Moving Forward Together: Designing the Process for Selecting a Site

Invitation to Review a Proposed Process for Selecting a Site

MAY 2009

nwmo

NUCLEAR WASTE MANAGEMENT ORGANIZATION

SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

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Invitation to Review a Proposed Process for Selecting a Site

In 2007, the Government of Canada approved a plan for the long-term management of the used nuclear fuel produced by Canada's nuclear electricity production. Called Adaptive Phased Management, the plan enables our generation to proceed in a deliberate and collaborative way to establish the foundation for the safe and secure stewardship of Canada's used nuclear fuel for the long term.

The NWMO is now implementing Adaptive Phased Management. Our current task is to collaboratively design the process that will be used to identify a safe and secure site in an informed and willing community to host Canada's long-term management facilities for used nuclear fuel.

Canadians have a decision to make: where should our used nuclear fuel be contained and isolated for the long term?

We need a fair, ethical and effective process for making this decision. We invite you to help design the process for selecting a site in an informed, willing host community.

A CANDU fuel bundle is approximately 0.5 metres long and weighs about 24 kilograms. If the used fuel bundles could be stacked like cordwood, all of Canada's used nuclear fuel bundles could fit into six hockey rinks, from the ice surface to the top of the boards.

Canada's Plan

FOR DECADES CANADIANS HAVE BEEN USING ELECTRICITY generated by nuclear power reactors in Ontario, Québec and New Brunswick. When used nuclear fuel is removed from a reactor, it is radioactive. Although its radioactivity decreases with time, the used fuel will remain a potential health risk for many thousands of years and requires proper management.

Today, used nuclear fuel is safely stored at licensed interim storage facilities at nuclear reactor sites in Canada. As we plan for the future, Adaptive Phased Management charts a course for the safe, secure long-term management of used nuclear fuel, in line with best international practice and the expectations of Canadians.

The Nuclear Waste Management Organization (NWMO) was created by Canada's nuclear electricity generators in 2002 as a requirement of the Nuclear Fuel Waste Act. The Act required the NWMO to study, recommend and then implement a plan for the long-term management of used nuclear fuel in Canada. The NWMO engaged thousands of citizens, specialists and Aboriginal people in every province and territory to develop a long-term management approach that is socially acceptable, technically sound, environmentally responsible and economically feasible. The plan that emerged from this dialogue, Adaptive Phased Management, requires that used nuclear fuel be contained and isolated in a deep geological repository. A fundamental tenet of this plan is the incorporation of learning and knowledge at each step, to guide a process of phased decision-making. The plan builds in flexibility to adjust the plan if needed.

Building on the Direction from Canadians

BUILDING ON ITS ONGOING PROGRAM OF ENGAGEMENT WITH CANADIANS, the NWMO initiated a dialogue in 2008 with interested organizations and individuals on important principles and elements for a fair process that ensures the selection of a safe, secure site for a deep geological repository in an informed and willing host community. Our Proposed Process for Selecting a Site is designed to be responsive to the direction provided by Canadians who participated in these dialogues.

Canadians told us they want to be sure, above all, that the selected site is safe and secure for people and the environment, now and in the future. The process for choosing the site must be grounded in the values and objectives that Canadians hold important, and it must be open, transparent, fair and inclusive. The people we engaged said the process must be designed in a way that citizens can be confident that the highest scientific, professional and ethical standards will be met. This project is designed to be implemented through a long-term partnership involving an informed and willing community.

What is the Project?

THIS $16 – $24 BILLION PROJECT will involve the development of a deep geological repository for the long-term management of used nuclear fuel and the creation of a centre of expertise. The used fuel will be safely contained and isolated by both engineered barriers and the geology surrounding the repository. This deep geological repository is similar to those being developed in other countries for the long-term management of used nuclear fuel. The system is designed so that the waste will be retrievable for an extended period. Consistent with international best practice, and the expectations of Canadians, the facility will be built to ensure the safety of people, communities and the environment.

This project is multi-generational and will be developed in phases. The deep geological repository will be sited and constructed over two or three decades, operated for three decades or more after that, and then monitored thereafter.

The repository and centre of expertise are high technology initiatives that will require extensive research and development over many decades. They will provide significant economic benefits, including direct employment for hundreds of people at the facility for many decades, plus many more indirect jobs. Implementation of the project will involve scientists, engineers, tradespeople and many others.

The project will be designed as a national centre of expertise for technical, environmental and community studies associated with the implementation of deep geological repositories. It includes the development of an underground demonstration facility and surface facilities such as laboratories, offices, public viewing galleries and exhibits. The centre will bring together a multi-disciplinary core group of scientists, researchers and others. It will become a hub for national and international scientific collaboration.

Community Well-Being

THIS PROJECT WILL BE IMPLEMENTED through a long-term partnership involving the community and the NWMO. It is important that the project be implemented in a way that will help the host community foster its well-being and sustainability.

Implementation of the project will deliver significant economic benefits to the host community, region and province from the construction and operation of the facilities and associated centre of expertise, extending over many decades. The project offers employment, income and other benefits, including the opportunity for the creation of transferable skills and capacities.

A project of this size may contribute to social and economic pressures in the community that will need to be managed by the NWMO and the community as part of implementation. The proposed process for selecting a site encourages communities to carefully consider their interest in the project in light of their long-term plans and aspirations.

Designing a Process for Selecting a Site

THE PROPOSED PROCESS IS DESIGNED TO address the broad range of issues and protections that people told us are important for any appropriate siting process in Canada. It draws from experiences and lessons learned from past work and processes developed in Canada to site facilities for the management of hazardous material. It also draws from similar projects in other countries pursuing the development of a deep geological repository.

The proposed site selection process is designed to use a partnership-based approach to:

- help ensure that any community that is selected to host this facility is both informed about the project and willing to host it;
- help ensure that any site that is selected to host this facility will safely contain and isolate used nuclear fuel for a very long period of time, in an appropriate geological formation, and that there is an acceptable way of transporting used fuel to the site;
- assist the potentially interested host community to consider carefully and thoroughly the project's potential benefits and risks when deciding whether to express interest, and ultimately, willingness to host the project;
- involve surrounding communities, regions and other jurisdictional levels potentially affected by the project and the transportation of used fuel in the identification and assessment of public health, environmental, social, economic and cultural effects of the project as part of a broader regional assessment;
- involve First Nations, Métis and Inuit who are potentially affected by the implementation of this project; and
- help foster an ongoing public conversation on questions to be answered and issues to be addressed throughout the site selection process.

We invite you to review the nine steps proposed in our discussion document Proposed Process for Selecting a Site

Share Your Thoughts

We invite you to review our discussion document, which outlines a proposed process for discussion. Share your thoughts on whether the proposed site selection process is appropriate and what changes, if any, need to be made. The comments you and others make will be used to refine the design of the process. To help initiate this conversation, we invite you to consider these 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?

We look forward to working with you to design an appropriate site selection process for this important national initiative. Please attend an upcoming information session in your region, complete a workbook, fill out a survey, make a submission on the NWMO website or send your comments to:

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SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

1 The Way Forward

For decades Canadians have been using electricity generated by nuclear power reactors in Ontario, Québec and New Brunswick. We have produced just over 2 million used fuel bundles—about 40,000 metric tonnes of uranium—a number that will double if our existing reactors operate to the end of their planned lives. When used nuclear fuel is removed from a reactor, it is radioactive. Although its radioactivity decreases with time, the used fuel will remain a potential health risk for many thousands of years and requires careful management. Canada's used fuel is now safely stored on an interim basis at licensed facilities located where the used fuel is produced. Like many other countries with nuclear power programs, Canada is planning for the future. Putting in place a plan for the long-term, safe and secure management of used nuclear fuel for the protection of people and the environment is an important responsibility we as Canadians share.

The Nuclear Waste Management Organization (NWMO) was created in 2002 as a requirement of the Nuclear Fuel Waste Act. The Act required the NWMO to study, recommend and then implement a plan for the long-term management of used nuclear fuel in Canada.

In 2002, the NWMO began its work to develop collaboratively with Canadians a management approach for the long-term care of Canada's used nuclear fuel. The organization envisaged an approach that would be socially acceptable, technically sound, environmentally responsible and economically feasible.

The NWMO conducted a three-year study involving thousands of citizens, including specialists, interested individuals and organizations and Aboriginal peoples, in research and dialogue to assess a range of storage and disposal options for the long-term management of used nuclear fuel. Two important requirements became evident during the study: the plan must be fair — both to current and future generations — and the outcome must be safe and secure — for people, communities and the environment. The NWMO came to understand that these requirements have important implications:

- Our generation needs to take active responsibility to achieve a safe, long-term response to our waste problem.
- The plan needs to have a definitive outcome, and it needs to provide flexibility along the way to take advantage of newer and better technologies when they are developed, or to adjust if people's values or priorities change over time.
- We need to provide the option to future generations to monitor the waste over an extended period.

In 2005 the NWMO recommended that Canada proceed in a deliberate and collaborative way to contain and isolate its used nuclear fuel in a deep geological repository. The plan for implementing this project includes phased decision-making, the incorporation of new learning and knowledge at each key step, and flexibility to adjust the plan if needed. The plan, called Adaptive Phased Management, was selected in 2007 by the Government of Canada as the approach for the long-term management of our used nuclear fuel. Adaptive Phased Management was developed in dialogue with Canadians to reflect features considered important by citizens. It is consistent with the programs that have been developed in many other countries with nuclear power programs, such as Switzerland, Sweden, United Kingdom, Finland and France.

Adaptive Phased Management involves:

- ultimate centralized containment and isolation of used nuclear fuel in a repository deep underground in a suitable rock formation;
- moving to this ultimate goal through a series of steps and clear decision points, which can be adapted over time as may be required;

- providing opportunities for citizens to be involved throughout the implementation process;
- allowing for optional temporary shallow storage at the central site, if needed;
- ensuring long-term stewardship through continuous monitoring of used fuel and maintaining the ability to retrieve it over an extended period should there be a need to access the waste or take advantage of new technologies that may be developed; and
- providing financial surety and long-term program funding to ensure the necessary money will be available for the long-term care of used nuclear fuel when it is needed.

The NWMO is now working to implement Adaptive Phased Management. The first major task is to collaboratively develop the process that will be used for seeking a site for this important national infrastructure initiative in collaboration with an informed, willing community.

In this document we propose a process for seeking an informed and willing community to host the project. This process has been designed to be responsive to the direction we received from Canadians who participated in our 2002–2005 study and in dialogues conducted in the fall of 2008, review of the experience of other countries and past siting experience in Canada.

The document provides a brief description of the project, suggests a set of principles and steps to guide the process, and outlines criteria to ensure safety of the facility and foster the well-being of the community. It also proposes a program to support the involvement of communities in the process, outlines the role of third-party review and describes the regulatory review as a key component of the process.

We invite Canadians to help us design this process. We look forward to hearing from you.

2 Description of the Project

Communities considering hosting the project will want to understand the dimensions of the project, how the community might benefit, what commitments they will have to make and the possible risks to be managed.

What might a community expect?

This national infrastructure project will involve the development of a deep geological repository for the long-term management of used nuclear fuel and a national centre of expertise. It is a multi-billion-dollar, high-technology project that will provide direct employment for hundreds of people for many decades, plus many more indirect jobs.

The used fuel will be contained and isolated in a deep geological repository consisting of a series of access and service shafts and a network of tunnels leading to placement rooms where specially designed used fuel containers will be placed. A series of engineered and natural barriers provided by the host rock will safely contain and isolate the used fuel from people and the environment for the very long time that it will remain dangerous. The used fuel will be monitored throughout all phases of implementation. It will also be retrievable at all times.

A centre of expertise comprising an active technical and social research and technology demonstration program will be established. This centre of expertise will support the project and serve as a hub for sharing research nationally and with other countries such as Switzerland, Sweden, the United Kingdom, France and Finland, and potentially other countries that are following similar paths.

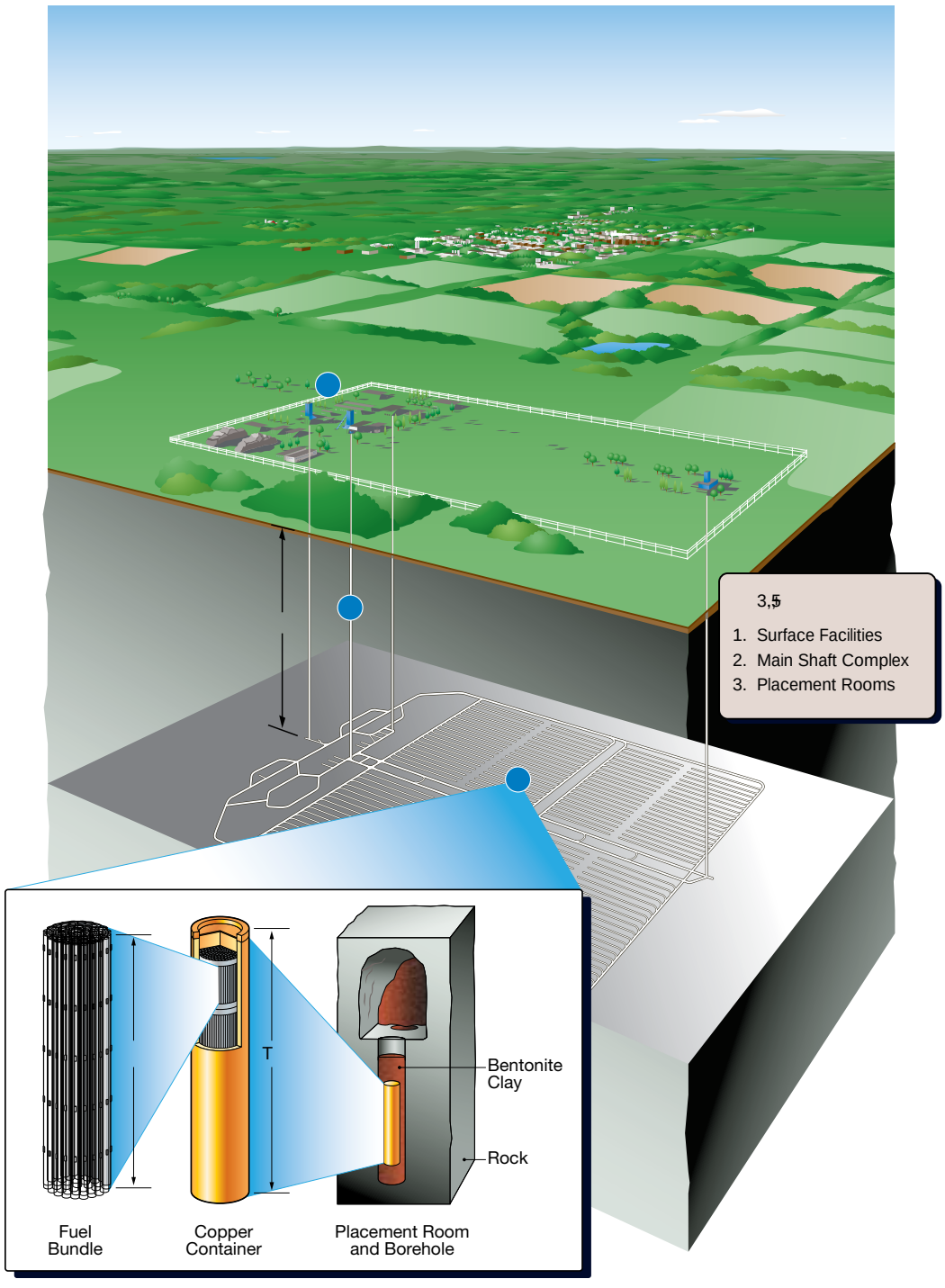
As a large infrastructure development involving scientists, engineers, construction crews and many others, the project will have an impact on any community in which it is located. It is a multi-generational project that will be developed in phases. The deep geological repository will be sited and constructed over two to three decades; waste will be placed there over a period of three decades, or more, after that and then monitored thereafter. The site will become a national centre of expertise for technical, environmental and community studies associated with the implementation of deep geological repositories. The centre will include the development of an underground demonstration facility and surface facilities such as laboratories, offices, public viewing galleries and exhibits. The centre will bring together a multidisciplinary core group of scientists, researchers and others.

Project implementation will require a long-term partnership involving the community and the NWMO to ensure that the project is implemented in a way that will help the community in which it is located foster its well-being and sustainability, consistent with its own vision for its future. The nature, pace and manner of progressing through the phases of the project will be determined in partnership with the community.

The construction and operation of facilities and the infrastructure associated with the project are expected to have significant economic benefits for a community over many decades. The project also offers significant employment and income revenue to the host region and host province.

With a project of this size and nature there is also the potential to contribute to social and economic pressures that will need to be carefully managed to ensure the long-term health and sustainability of the community. For example, housing and land values may rise at the outset and fall as construction of the deep repository is completed. Additional pressures may arise with the potential influx of temporary workers associated with the construction phase of the repository, possibly increasing demand for social and physical infrastructure services. In order to avoid or minimize social costs of this type, and to assist communities to adapt to the

opportunities and challenges linked to the project, the need for assistance in areas such as job training, affordable housing and needed infrastructure would be examined. The NWMO is committed to helping to ensure that the long term well-being of the community is fostered through its involvement in this project.

The deep geological repository will require a surface area of about two by three kilometres. The underground facility will be constructed at a depth of approximately 500 metres, depending upon the geology of the site, and will consist of a network of placement rooms for the used fuel.

A CANDU fuel bundle is about 0.5 metres long. Engineered and natural barriers will safely contain and isolate the used fuel from people and the environment. Three hundred or more used fuel bundles will be enclosed in corrosion-resistant copper and steel containers. These containers will be placed in boreholes drilled into the floor along the length of the placement rooms and surrounded and protected by a bentonite clay sealing material. The placement rooms will be connected by a series of access and surface shafts and a network of access tunnels.