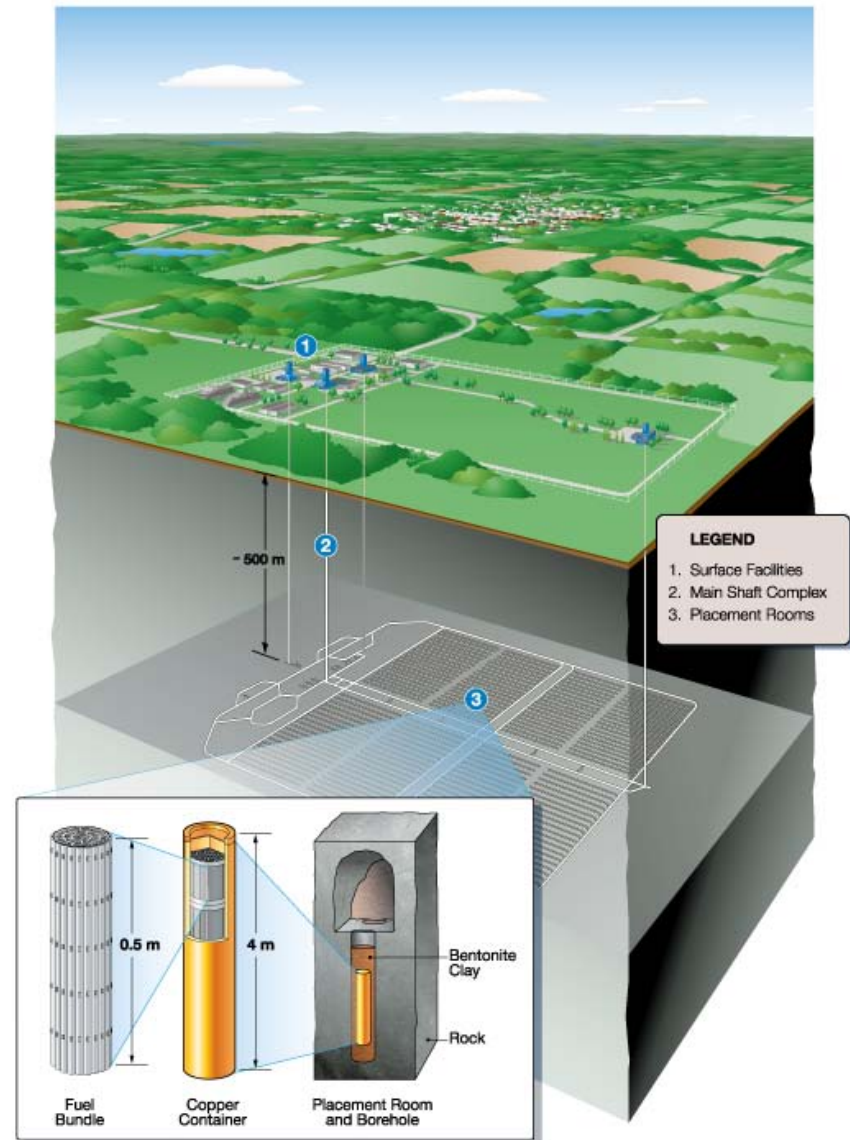


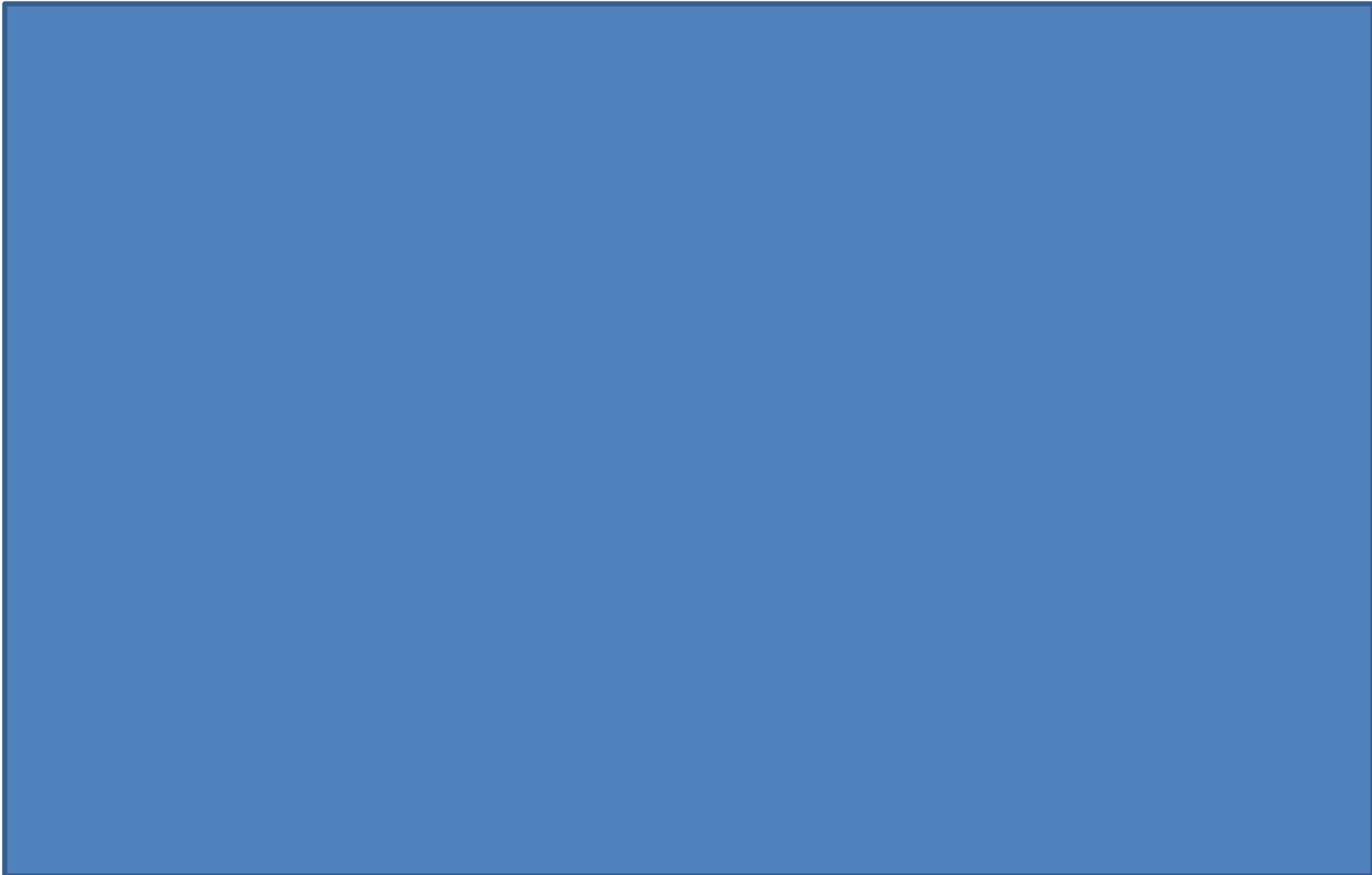
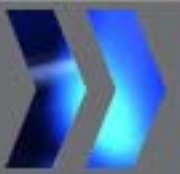
Adaptive Phased Management best meets the values and objectives which Canadians said were important:

- It commits this generation of Canadians to take the first steps now to manage the used nuclear fuel we have created
- It will meet rigorous safety and security standards
- It allows flexibility to adapt to experience and societal change
- It provides genuine choice by providing for capacity to be transferred from one generation to the next
- It promotes continuous learning
- It provides a viable, safe and secure long-term storage capability, with the potential for retrievability of used fuel
- It is rooted in values and ethics, and it engages citizens throughout implementation

Project Description

- » High technology, national infrastructure project
 - Investment of \$16-24 billion
 - Will be operated as centre of expertise, comprising technical and social research and technology demonstration program
 - Will provide skilled employment for thousands over many decades
- » Highly regulated – strict scientific and technical criteria ensure safety
- » Long-term partnership between NWMO and community
- » Ensure community well-being





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Current Used Fuel Storage Locations



1. Whiteshell Laboratories
2. Bruce - A and B Nuclear Generating Stations
3. Pickering - A and B Nuclear Generating Stations
4. Darlington - A and B Nuclear Generating Stations
5. Chalk River Laboratories
6. Gentilly - 1 and 2 Nuclear Generating Stations
7. Point Lepreau - Nuclear Generating Station

Transportation



- » The project requires transportation of used nuclear fuel from where it is currently stored at reactor sites to the deep geological repository
- » Transportation of nuclear waste is stringently regulated by Transport Canada and the Canadian Nuclear Safety Commission (CNSC)
- » While used nuclear fuel has not been transported widely in Canada, government, regulators and commercial organizations around the world have extensive experience transporting radioactive and nuclear materials, and regulating it for safety and security
- » It has been estimated by the International Atomic Energy Agency that about 20 million shipments of radioactive material are made every year throughout the world
- » Transportation containers are built to withstand a wide variety of 'what-if' scenarios without breach of containment or increase in radiation level



What is Happening in Other Countries?

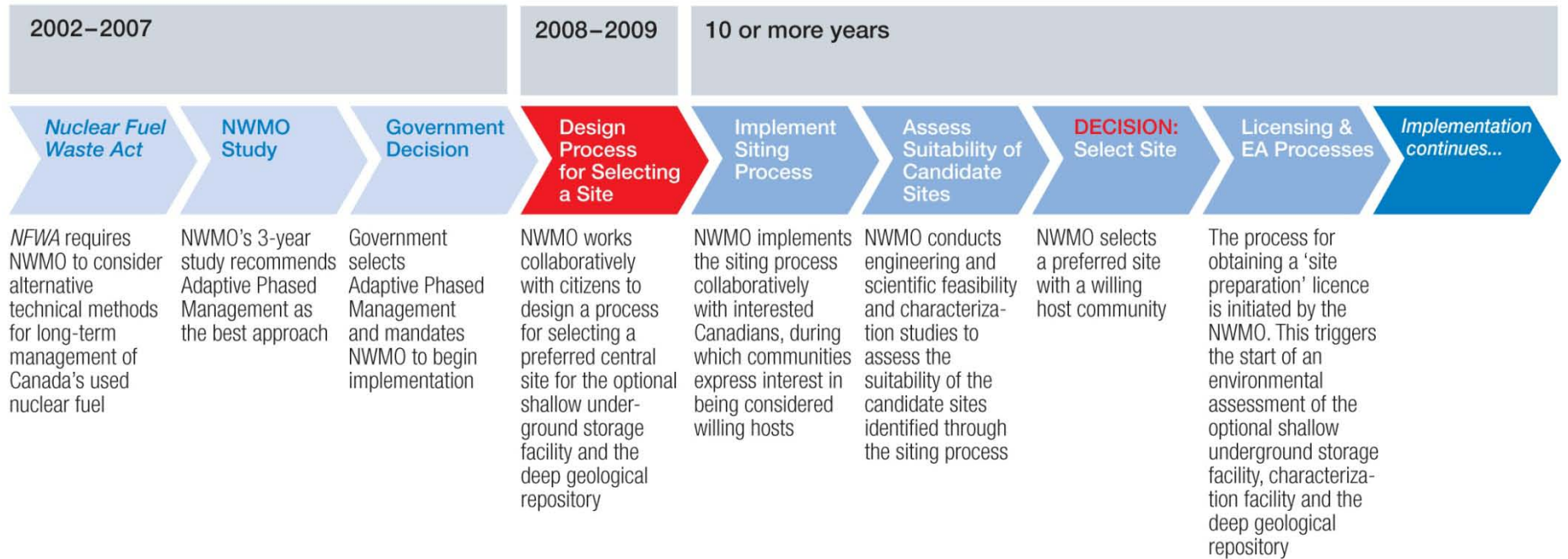


Country	National Plan for High-Level Waste	Repository Target in Service Date
Finland	Geological Repository	2020: Willing host community selected
Sweden	Geological Repository	2020: Willing host community selected
USA	Geological Repository	2021?? - Review panel being formed
France	Geological Repository	2025
Germany	Geological Repository	2030
Japan	Geological Repository	2030
Switzerland	Geological Repository	2040
UK	Geological Repository	Siting started
Canada	Geological Repository	2035 earliest
Belgium	No decision	R&D
Spain	No decision	R&D



Implementation Timelines

Implementation Timelines



Collaborative Design of Process for Site Selection

2008

- Dialogue about principles & key elements for a site selection process

May 2009

- Took input and developed and published Proposed Process for Selecting a Site

Now

- Seeking comments on the proposed process

Late 2009

- Refine Site Selection Process in light of comments received

Post 2009

- Siting process is initiated





2009

Engagement Activities



Regional Public Information Sessions

(May-November 2009)

- Open-house information sessions
- Open to public, advertised, media briefed in advance
- Regionally based, in major population centres in nuclear provinces

Citizen Dialogues

(September-October 2009)

- Facilitated sessions
- Citizens from different regions randomly recruited through research techniques
- A complement to Regional Public Information Sessions, to understand citizen views

Aboriginal Dialogues

(May-October 2009)

- Regional dialogues coordinated and delivered with provincial organizations
- To engage leadership, Elders, youth, women, broad community
- Facilitated dialogues with community/regional representatives

Multi-Party Dialogues

(September-October 2009)

- Evening and full day, by-invitation roundtables, to hear diverse perspectives and experiences
- Re-engage invited participants (100+) from 2008 dialogues
- Invite multiple perspectives – community groups, municipal associations, Aboriginal groups, NGOs, researchers, industry
- Workshop format: plenary and break-out groups

» **Discussion to-date generally focused on:**

- ◆ questions, clarifications on used nuclear fuel, NWMO, APM
- ◆ interest in, and further definition of, the project description
- ◆ some suggestions for very minor refinements to siting proposal
- ◆ ideas for launch activities as siting process is implemented

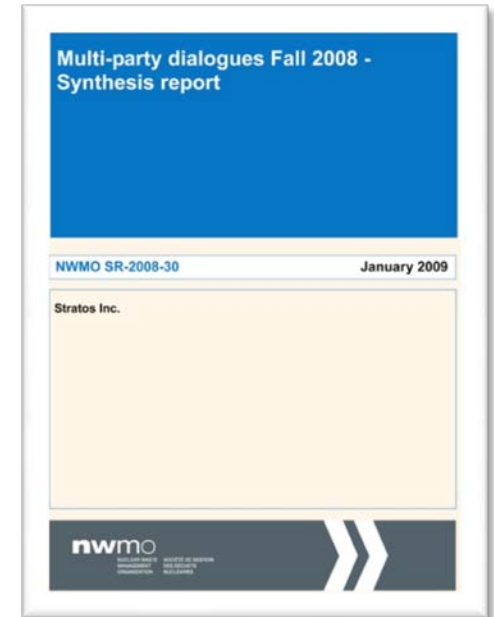


Direction from 2008 Fall Dialogues



Participants said the siting process must:

- » be based on sound technical analysis to ensure safety
- » Include a preliminary feasibility assessment / pre-screening
- » address transportation considerations
- » have communities volunteer to become a host
- » include public awareness building, education and engagement activities
- » involve Aboriginal peoples
- » incorporate Traditional Knowledge and approaches
- » involve communities beyond the immediate host (adjacent region, province, transportation communities)
- » provide appropriate funding and experts to communities
- » encourage communities to engage in long-term visioning for sustainability
- » provide economic benefits in ethical manner
- » involve third party entities to add objectivity
- » include clear project description





Participants identified a range of activities and steps for the siting process

Suggested Steps and Activities in the Siting Process

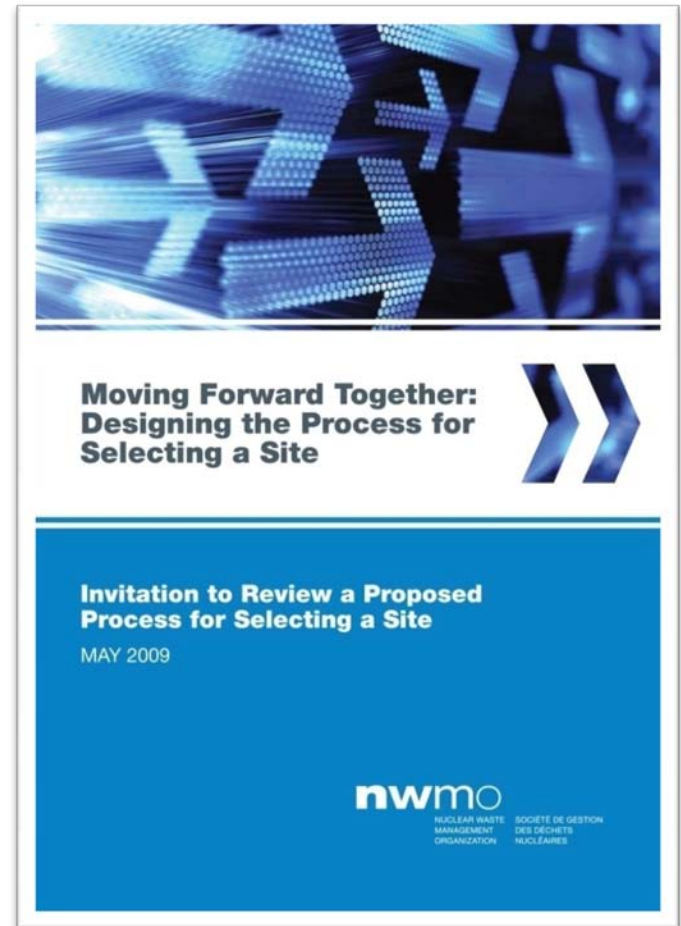
1. Public awareness/public education
2. Call for expressions of interest
3. Provision of information, tools, and resources
4. Communities to self identify through expression of interest
5. Statement of willingness by communities
6. Full technical assessment for willing community/ies
7. Regulatory process



Proposed Site Selection Process

What Does the Document Cover?

- » The Project
 - Description
 - Information that communities need to know
- » The proposed decision-making steps and process
- » Criteria
- » The way in which a partnership approach will be built and support for the community provided
- » Role of independent third-party review; regulatory review



Key Principles that Guide the Process

- » **Safety**
- » **Informed, willing** community; focus on 4 nuclear provinces
- » Communities **choose to participate**
- » **Right to withdraw**
- » **Respect Aboriginal rights and treaties**; will take into account that there may be unresolved claims between Aboriginal peoples and the Crown
- » **Inclusiveness** of the views of others, including those along possible transportation routes
- » **Partnership-based** approach
- » Foster long-term community **well-being** in the host community
- » **Shared decision-making** with potential host community

What is the Proposed Process?

Step 1

Becoming
aware &
informed

Steps 2, 3 & 4

Assessing interest &
suitability

- Community visioning
- Screening
- Feasibility
- Detailed assessment
- Regional study & involvement

Step 5

Community
assesses &
demonstrates
willingness

Steps 6 & 7

Preferred site identified

- Collaborative agreement established
- Centre of expertise established & construction of underground demonstration facility

Step 8

Regulatory review
& approvals

- Site is selected

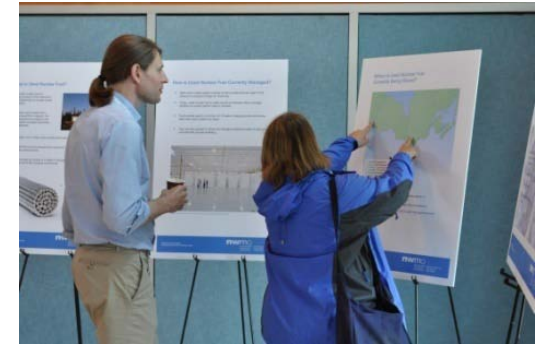
Step 9

Construction
begins...

Key Definitions

How do we define *Interested Community*?

- » Defined as a political entity interested in the siting process
 - such as a city, town, village, municipality, region or other municipal structures, or a combination of these
- » Includes Aboriginal governments
- » For Crown land and unorganized territory, the provincial government would be considered as an “interested community” in consultation with potentially affected Aboriginal peoples



Who can express *willingness*?

- » In initial steps, accountable political authority expresses interest on behalf of the community
- » Ultimately, a compelling demonstration of willingness is required, including residents



Community Well-being

- » Beyond ensuring safety, the NWMO's commitment to any host community is that its long-term well-being, or quality of life, will be fostered through its participation in this project.
- » Ultimately, the vision for the community, and the extent to which the project contributes to this vision in an acceptable way, is a matter for the community to discuss and assess.

A community will need both a good understanding of the project and a good sense of the long-term vision for the community to begin to assess interest in the project.

What Will the Proposed Process Achieve?



- Host community has the opportunity to learn about nuclear waste and the project
- Safe containment and isolation of used nuclear fuel, and ability to retrieve the used fuel
- Community is willing to be host
- Acceptable way of transporting used fuel to the site
- Community is supported and assisted throughout the process
- Surrounding communities, regions, transportation communities and others are involved, and have their concerns taken into account
- First Nations, Métis and Inuit are involved
- Ongoing public involvement

Proposed Site Selection Criteria

- » Ensure technical safety – to protect humans and the environment, now and in the future:
 - Progressive and thorough site evaluation process
 - Comprehensive technical site evaluation criteria

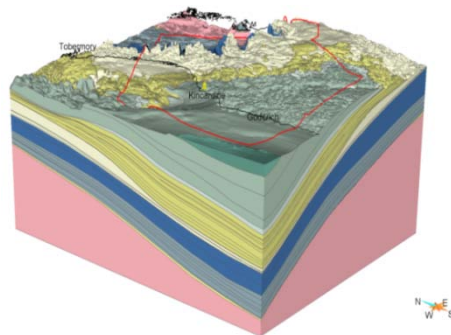
- » Beyond technical safety – to foster the well-being of the community:
 - Socio-economic criteria to assess the potential effects of the project on the community

- » Include factors identified by Traditional Knowledge



Technical Safety Evaluation Steps

- » Initial Screening (several months)
 - Assess whether the site meets a minimum set of criteria in order to enter the siting process (initial screening criteria)
 - Use of readily available information
- » Preliminary Assessment (1~2 years)
 - Assess potential suitability of the site to safely host the repository
 - Review and analyze available technical information
 - Possibility of limited field investigations



- » Detailed Site Characterization (~ 5 years)
 - Conduct detailed site investigations to confirm suitability of the site
 - Geophysical studies, boreholes drilling and testing, laboratory testing
 - Safety analysis, etc.

Proposed Initial Screening Criteria

Initial Screening Criteria:

- » Enough land to accommodate surface and underground facilities
- » Outside protected areas, heritage sites, provincial/national parks
- » Land must not contain groundwater resources at repository depth
- » Land must not contain known economically exploitable natural resources
- » Land must not be located in areas with known geological and hydrogeological features that prevent site from being safe

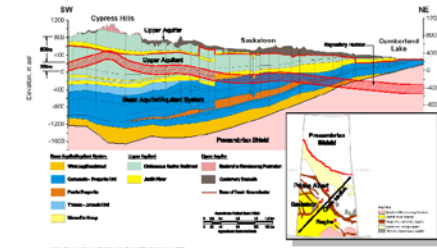
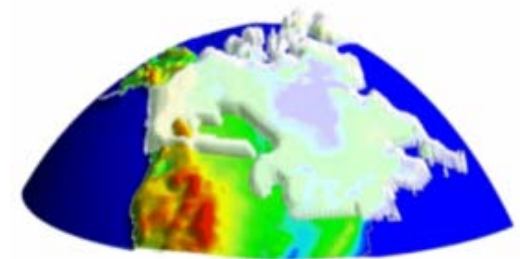
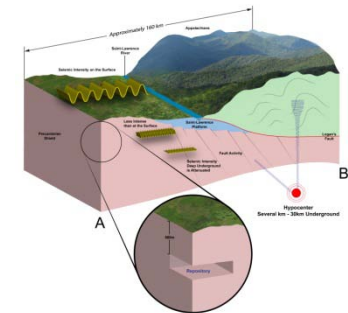
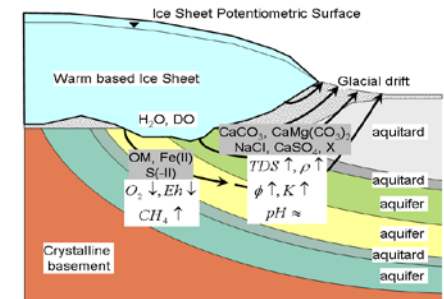


Figure 17 The Geological and Hydrogeological Stratigraphy of the Western Canada Basin, Saskatchewan showing a hypothetical "Repository Horizon"

Proposed Technical Site Evaluation Criteria

- » Containment and isolation characteristics of the host rock
 - Sufficient depth to isolate the repository from surface events
 - Low groundwater movement
 - Favourable chemical composition of the rock and water at depth
 - Favourable thermal properties
- » Long-term resilience of the site to future geological processes and climate change
 - Resilience to earthquakes and other geological processes
 - Resilience to climate change effects (e.g. glaciation)
 - Stable characteristics of the rock and groundwater



Proposed Technical Site Evaluation Criteria

- » Isolation from future human activities - prevent human intrusion
 - Avoid areas containing economically exploitable natural resources
 - Avoid areas containing exploitable groundwater resources at repository depth
- » Site amenable to characterization and data interpretation activities
 - Simple and predictable rock geometry and structure
- » Safe construction, operation and closure of the repository
 - Rock has sufficient strength to ensure stability of underground openings
 - Soil cover depth should not impact repository construction
 - Sufficient area to accommodate surface infrastructure

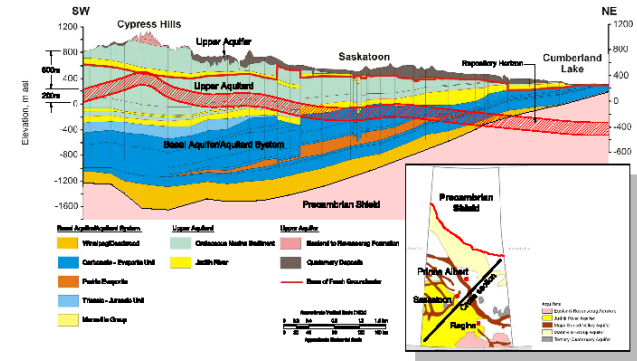


Figure 17 The Geological and Hydrogeological Stratigraphy of the Western Canada Basin, Saskatchewan showing a hypothetical "Repository Horizon"



Proposed Technical Site Evaluation Criteria

- » Safe and secure transportation routes
 - Transportation route exists or can be constructed to safely transport used nuclear fuel from storage sites to the central repository site
 - Routes allows for security and emergency response measures to be implemented



Foster the Well-Being of the Community



- » Evaluate the site against positive and negative social, economic and cultural effects on host community
- » Evaluate existing and potential physical and social infrastructure to implement the project
- » Evaluate potential to avoid ecologically sensitive areas and locally significant features
- » Evaluate potential to avoid or minimize effects of transportation



Partnership & Community Support



- » Communities choose to enter the process and proceed through steps
- » Joint development of terms & conditions of participation between community & NWMO



- » Resources provided to support decision-making
 - Conduct a community visioning exercise – identify a long-term plan for well-being and sustainability
 - Seek independent expert advice about the project and evaluation results
 - Inform residents, assess interest, demonstrate willingness



Partnership & Community Support



- » Involve surrounding communities, region and affected Aboriginal governments as early as possible
- » Involve community members as early as possible
- » The siting process will respect Aboriginal rights, support Aboriginal engagement, and include Aboriginal Traditional Knowledge shared with the NWMO
- » The NWMO will continue to foster ongoing public discussion
- » Transportation route communities invited to raise questions/concerns



Third-Party Review

- » Third-party review and advice ensures NWMO process is thorough and incorporates the best knowledge
- » Review group to review initial screening, preliminary assessment and detailed assessment of the sites
- » Review by Advisory Council to confirm adherence to site selection principles and processes
- » Followed by regulatory review to ensure safety of the proposed site and the project overall
- » NWMO provides resources to communities to seek their own expert advice

- » To help initiate discussion, the document proposes the following questions:
 1. Are the proposed siting principles (outlined on pages 16 and 17) fair and appropriate? What changes, if any, should be made?
 2. Are the proposed decision-making steps (outlined in brief on page 19) consistent with selecting a safe site and making a fair decision? What changes, if any, should be made?
 3. Does the proposed process provide for the kinds of information and tools (outlined on pages 33 to 35) that are needed to support the participation of communities that may be interested? What changes, if any, should be made?
 4. What else needs to be considered?



Questions?