



NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES

DRAFT STUDY REPORT

DIALOGUE

Nuclear Waste Management Organization

June/July 2005

NWMO Mandate

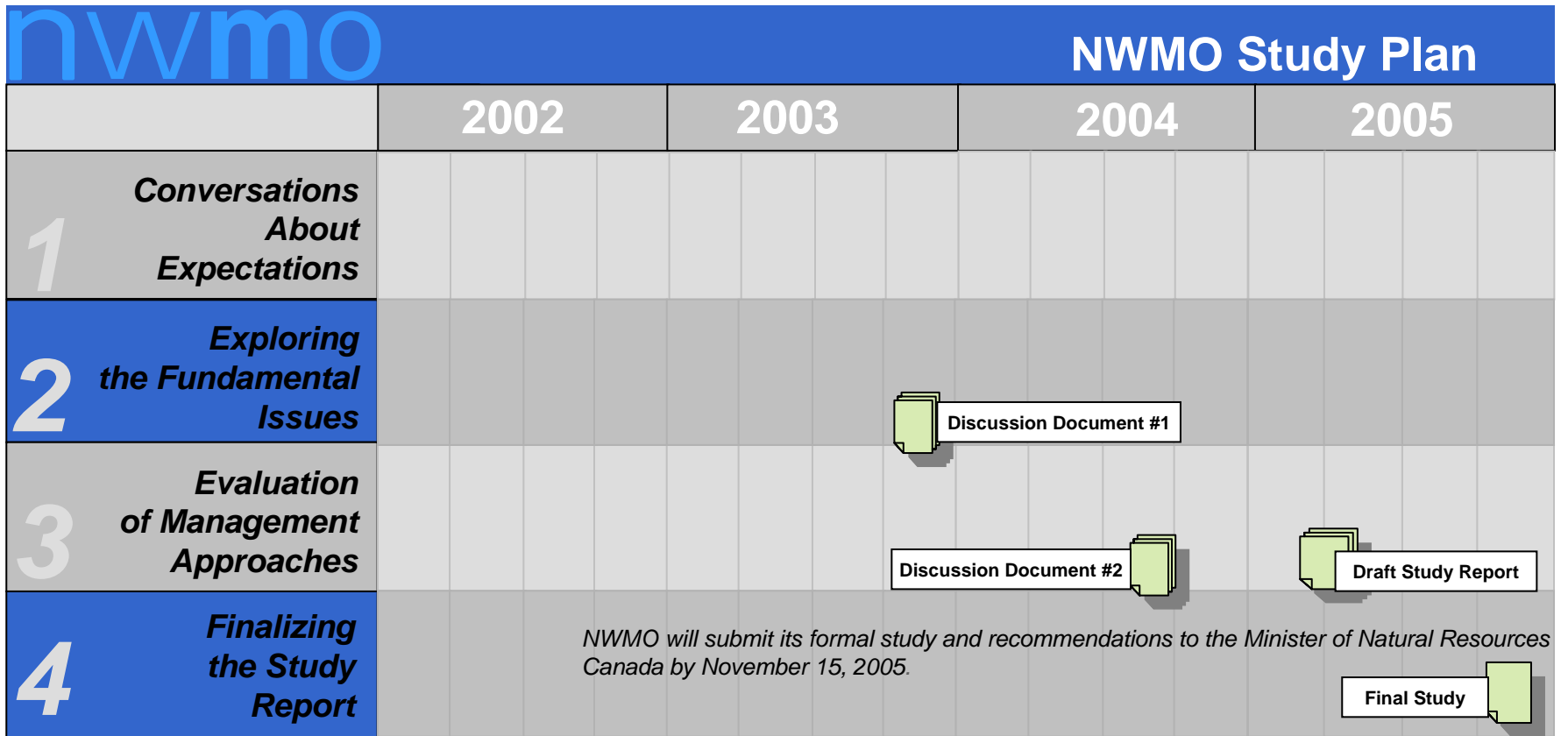
- ❖ *Nuclear Fuel Waste Act (NFWA)* came into force November 15, 2002.
- ❖ Act required major waste owners (Ontario Power Generation, Hydro-Québec, NB Power Nuclear) to establish NWMO, its Advisory Council and trust funds.
- ❖ NWMO is required to study proposed approaches for the long-term management of used nuclear fuel.
- ❖ NWMO is required to consult broadly with the general public and Aboriginal Peoples.
- ❖ **NWMO will submit study with recommendation to Minister of Natural Resources Canada by November 15, 2005.**

NWMO Study of Management Options

- ❖ *Nuclear Fuel Waste Act* explicitly required NWMO study to include, *at a minimum*, approaches based solely on 3 specific technical methods:
 - ❖ Deep geological disposal in the Canadian Shield (AECL Concept)
 - ❖ Storage at nuclear reactor sites
 - ❖ Centralized storage, either above or below ground

- ❖ For each approach, the study must include:
 - ❖ Detailed technical descriptions
 - ❖ Comparison of benefits, risks & costs
 - ❖ Ethical, social, economic and aboriginal considerations
 - ❖ Economic Regions for implementation (not sites)
 - ❖ Implementation plan

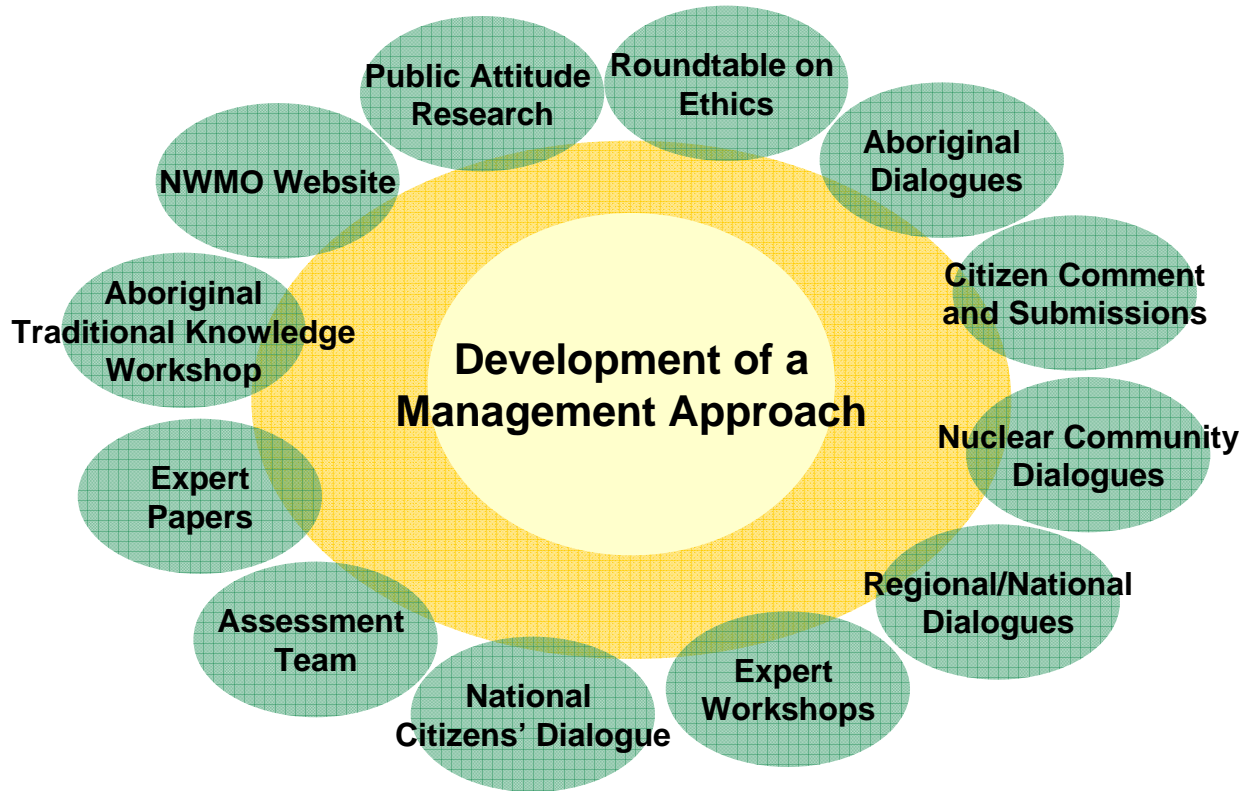
Phases of NWMO Study Plan & Milestone Documents



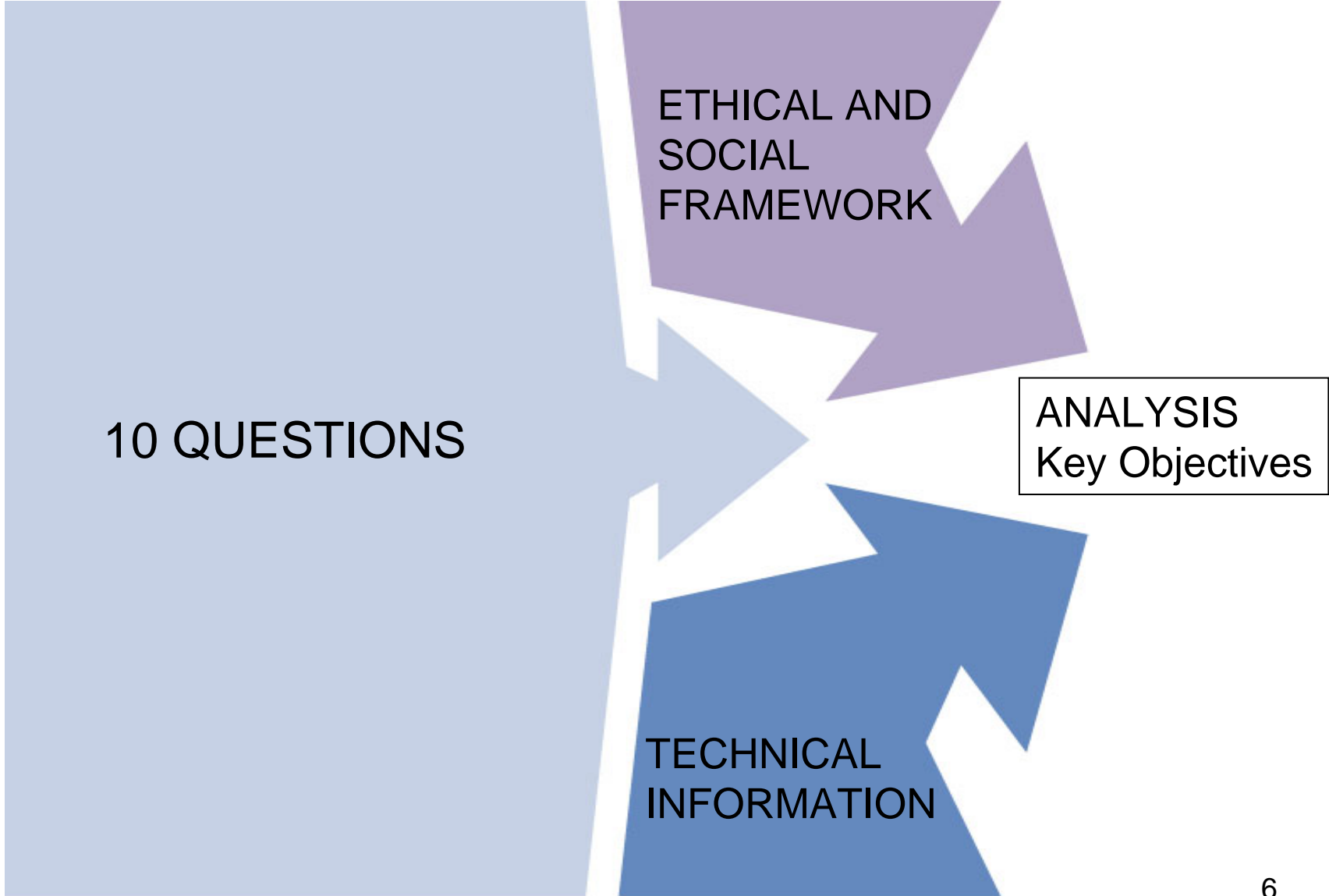
A Diversity of Voices

Participants have included:

- ❖ specialists in natural and social sciences & technical areas
- ❖ faith communities, environmental groups, youth
- ❖ nuclear station communities
- ❖ political representatives at all levels of government
- ❖ Aboriginal Peoples & other interested citizens



Inputs to the Assessment



Comparative Assessment of Options

- ❖ Comparative Assessment of Options through:
 - ❖ Analysis of strengths and weaknesses of the 3 approaches in the Act, based on multi-attribute utility analysis
 - ❖ Assessment of benefits, risks and costs, taking into account economic regions
 - ❖ Topical analysis (e.g., risk, monitoring, security, reprocessing, alternate geomeia)

A Fourth Option Emerges: Adaptive Phased Management

NWMO analyses and our engagement has indicated:

- ❖ 3 options required for study in *Nuclear Fuel Waste Act* have distinct strengths and limitations
- ❖ No one method specified in *Nuclear Fuel Waste Act* perfectly addresses all of the values & objectives that are important to Canadians
- *Adaptive Phased Management – risk management approach based on centralized containment and isolation of Canada’s used nuclear fuel deep underground. At all times, used fuel is monitored, retrievable, safe and secure.*
 - ❖ Builds on the features of the other three options and implements them in a staged manner through three phases
 - ❖ Central site to be sought that can host both a shallow interim storage facility and deep repository
 - ❖ Provides genuine choice and greater adaptability, ensuring safety and fairness

Four Principles

1. Unique time dimension – longer than recorded history
2. Pre-eminent requirement to ensure safety and security for people and the environment
3. Sustainable approach – social acceptability, technical soundness, environmental responsibility, economic feasibility
4. Citizen engagement - collaborative approach

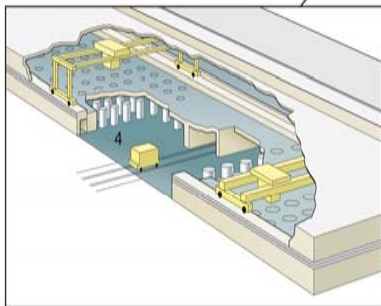
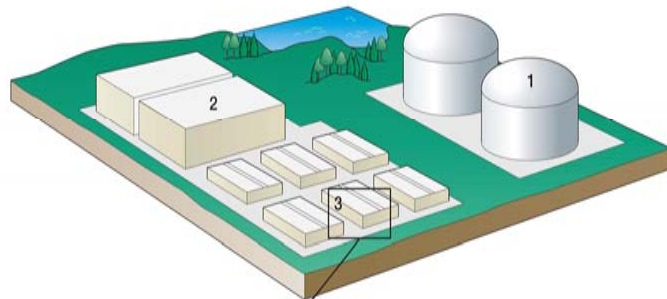
Adaptive Phased Management

- ❖ Management System

- ❖ Technical Method

Three Phases of Development – Phase 1

First 30 years



LEGEND

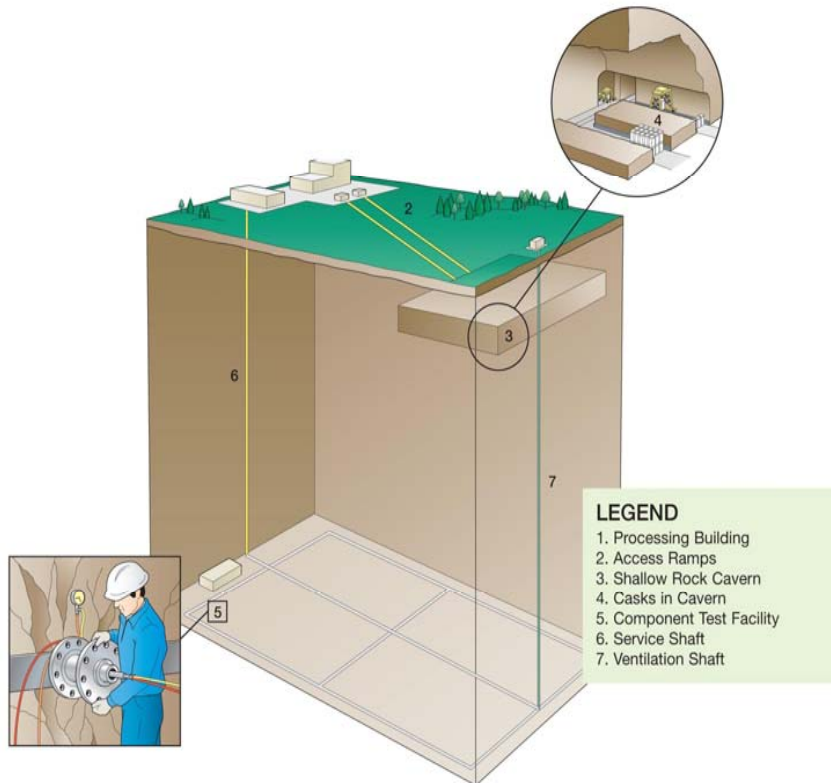
1. Nuclear Generating Station
2. Processing Building
3. Storage Buildings
4. Casks in Storage

Preparing for Central Used Fuel Management

- ❖ Used nuclear fuel remains safely stored at reactor site locations
- ❖ Continue R&D in repository technology
- ❖ Develop siting process & engagement
- ❖ **Select** site for central facility
- ❖ Complete Environmental Assessment & obtain Site Licence
- ❖ Build an underground research facility
- ❖ **Decide** (Y/N) to build a shallow underground storage facility at the central site (while developing deep repository)

Three Phases of Development – Phase 2

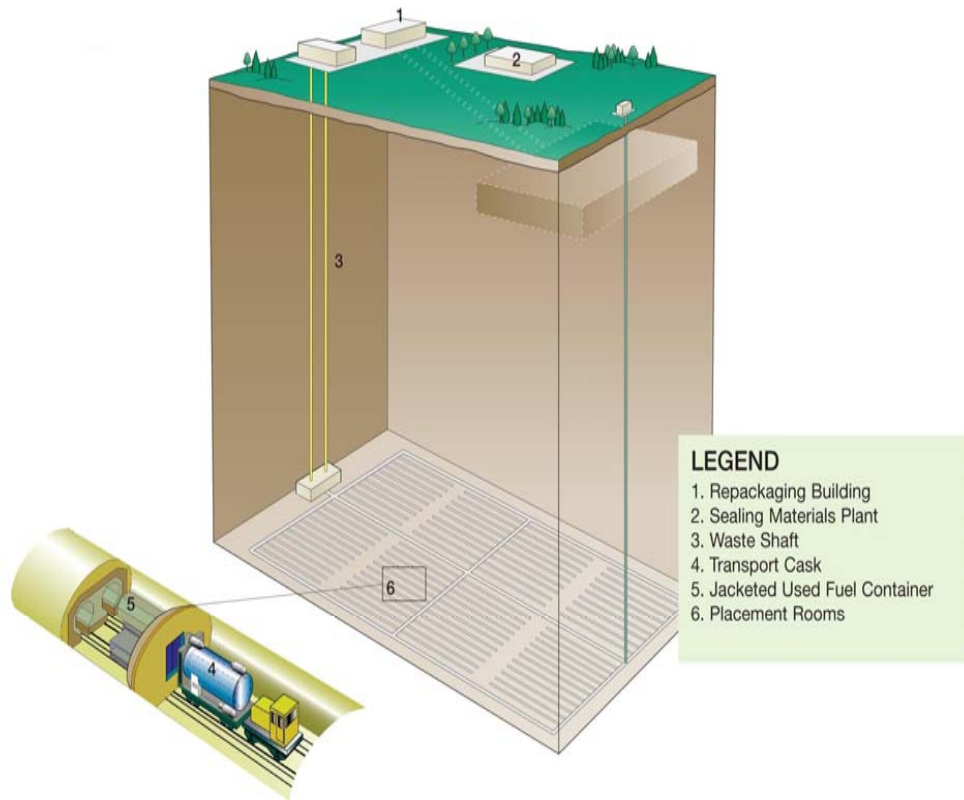
30 to 60 years



Central Storage and Technology Demonstration

- ❖ Transport used fuel from reactor sites (if central storage facility built)
- ❖ Obtain Operating Licence for shallow underground storage
- ❖ Confirm suitability of site & demonstration of long-term isolation technology
- ❖ Complete final design & safety analysis needed for licensing deep repository and associated facilities
- ❖ **Decide** when to construct deep geologic repository

Three Phases of Development – Phase 3 60 to several hundred years



Long-Term Containment, Isolation and Monitoring

- ❖ Transfer used fuel from storage to surface for repackaging
- ❖ Place used fuel in deep repository
- ❖ Continue monitoring used fuel
- ❖ Used fuel remains accessible for retrieval, if required
- ❖ Future society will **decide** when to close & decommission deep repository & continue postclosure monitoring

Characteristics of the Recommended Approach

- ❖ Centralized containment and isolation in suitable rock formations
- ❖ Flexibility in the pace and manner of implementation + phased decision-making
- ❖ Provision for interim shallow storage at the centralized site
- ❖ Continuous monitoring of the used fuel
- ❖ Potential for retrievability for an extended period

Question 1

1. Is the recommended management approach appropriate for Canada?
 - ❖ In what ways is it appropriate?
 - ❖ What concerns, if any, do you have?
 - ❖ How can it be improved?

Implementation

- ❖ Institutions and governance; accountability and transparency; NWMO to be implementing agency
- ❖ Financial surety – trust funds
- ❖ Establishing a site – willing host community where technical and scientific criteria are met; where community support is demonstrated, and where the aspirations of people are respected
- ❖ Four province focus: Ontario, Quebec, New Brunswick, and Saskatchewan; though others may express interest
- ❖ Citizen engagement, continuing collaboration and ongoing role in decision-making

Question 2

2. What are the conditions required to successfully implement the approach?
 - ❖ What matters to you most in implementation?
 - ❖ What assurances do you need to be confident in implementation?

A Responsive and Responsible Path

- ❖ Commits this generation of Canadians to take the first steps
- ❖ Requires meeting/exceeding rigorous safety & security standards
- ❖ Allows sequential decision-making & provides genuine choice
- ❖ Builds in flexibility to adapt to experience & societal change
- ❖ Promotes continuous learning
- ❖ Provides viable, safe and secure long-term storage capability, with potential for retrievability of used fuel, until future generations have confidence to close the facility
- ❖ Rooted in values & ethics, engages citizens, allow for societal judgments – e.g., is there sufficient certainty to proceed with each step

Next Steps

- ❖ Invite Public Dialogue and Comments on the Draft Study:
 - ❖ Provides for comment period extending to August 31, 2005
 - ❖ Dialogues in Ontario, Québec, New Brunswick, Saskatchewan and Manitoba – engaging participants from earlier phases of NWMO workshops, dialogues, discussion sessions, and research
 - ❖ Open houses in reactor site communities
 - ❖ Continued Aboriginal dialogues
 - ❖ Scheduling of other meetings and events upon request
- ❖ NWMO Refinement of Study
- ❖ Submission of Final Study to Minister of Natural Resources Canada, and public release by November 15, 2005
 - ❖ Includes NWMO's final recommendations, with Advisory Council comments and summary of comments from consultations