



AFN Nuclear Dialogue



nwmo
NUCLEAR WASTE MANAGEMENT ORGANIZATION SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES



Natural Resources
Canada

Ressources naturelles
Canada

OUTLINE

- AFN dialogue process
- What is nuclear fuel waste?
- Where is it stored now?
- Who is responsible for storage?
- What are the potential storage options?
- Regional issues
- Discussion

What is the Dialogue Process?

*Nuclear
Fuel Waste
Act comes
into force*

AFN Dialogue

***AFN Report
to NRCan***

***Government
Review of NMWO
recommendation***



NWMO Citizens Dialogue

***Submit Reports
to NRCan***

Other dialogues:

Inuit Tapiriit Kanatami Dialogue

Metis National Council Dialogue

Congress of Aboriginal Peoples

Pauktuutit Inuit Women's Association

Native Women's Association of Canada



NWMO: Nuclear Waste Management Organization
NRCan: Natural Resources Canada



Mandate



- AFN Resolution No. 103/99

First Nation Participation in Shaping the Preferred Approach to Long-term Nuclear fuel Waste Management

- AFN Resolution No. 51/2003

Recognition of Nuclear Waste Management Organization Aboriginal and Treaty Right Obligations

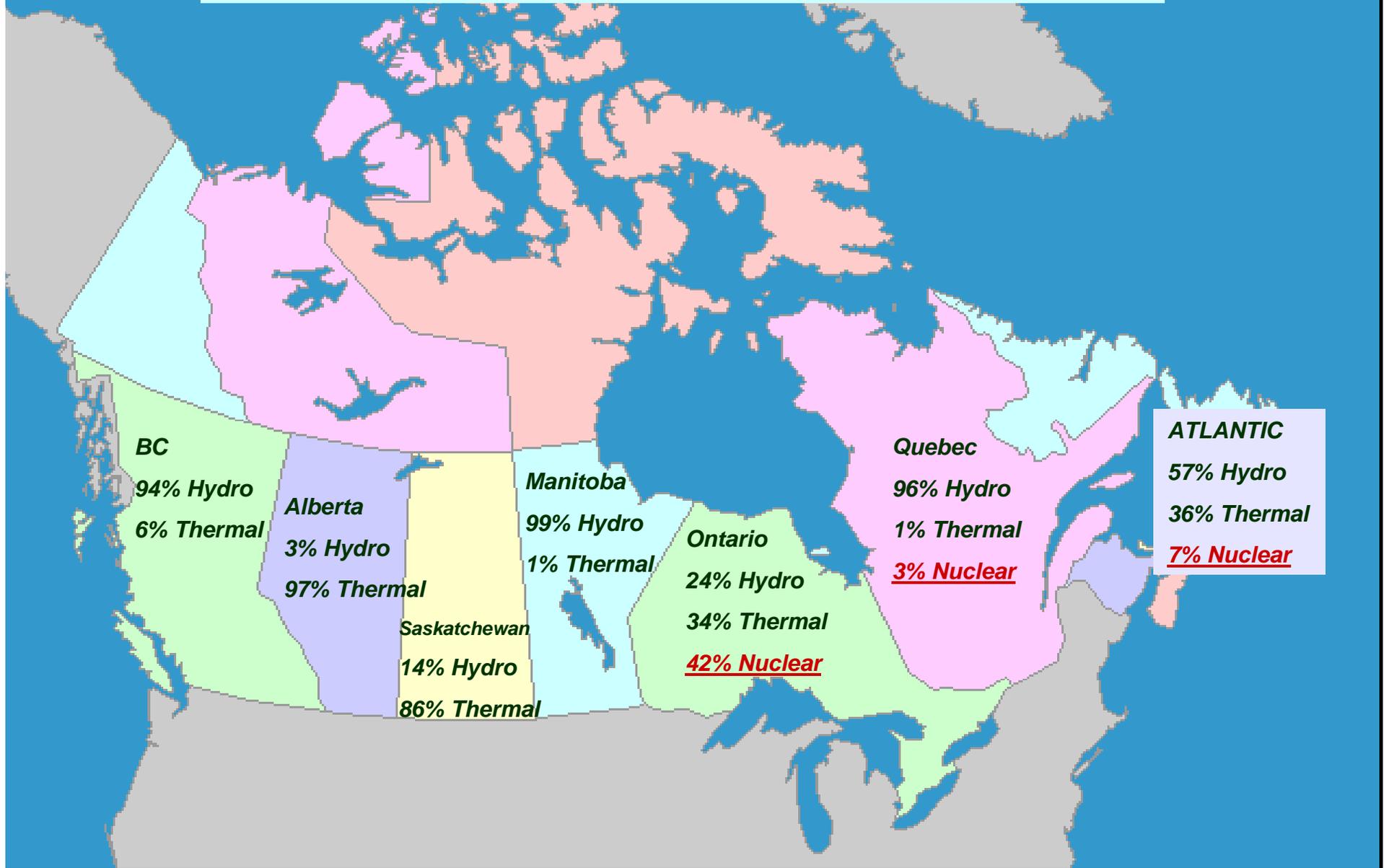
- AFN Resolution No. 39/2005

Nuclear Waste Management Organization Dialogue Process

Overview of Energy Production in Canada

Electricity Generation by Province & Region

(Source: Canadian Electricity Association, 2001 Data)



Where is the Waste Produced?



How is the Waste Produced?



Mining



Milling



Refining & Conversion



Energy Production

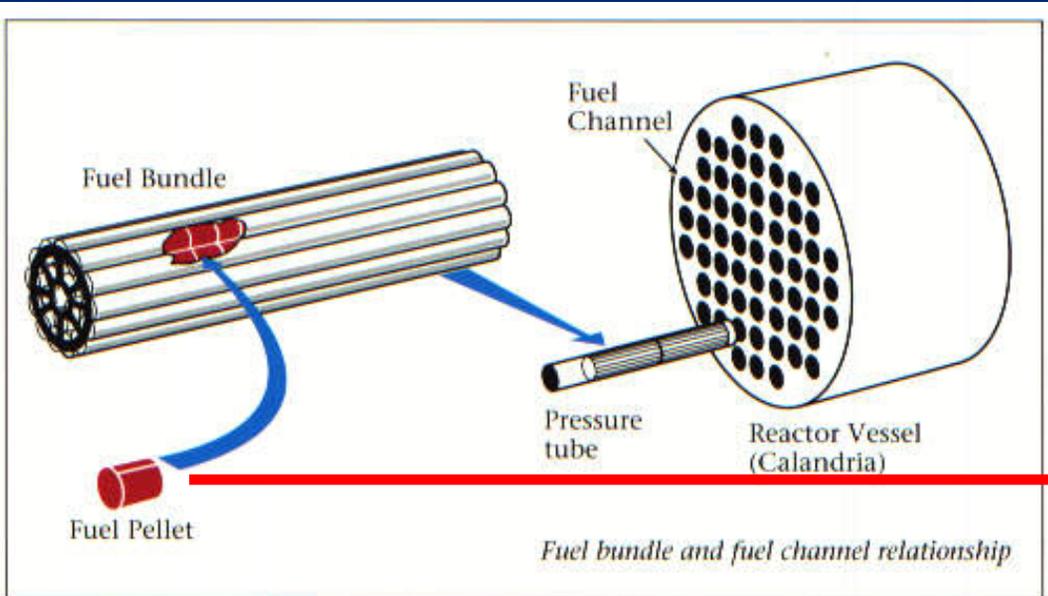


Nuclear Waste



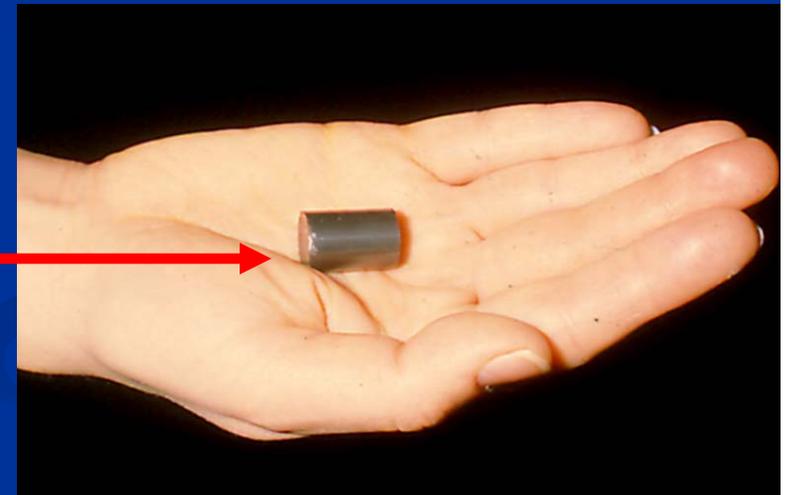
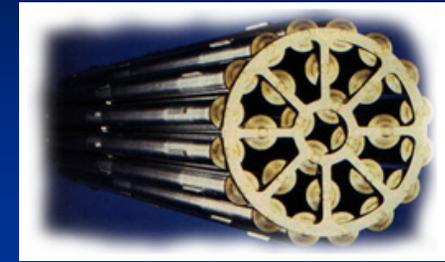
*Long Term
Waste
Management*

What is nuclear fuel waste?



Source: http://www.cameco.com/uranium_101/uranium_science/nuclear_fuel/index.php#ten

Nuclear Fuel Bundle



Source: Ontario Power Generation and NWMO
<http://building.bu.edu/virtualvillage/gallery/arena/04.html>

Uranium Pellets

How much nuclear fuel waste is there in Canada?

- In 2004 = **1.8 million** used nuclear fuel bundles
~ 5 full hockey rinks
- Projected to End of 2033 =
est. **3.7 million** used nuclear fuel bundles



NOT including low or intermediate level radioactive waste ~ mine tailings, etc.

Where is the nuclear fuel waste?

OPG: 90 %

Point Lepreau: 4 %

Gentilly-2: 4 %

AECL: 2 %

Source: www.nfwbureau.gc.ca

Gentilly Nuclear Power Plant

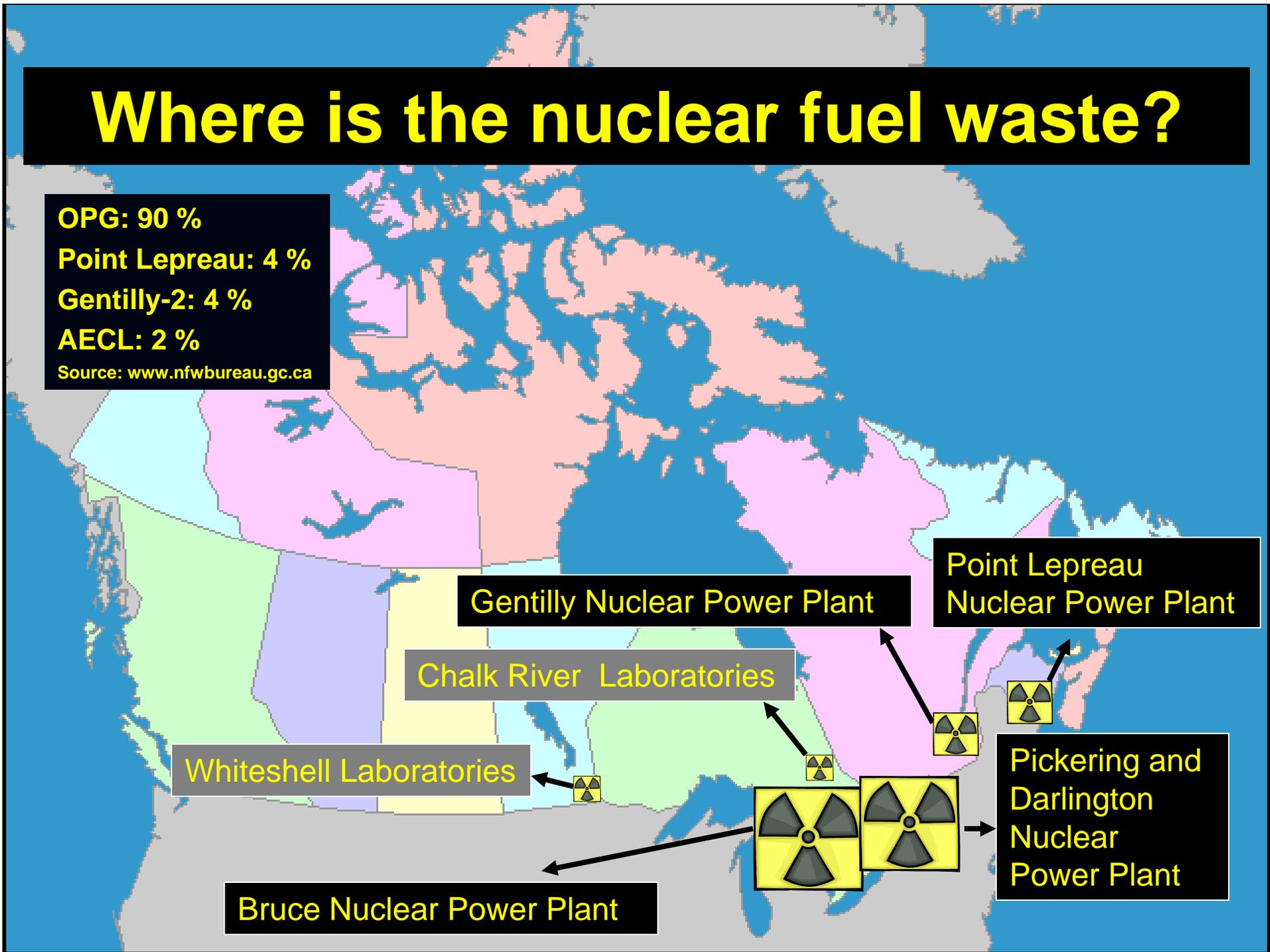
Point Lepreau Nuclear Power Plant

Chalk River Laboratories

Whiteshell Laboratories

Pickering and Darlington Nuclear Power Plant

Bruce Nuclear Power Plant



Where is the waste stored now?



Source: www.nuclearfaq.com

Wet Storage

Cooled for 7 to 10 years



Source: NWMO

Dry Storage

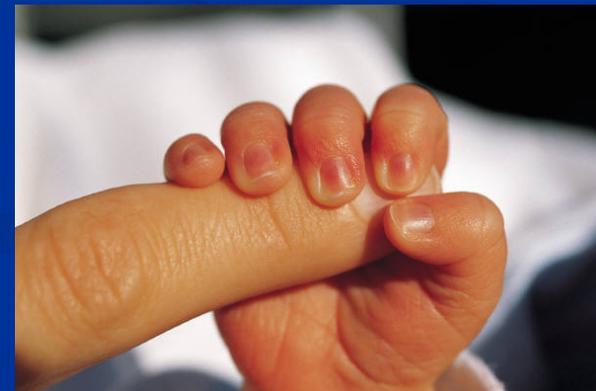
Containers last up to 50 years

Why is Nuclear Fuel Waste a concern?



■ Potential impact on the Environment:

- Water Supply
- Plants & Animals
- Human Health
- Future Generations
- Long-term Viability of the Land
- Safety Concerns



Traditional Knowledge

- Ensure the treatment and interpretation of TK is undertaken in a manner based on respect, appreciation and cultural awareness
- **Ensure TK holders should be involved in all stages of the decision making process**
- **Ensure TK is considered equivalent in a manner to western-based knowledge systems**



Why is Nuclear Fuel Waste a Concern?



- ☉ Radiation is energy in the form of waves or particles
- ☉ High doses cause cancer & genetic defects
- ☉ Low doses have been linked to cancer (especially children)
- ☉ No agreement on what dosage is safe



Are there any Benefits of Nuclear Fuel Waste?

- Potential economic development opportunity:
 - Construction
 - Security
 - Operation & Maintenance
 - Transportation



How long does nuclear fuel waste remain dangerous?

- Radioactivity is measured in “half-lives”

- Examples:

Plutonium²³⁹ = 24,400 years

Uranium²³⁵ = 710 million years

Iodine¹²⁹ = 16 million years



Proposed Options



- Deep Geological Disposal in the Canadian Shield
- Centralized Storage (either above or below ground)
- Reactor-site Extended Storage at Nuclear Reactor Sites

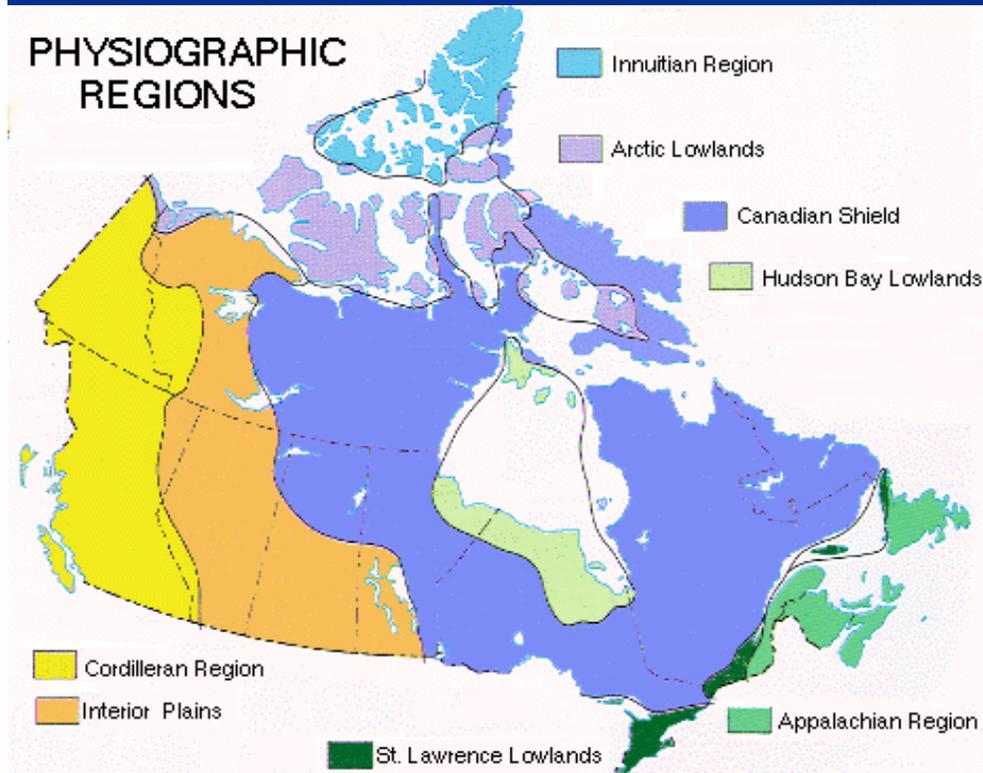


NWMO is proposing to recommend an Adaptive Phased Approach

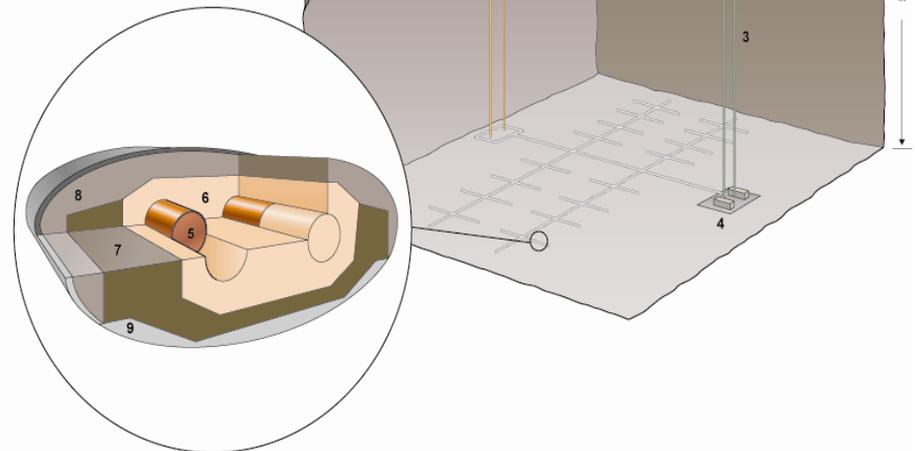


Deep Geological Disposal in the Canadian Shield

- Transportation is required
- No *intended* retrieval or reuse of waste = permanent disposal
- \$16.2 Billion (2002 \$) including transportation costs



1. Ventilation Shafts
2. Surface Facilities
3. Access Shafts
4. Subsurface Facilities
5. Used Fuel Container
6. Buffer
7. Dense Backfill
8. Light Backfill
9. Concrete Floor



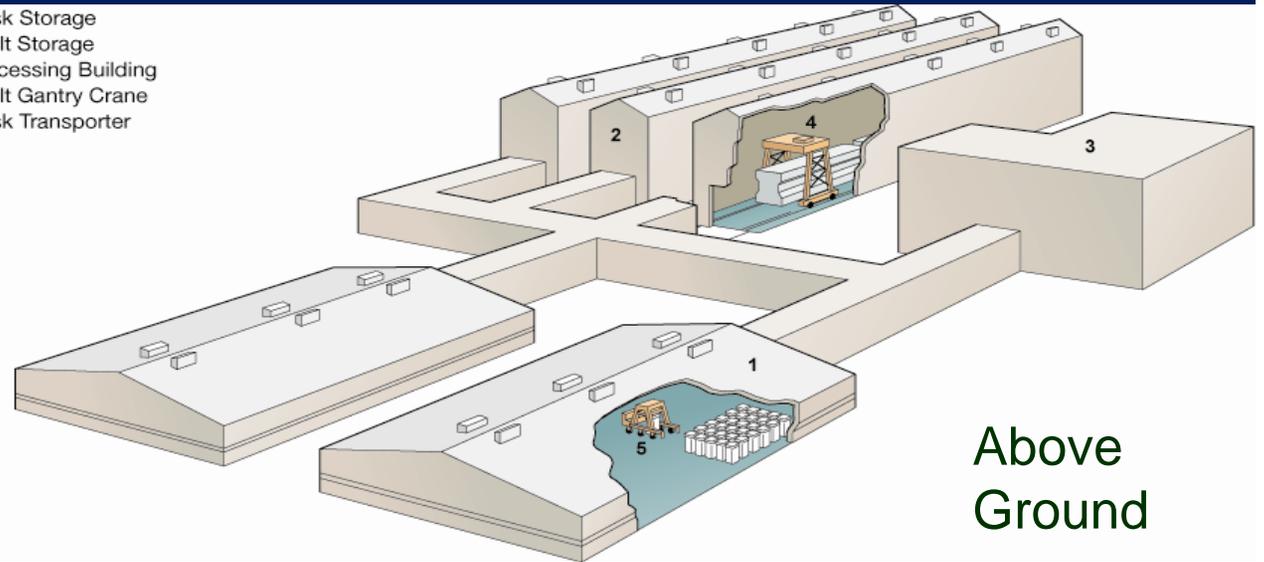
Source: NWMO, 2003

Source: Physical Maps of Canada Plus
<http://www.canadainfolink.ca/physical.htm#physio>

Centralized Storage

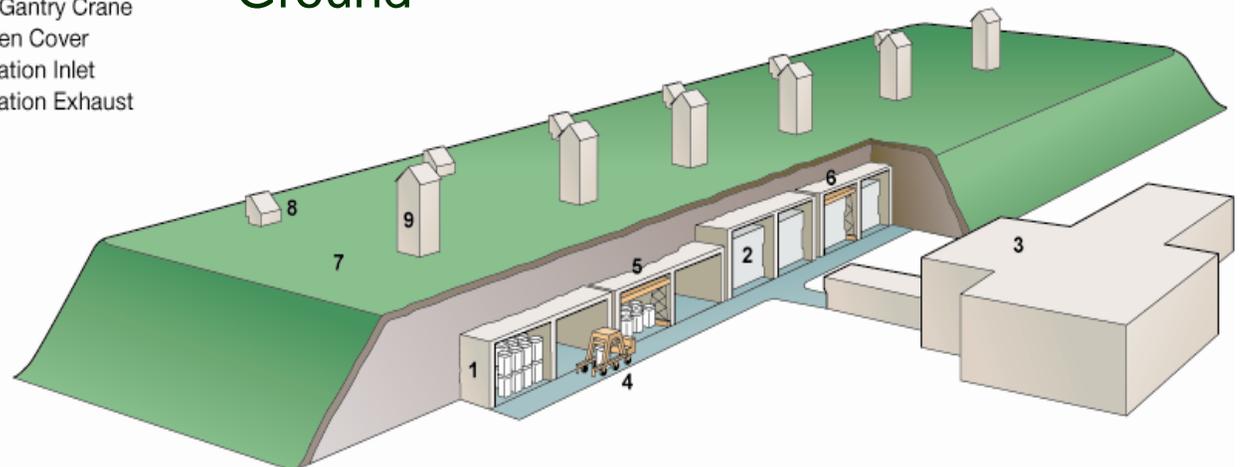
- Transportation is required.
- Retrieval of waste is possible.
- Allows for continued monitoring
- \$ 15.7 - \$20.0 Billion (2002 \$) including transportation costs

1. Cask Storage
2. Vault Storage
3. Processing Building
4. Vault Gantry Crane
5. Cask Transporter



1. Cask Storage
2. Vault Storage
3. Processing Building
4. Cask Transporter
5. Cask Gantry Crane
6. Vault Gantry Crane
7. Earthen Cover
8. Ventilation Inlet
9. Ventilation Exhaust

Below Ground



Extended Storage at Reactors



Source: The Canadian Nuclear FAQ, by Dr. Jeremy Whitlock
<http://www.nuclearfaq.ca/frystrge.html>

Gentilly 2 Nuclear Station Dry Storage



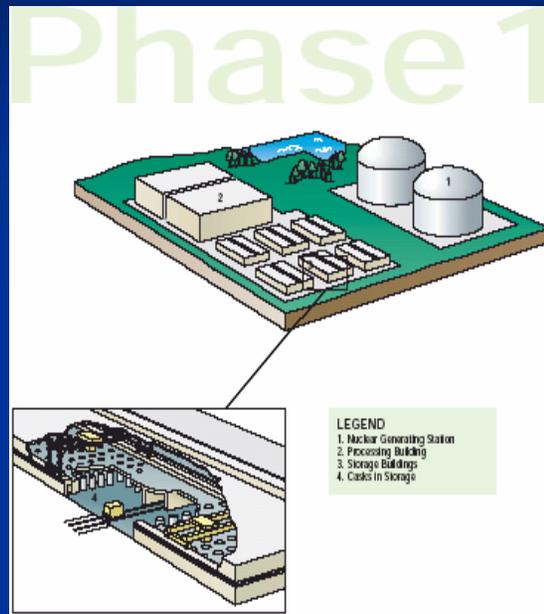
Chalk River Dry Storage Facility

- Operate indefinitely
- Require periodic maintenance
- Transportation is not required

Recommended Option

Adaptive Phased Management

Source: NWMO, May 2005



☢ Preparing for Central Used Fuel Management

☢ Timeline: approx. first 30 years



☢ Central Storage and Technology Demonstration

☢ Timeline: approx. next 30 years

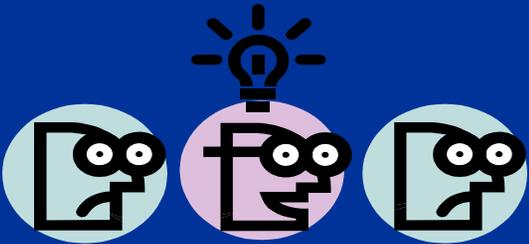


☢ Deep Geological Storage: Long-term Containment, Isolation and Monitoring

☢ Timeline: approx. beyond 60 years

Focus on 4 Provinces: Ont., Que., Sask. & NB

Other Options

| Methods receiving international attention | Methods of limited interest |
|---|------------------------------|
| Reprocessing, Partitioning and Transmutation | Direct Injection |
| Storage or Disposal at an International Repository | Rock Melting |
| Emplacement in Deep Boreholes | Sub-seabed Disposal |
|  | Disposal at Sea |
| | Disposal in Ice Sheets |
| | Disposal in Subduction Zones |
| | Disposal in Space |
| | Dilution & Dispersion |

Preliminary Dialogue Results

■ Key Issues

- **Aboriginal & Treaty Rights**
- **Consultation / Decision-Making Authority / Protocols**
- **Independent Capacity/ Resources**
- **Energy Policy / Source Reduction**
- **Low & Intermediate level waste**
- **Transportation**
- **Voluntarism**
- **Environmental Racism**
- **Importation of Waste**



More Information

- ✓ Fact Sheets / Information Package
- ✓ Promotion Items
- ✓ Video – DVD & VHS



Assembly of First Nations
1-866-869-6789

Our Land.
Our Choice.

AFN nuclear waste dialogue.

Youth Art Contest

1st Prize Winner
Stanley Itsi
(Gwich'in)
Fort McPherson, NWT
Age: 26
Untitled



**2nd Prize Winner
Gerry McComb III**

(Moose Cree)

Moose Factory, ON

Age: 15

Title: "Slowly Burning"



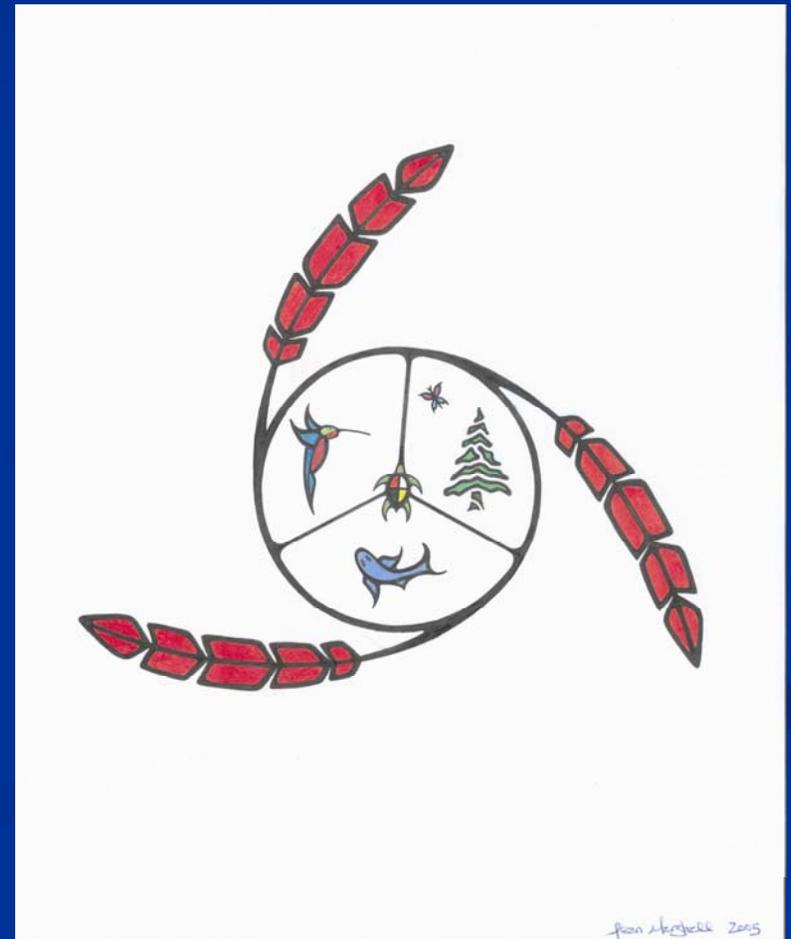
**3rd Prize Winner
Jean Marshall**

(Kitchenuhmaykoosib Inninuwug)

Thunder Bay, ON

Age: 28

Title: "Honour Earth"



Meegwetch



Contact information:

Nuclear Waste Dialogue Coordinators

Tel: 613-241-6789

Toll Free: 866-869-6789

nwmo

NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES



Natural Resources
Canada

Ressources naturelles
Canada