



# **Building Understanding and Engaging Young Adults in a Dialogue about Canada's Management of Used Nuclear Fuel**

# OBJECTIVE & AREAS OF FOCUS

## OBJECTIVE

To determine how the NWMO can:

- Raise **awareness** of the issue of used nuclear fuel as well as the NWMO
- Build **interest** amongst youth in the issue
- Facilitate **participation** of youth in dialogues and future decision-making processes

## AREAS OF FOCUS

The NWMO Youth Roundtable organized its youth engagement recommendations around 3 key areas:

- Key messages
- Communication channel – online & print
- Community environment – engaging youth in and out of the education system



# KEY CHALLENGES FOR THE NWMO

- There is a low level of literacy regarding Canada's energy landscape and nuclear fuel cycle
- Young adults are engaged more as consumers than they are as citizens
  - Communicating a technical issue that is not “sexy” to a group that is inundated with advertising and information will be difficult
- Young adults are distrustful of institutions & are more likely to trust peers
  - Youth are used to multiple sources of information, open source communication



# THE INFORMATION YOUNG ADULTS WANT IS NOT OVERLY DIFFERENT FROM OTHER POPULATIONS

- Explain the issue / nuclear fuel cycle
- Who is the NWMO?
  - History
  - Values/Ethical standards
  - Funding
  - APM and the current stage
- Current practices & why we need a permanent solution
- Deep Geological Repository (DGR)
  - What it is, how it works and is managed and how expansion might work
- Why a community would want to consider hosting a DGR
  - Socio economic impacts
  - Community well being
- Environmental impact
  - Complete footprint from site prep, to construction to maintenance
- Safety implications
  - Explain multi-barrier system, worst case scenario
- Suitability of site



# HOW NWMO COMMUNICATES INFORMATION NEEDS TO BE REFINED

## Print Material

Thermal-mechanical analyses of a deep geological repository in sedimentary rock using a horizontal tunnel placement method for used fuel containers were completed. Microbial studies under various buffer densities and intermediate groundwater salinity values suggest limited microbial viability in a deep geological repository at lower groundwater salinities compared to previous studies.

In the geoscience field, the NWMO prepared preliminary geoscientific criteria for initial evaluations of potential candidate sites for a deep repository. Geoscientific data were collected and site characterization methods developed.

Practical knowledge and experience in sedimentary rock environments are being acquired through our involvement in Ontario Power Generation's site characterization program for the proposed Low and Intermediate Level Waste Deep Geologic Repository. This program includes: field operations, borehole drilling in sedimentary rock, groundwater sampling, rock core mineralogy, geophysical logging, deep hydraulic well testing, geo-mechanical testing, borehole instrumentation, site characterization safety assurance procedures and multi-dimensional scientific visualization.

Ongoing research for the development of generic geoscientific characterization tools, techniques and protocols in collaboration with universities and consultants, cover a wide range of geoscientific characteristics such as seismicity, geology, geostatistics, geochemistry, methane gas, and geogenic water extraction and characterization techniques, diffusion coefficients, permeability and sorption. The NWMO also issued a research grant to the University of Toronto to expand Canadian expertise in Glacial Systems Modelling.

The repository safety program initiated research projects to conduct coupled thermal-hydraulic-mechanical modelling to support safety assessment, and to review and assess safety assessment software quality assurance.

The Nuclear Waste Management Organization (NWMO) was established in 2002 by Ontario Power Generation Inc., Hydro-Québec and

New Brunswick Power Corporation in accordance with the *Nuclear Fuel Waste Act (NFWA)* to assume responsibility for the long-term management of Canada's used nuclear fuel. On

June 14, 2007, the Government of Canada selected the NWMO's recommendation for Adaptive Phased Management (APM). APM moves towards a goal that Canadians

themselves identify as safe and secure long-term containment and isolation of used nuclear fuel produced in

Canada, with flexibility for future generations to act in their own best interests. The NWMO now has the mandate to implement the recommendation.

## 2009 NWMO Approach:

- Pamphlets with dense text + heavy technical terms

## The message was:

- Long
- Full of unexplained corporate jargon
- Fore-fronted the organization before the issue



# RECOMMENDED CORE MESSAGING

**Nuclear Waste** exists. It's ours to deal with. Now.

**Canadians made a decision** to have nuclear waste safely stored deep underground. It's time to take the next step forward.

The **Nuclear Waste Management Organization** is a not-for-profit ready to work with a willing and informed community that may be interested in hosting used nuclear fuel underground. It could be your community.

Have an opinion. Make it educated. **Voice it.**

Find out more.

[www.nwmo.ca](http://www.nwmo.ca) or 1-866-249-6966

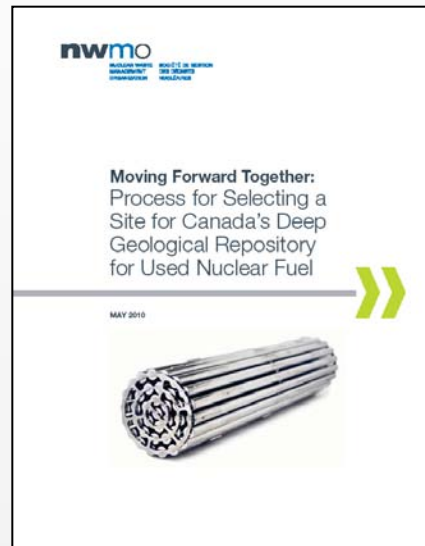
**NWMO Youth Roundtable**



# NWMO RESPONSE: NEW 'CLEANER' DESIGN

2009

2010




# NWMO RESPONSE: SIMPLIFIED LANGUAGE & LAYERED INFO

**nwmo**  
NUCLEAR WASTE MANAGEMENT ORGANIZATION SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

Invitation to Learn More

Focus on Early Steps  
MAY 2010



**nwmo**  
NUCLEAR WASTE MANAGEMENT ORGANIZATION SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

Research Support Program – Studies in the Humanities and Social Sciences

August 2010

**nwmo**  
NUCLEAR WASTE MANAGEMENT ORGANIZATION SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

Community Sustainability Visioning

If a community is interested in potentially becoming a host community for the deep-geological repository for containing and isolating used nuclear fuel in Canada and associated facilities, the Nuclear Waste Management Organization (NWMO) is prepared to provide financial support to assist the community to undertake a community sustainability visioning process. Participation in this process is entirely voluntary and in no way obligates a community to commit to participating in subsequent stages of the siting process. By undertaking the community sustainability visioning, a community has given initial consideration to the possibility of hosting the deep-geological repository and associated facilities, but has the option of removing its community as a potential candidate for the facilities at any point in the site investigation process.

What is a community sustainability vision, and what is involved in a visioning process?  
This document outlines a possible framework for community sustainability visioning as a starting point for discussion with community members in considering the Adaptive Phased Management project.

Background  
The Government of Canada selected Canada's plan for the long-term management of used nuclear fuel in June 2007. The plan, called Adaptive Phased Management, involves the development of a deep-geological repository for used nuclear fuel and associated facilities. The NWMO is formally mandated to implement this plan and is leading a multi-year process for selecting an informed and safety-conscious host community for the repository. A deep-geological repository is a secure underground facility for used nuclear fuel. The multi-300-year project will also involve the creation of a series of barriers to technical successions and community studies. It will become a hub for national and international scientific collaboration.

The NWMO continues to support its interested communities to learn more about Canada's plan for the long-term management of used nuclear fuel and to think through their interest in the project fully in the site selection process. Communities may wish to consider the project in the context of their own communities. Such a shared discussion would help bring the repository closer, identify the environmental of the community and pave the way for thinking about how the program may affect the community in a variety of dimensions. However, the NWMO is not a government and the NWMO cannot provide the final decision on the siting of the repository. It is up to the community to decide and accept. (Final siting decision requires the community to be selected by the project, the community – as represented by accountable authorities – may request and receive resources from the

**nwmo**  
NUCLEAR WASTE MANAGEMENT ORGANIZATION SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES


Multiple-Barrier System

When used nuclear fuel is removed from a reactor, it is considered a waste product, is radioactive and requires careful management. Although its radioactivity decreases with time, chemical toxicity persists and the used fuel will remain a potential health risk for many hundreds of thousands of years.

A series of engineered and natural barriers will work together to contain and isolate used nuclear fuel from the biosphere. Each of these barriers provides a unique and stand-alone level of protection – if any of the barriers deteriorates, the next one will come into play.

**Barrier 1: The Used Nuclear Fuel Pellet**

Fuel pellets are made from uranium dioxide powder baked in a furnace to produce a hard, high-density ceramic. Ceramics are extremely durable; they do not readily dissolve in water, and their resistance to wear and high temperatures makes them one of the most durable engineered materials. The first barrier in the multiple-barrier system is the fuel itself, which contains over 99.9% of the radioactivity.



Fuel pellets are one of the most durable engineered materials.

**nwmo**  
NUCLEAR WASTE MANAGEMENT ORGANIZATION SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

Monitoring and Retrievability

**Monitoring**

Adaptive Phased Management (APM) embraces the concept of monitoring throughout all phases of implementation (NWMO 2009), and the Nuclear Waste Management Organization (NWMO) is continuing to conduct research on monitoring methods, tools and longevity of monitoring equipment required during implementation of APM (Simmons and Chandler 2003). Within the context of APM, monitoring can be subdivided into two major categories:

- Monitoring of processes and parameters in the living environment and geosphere that support conclusions about the integrity of a site for a deep geological repository to safely manage used nuclear fuel over the long term.
- Monitoring the deep geological repository system once used nuclear fuel has been placed in the repository to confirm that:
  - performance of the repository system is proceeding as expected; and
  - conditions related to the capability of the repository system to safely manage used nuclear fuel over the long term remain valid.

There are many processes and parameters that will be identified as part of the monitoring program during implementation of APM. Initially, monitoring provides:

- baseline information that would be needed for an Environmental Assessment and licence approval of the preferred site for used fuel management;
- design and layout of a deep geological repository; and
- safety assessment of the deep geological repository.

Subsequently, monitoring provides both more detailed and longer-term data for analysis and confirmation of repository performance. Monitoring would also be used as an indication of a need to retrieve used fuel from the repository.

The development, testing and demonstration of monitoring instruments and equipment for a deep geological repository have been underway for many decades (Simmons and Chandler 2003, Dixon et al. 2004, Meyer et al. 2005, SNR 2007). In particular, the performance and longevity of hundreds of monitoring instruments and methods have been tested in underground research facilities including:

- Underground Research Laboratory (URL), Manitoba, Canada;
- Aspo Hard Rock Laboratory, Sweden;
- Mont Terri Project, Switzerland; and
- Sus Underground Research Laboratory, France.

Monitoring will continue to be an ongoing area of co-operative research, development and demonstration for the NWMO and other radioactive waste management organizations.

NWMO Youth Roundtable





# NEED TO EVOLVE NWMO MULTI-MEDIA MATERIALS TO CONNECT WITH YOUNG ADULTS

## 2009 NWMO Video



- Overly scripted “cheesy corporate” videos – too many talking heads
- Video didn’t have background info and didn’t build to a climax
- Didn’t make you feel like you can get involved
- No youth were represented

## **YRT recommended use of animation / graphical representation:**

- Able to cross boundaries and avoids association of one ‘live’ face & voice with the project
- Able to simplify complicated message/concept without “dumbing it down” and establish a common baseline of knowledge
- Easy to share and transmit across multiple channels



# NWMO RESPONSE: ANIMATED AND SUBJECT-SPECIFIC VIDEOS



# ONLINE ENGAGEMENT: SHIFT FROM WEBSITE TO WEBSITE

- Static sites are no longer accepted. Youth are used to content that is constantly updated
- Young adults are used to consuming information online which demands a different way of reading material
  - Hyperlink content to access multiple sources, use interactive elements such as video and audio, mouse-overs
- Young adults will not dig for information
  - Website needs to be organized intuitively
  - NWMO information is difficult to search because of use of .pdf documents
- Social, interactive peer-to-peer media is part of their everyday existence: Shift from website to webspace
  - NWMO needs a social media presence to direct people to the NWMO webspace



# NWMO RESPONSE: MORE INTUITIVE WEBSITE NAVIGATION

2009

2010



# ENGAGING YOUTH IN EDUCATIONAL INSTITUTIONS

## Secondary School Opportunities

- Help establish and support after school science clubs, fairs, camps
- Develop a digital teachers tool kit
- Interactive traveling road show facilitated by younger NWMO staff

## Post-Secondary School Opportunities

- Use existing networks to provide presentations
- Engage relevant departments and disciplines in targeted activities
- Provide scholarships & grants
- Participate in job fairs to promote the organization and the work NWMO is doing
- Organize relevant panel discussions and symposia for students in Canada and from other countries



# NWMO RESPONSE: SUPPORTING SCIENCE LEARNING

- NWMO presents to students in relevant disciplines in universities (e.g. geology, engineering, policy & planning)
- During community engagement open houses, upon invitation, presentations are given to school groups
- Through NWMO Corporate Social Responsibility Program, NWMO sponsors national organizations that support science learning including student participation in:
  - Youth Science Canada science fairs
  - Shad Valley science & technology summer education program
  - Actua science-focused workshops and summer camps for Aboriginal youth, which include how Traditional Knowledge can play a role in the study of science
- Draft youth education and outreach strategy in development



# ACCESSING NON-SCHOOL BASED YOUNG ADULT POPULATIONS

## CURRENT REALITY

- Many young people do not attend post-secondary school, are pulled in a number of directions and have limited time available
- Young adults do not participate in traditional engagement activities such as town hall meetings
- To engage a geographical community it is important to engage the sub-communities within it

## OPPORTUNITIES

- Participate in local community activities and popular events
- Help to explore and foster community well-being by sponsoring local projects
- Develop tactile activities which include multi-media components: e.g. mobile exhibit; virtual tour of DGR



# NWMO RESPONSE: STIMULATING & INTERACTIVE EXHIBITS



NWMO Youth Roundtable





# YRT COMMENTS - OVERVIEW

- Impressed with NWMO efforts to change how project is communicated
  - Recognize how hard it is for an organization to adapt its approach
- YRT sees a fundamental shift in NWMO visual identity and how messages are communicated
  - From bureaucratic to exciting, scientific, cutting edge project
  - Cleaner design that will transfer well to social media context
- Impressed with integration of different learning models/approaches, particularly in the NWMO exhibit
  - Good use of visuals, sound, text, interactives in exhibit
  - NWMO information presented in more layered manner to facilitate learning and respond to different levels of interest
- Excellent improvements to website: new design, layout
- Key pillars of activity outlined in draft framework for education and outreach to youth were well-received, reflects direction provided by YRT – YRT looking forward to roll-out



# ADDITIONAL CONSIDERATIONS

- Moving forward, the YRT continued to encourage the NWMO to evolve its communications approach by: building a social media presence, considering the development of materials targeted to Aboriginal youth, and continuing to expand the mobile exhibit.
- Integrate more focus on engaging youth in social sciences, not just technical disciplines
  - Consider summer employment opportunities
- Integrate accessibility factors into NWMO communications materials (e.g. closed captioning for videos)
- Leverage the time and effort put into the YRT and identify opportunities to:
  - Integrate YRT members in NWMO outreach activities
  - Support YRT member presentations to schools, peers
  - Use YRT members as beta-testers for NWMO social media strategy
- Monitor generational shifts and consider bringing together a new YRT group in a few years for fresh perspectives

