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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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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Discussion Document: Proposed Process for Selecting a Site

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NUCLEAR WASTE MANAGEMENT ORGANIZATION

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.

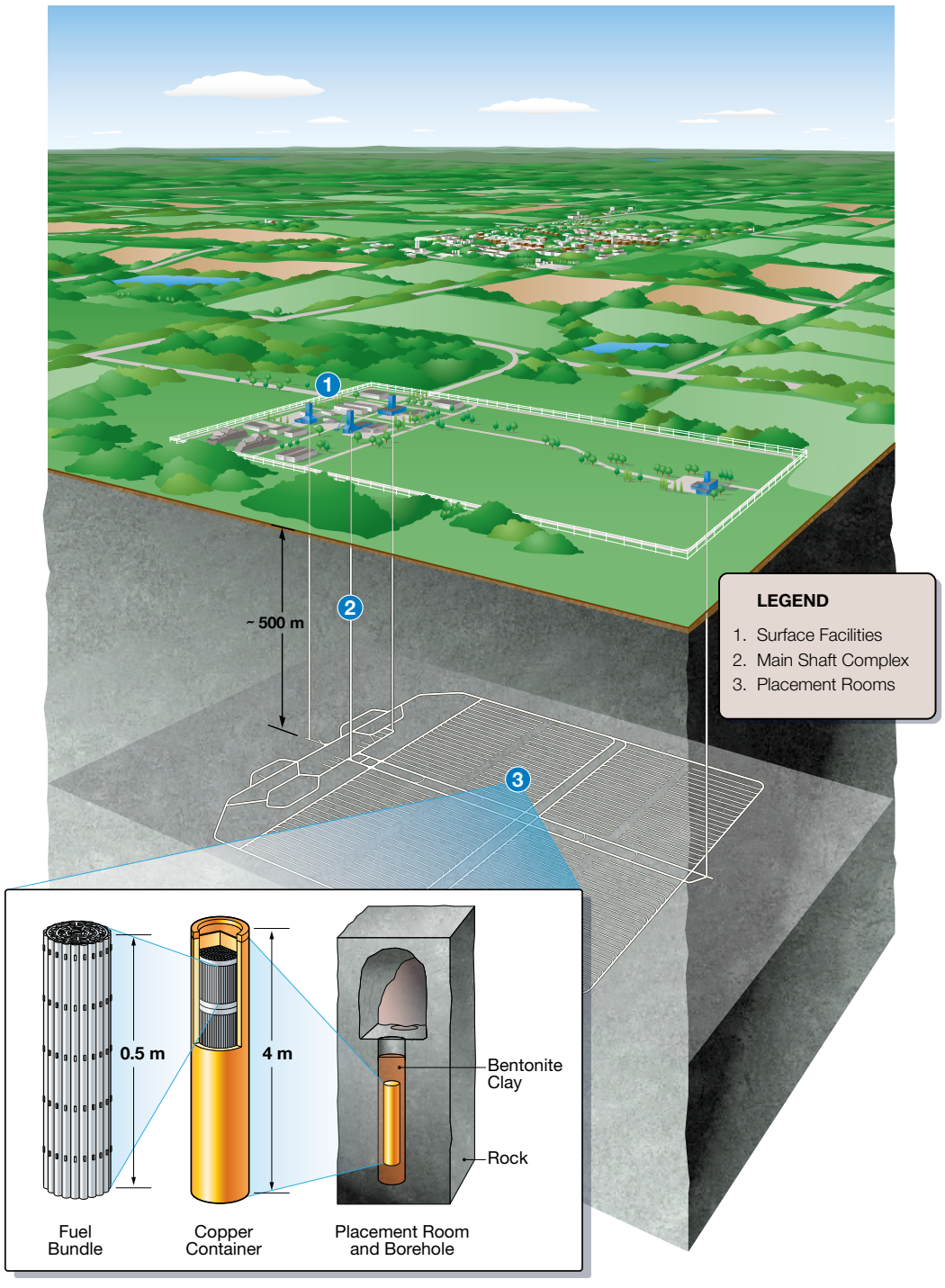
The construction and operation of facilities and the infrastructure associated with the project are expected to have significant economic benefits for a community over many decades. The project also offers significant employment and income revenue to the host region and host province.

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.



What are the initial requirements to be considered?

The NWMO is committed to ensuring that any site selected to host the deep geological repository and centre of expertise can safely and securely contain and isolate used nuclear fuel for the long time frames required.

The proposed site selection process will evaluate the safety of the site over a series of steps using a comprehensive set of safety criteria, described later in this document.

In order to begin the evaluation process, a site would need to meet the following initial screening criteria:

- Have enough available land to accommodate the surface and underground facilities. (The project requires a surface area of about two by three kilometres of open land. Most of the site surface will be suited to landscaped grounds. The surface buildings that would be constructed would cover a small fraction of the total land area.)
- Be outside of protected areas, heritage sites, provincial parks and national parks.
- Not contain groundwater resources at the repository depth, so that the repository site is unlikely to be disturbed by future generations.
- Not contain economically exploitable natural resources as known today, so that the repository site is unlikely to be disturbed by future generations.
- Not be located in areas with known geological and hydrogeological features that would prevent the site from being safe, considering the safety factors outlined beginning on page 28.

How much used fuel will be managed?

The *Nuclear Fuel Waste Act* requires the NWMO to manage all used nuclear fuel produced in Canada. To date, Canada has produced just over 2 million used fuel bundles. If Canada's existing reactors operate to the end of their planned current lives, the number of used fuel bundles that will need to be managed in the facility will double to approximately 4 million.

The specific volume of used fuel to be managed will be determined by decisions made in the future by provincial governments, nuclear plant operators and regulators. For instance, the lives of existing reactors might be extended through refurbishment. Provincial governments may also decide to build additional nuclear plants that would add to the volume of used fuel to be managed. It is currently estimated that planned and proposed refurbishment projects could bring the total volume of used fuel to be managed to about 5 million bundles, and with the new nuclear reactors currently under discussion the total could reach 8 million bundles. Ultimately, the specific volume and type of used fuel to be placed in a particular facility will be subject to the agreement of the community hosting the facility and approval of regulatory authorities.

How will the project be funded?

The planning, development and implementation of the project is funded by the major owners of used nuclear fuel in Canada: Ontario Power Generation, NB Power, Hydro-Québec and Atomic Energy of Canada Limited. As required by the *Nuclear Fuel Waste Act*, each of the four companies has established separate independently managed trust funds (segregated funds) and makes annual deposits to ensure the money to fund this project will be available when needed.

About the project

This is a $16–$24 billion project that will be implemented in phases.[1, 2]

DURING THE SITE SELECTION PROCESS

- **Initial site evaluation** (initial screening and preliminary assessment) will explore in a preliminary way whether geographic areas identified by the community contain sites that may have the geological characteristics required to safely host a deep geological repository for Canada's used nuclear fuel, and whether the well-being of the community will be fostered by the project. Conducted in collaboration with the community, this work would involve desktop studies based on available geoscientific and socio-economic information. Limited field investigations may be conducted depending on the extent of available information concerning sites. This work is expected to be conducted over a period of 1-2 years.
- **Detailed site evaluation** will confirm whether the site is suitable in terms of safety and community well-being and support the regulatory approval process. Conducted in collaboration with the community, this work would involve detailed field and laboratory investigations, testing, monitoring and safety analysis as well as socio-economic studies. About 20–40 workers with a wide range of skills, including technical and social scientists, equipment operators and other skilled workers and technicians, would be required at the site. Spending during this phase would be tens of millions of dollars per year for a period of about 5 years.
- **Establishment of a centre of expertise,** including construction and operation of an underground demonstration facility, will demonstrate the safety of the facilities before they are constructed. This work would involve several hundred workers at the site per year to build and staff the underground facility as well as a centre of expertise, which will operate throughout construction and operation of the project. Spending during this phase would be in the order of 100 million dollars each year for a period of about 5 years.

DURING IMPLEMENTATION OF THE PROJECT

- **Construction of the deep geological repository** will proceed at a depth of approximately 500 metres and consist of a series of access and service shafts and a network of tunnels leading to placement rooms where used fuel containers will be safely placed. Various surface facilities will also be required to receive, process and re-package used fuel bundles and prepare clay-based sealing materials. Construction activities will involve about 600–800 workers at the site with a wide range of skills, including equipment operators, engineers, scientists, mining personnel, tradespeople, social researchers, financial administrators and public communication professionals, each year. Spending during this phase would be several hundreds of millions of dollars each year for a period of about 5 years. In addition to the on-site employment, there will be significant direct employment opportunities created in the host community for a variety of support services such as transportation, catering and equipment supply. Depending on the host economic region, wealth creation in the form of business profits and personal income throughout the region during the construction phase is expected to be billions of dollars.
- **Operation of the facilities** would continue as used nuclear fuel is transported from the nuclear stations and placed in the repository. This work would involve hundreds of workers with a wide range of skills, including equipment operators, engineers, scientists, mining personnel, tradespeople, financial analysts and public communication professionals. Spending during this phase would be in the order of 200 million dollars each year for a period of 30 or more years. In addition to this, annual employment in the host community will be created by the many businesses that will be required to support direct ongoing operations at the facility. Depending on the host economic region, wealth creation in the form of business profits and personal income throughout the host region during the operation phase is expected to be billions of dollars.

1: Project costs are estimated to be between $16 and $24 billion (2002 dollars); or $7–$8 billion in present value terms (January 2009$).
2: Labour and dollar figures (reflecting cash flows) are estimates provided by AECOM. See "Summary of Economic Benefits Linked to Adaptive Phased Management at an Economic Region Level" on the NWMO website.

3 A Fair Process

Canadians told us they want to be sure, above all, that the site for the deep geological repository 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. The process must be open, transparent, fair and inclusive. And the process must be designed in a way that assures citizens across the country that the highest scientific, professional and ethical standards will be met.

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 will potentially be 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.

The approach is built on a set of guiding principles and is composed of nine key steps. While the principles and steps are proposed as a foundation for proceeding, the pace and manner of implementation will need to be flexible and adaptive. For example, since this is a process designed to be triggered by the interest and decision of a community, it is anticipated that different communities may be at different points in the process at any given time. As well, concepts such as "community" and "willingness" require further definition as the site selection process progresses. The proposed process is designed to provide a platform for discussion and refinement of these concepts as these decisions are made.

Guiding Principles

In the design of Adaptive Phased Management and in recognition of its ethical obligation, the NWMO made four important commitments. These commitments comprise the starting point for the design of the siting process:

Focus on safety. Safety, security and protection of people and the environment are central to the siting process. Any site selected will need to address scientific and technical site evaluation factors that will acknowledge precaution and ensure protection of present and future generations and the environment for a very long period of time. All applicable regulatory requirements will need to be met and, if possible, exceeded.

Informed and willing "host community". The host community, the local geographic community in which the facility is to be located, must be informed and willing to accept the project. The local community must have an understanding of the project, and how it is likely to be impacted by it. As well, the local community must demonstrate that it is willing to accept the project.

Focus on the nuclear provinces. As identified by Canadians involved in the NWMO study, fairness is best achieved with the site selection process focused within the provinces directly involved in the nuclear fuel cycle: Ontario, New Brunswick, Québec and Saskatchewan. These provinces will be the focus of NWMO siting activities. Communities in other regions that identify themselves as interested in possibly hosting the facility will also be considered.

Right to withdraw. Communities that decide to engage in the process for selecting a site as potential hosts have the right to end their involvement in the siting process at any point up to and until the final agreement is signed, just prior to the project being submitted for regulatory approvals.

In conversations with Canadians during the study phase of our work, we heard that the process for selecting a site should seek to be responsive to a broad range of characteristics which Canadians said would be important. Building on these characteristics, the NWMO proposes the following additional operational principles to guide the site selection process.

Siting process led by "interested communities". The steps in the siting process will be driven or triggered by communities expressing interest in exploring their potential suitability as host. A community will proceed to the next step only if it chooses to do so. Potentially interested communities may explore their interest in the project in the way they see fit, with the support of the NWMO, and with funding available to seek independent advice and peer review, and to involve residents in the community, at each stage.

Definition of "interested community". For the purpose of the initial steps in the site selection process, an "interested community" refers to a community—defined as a political entity such as a city, town, village, municipality, region or other municipal structure—which is interested in the siting process. "Interested communities" may also include Aboriginal governments. An "interested community" may also be made up of a combination of these.

Definition of "interested community" in the special case of Crown land. In the case of Crown land and unorganized territory, the provincial government would be considered an "interested community" in consultation with potentially affected Aboriginal peoples.

Aboriginal rights, treaties and land claims. The siting process will respect Aboriginal rights and treaties and will take into account that there may be unresolved claims between Aboriginal peoples and the Crown.

Shared decision-making. The site selection decision will be made in stages and will entail a series of decisions about whether and how to proceed. Each potential host community, and later the host community, would be involved in decision-making throughout the process. For example, criteria and procedures to assess the effects of the project on the community would be collaboratively developed and assessed with the NWMO.

Inclusiveness. In addition, the NWMO will respond to, and address where appropriate, the views of others that are most likely to be affected by implementation, including the transportation of used nuclear fuel that would be required. Full opportunity will be provided to have their questions and concerns heard and taken into account in decision-making on a preferred site. The NWMO will provide the forms of assistance they require to formulate and communicate their questions and concerns. The views of provincial governments that could be affected will also be addressed.

Informing the process. The selection of a site will be informed by the best available knowledge—including science, social science, Aboriginal Traditional Knowledge, and ethics—relevant to making a decision and/or formulating a recommendation throughout the process. Consistent with the NWMO's commitment to transparency in its work, the information that is collected and used to assess the potential suitability of a site will be the subject of third-party review at each step and will be published on the NWMO website for public review and scrutiny throughout the process.

Community well-being. An important objective of project implementation will be to foster the long term well-being, or quality of life, of the community in which it is implemented. The site selection process is designed to assist the potential host community to think carefully and thoroughly about the potential benefits and risks to their community associated with this project in assessing their interest and, ultimately, willingness.

Regulatory review. Once a willing host community has been identified, and a preferred site has been selected and its safety assessed through detailed study, construction of the facility will not proceed until it has been further demonstrated that the safety, health and environmental protection standards set by the regulatory authorities can be met and enforced. The project and site will be independently reviewed in a stepwise fashion through a series of regulatory approval processes as outlined in the *Canadian Environmental Assessment Act* and the *Nuclear Safety and Control Act* and their regulations. These regulatory processes involve detailed independent review as well as the conduct of public hearings.

Ensuring the well-being of the community will be a continuing focus of federal government oversight of this national project. As required by the *Nuclear Fuel Waste Act* (2002), the NWMO will report to the Minister of Natural Resources every three years on: significant socio-economic effects of NWMO activities on a community's way of life or on its social, cultural or economic aspirations; the results of its public consultations; and the comments of the NWMO Advisory Council on these activities.

Steps in the Process

The decision about an appropriate site is proposed to be made over a series of steps. The proposed steps in the process are outlined at a glance in the table that follows, and then in more detail in a second table. It is expected that individual communities will proceed through the steps in a pace and manner that reflects their needs and preferences. Individual communities may find themselves at different points in the process at any given time.

The Proposed Process for Selecting a Site – At a Glance

Step 1	**The NWMO initiates the siting process.** Through a broad program of activities, the NWMO will provide information, answer questions, and build awareness among Canadians and communities about the project and the siting process. Awareness-building activities will continue throughout the siting process.
Step 2	**For communities that would like to learn more, an initial screening is conducted.** At the request of the community, the NWMO will evaluate the potential suitability of the community against a list of initial screening criteria (outlined on page 25).
Step 3	**For interested communities, a preliminary assessment of potential suitability is conducted.** At the request of the community, a feasibility study will be conducted to determine whether a site in the community has the potential to meet the detailed requirements for the project. The NWMO will conduct the feasibility study in collaboration with the community.
Step 4	**For interested communities, potentially affected surrounding communities are engaged and detailed site evaluations are completed.** In this step, the NWMO will work with interested communities to engage potentially affected surrounding communities in a study of health, safety, environment, social, economic and cultural effects of the project at a regional level, including effects that may be associated with transportation. Involvement will continue throughout the siting process. The NWMO will also select one or more suitable sites from communities expressing formal interest, and conduct detailed site evaluations in collaboration with the community.
Step 5	**Communities with confirmed suitable sites decide whether they are willing to accept the project and negotiate the terms and conditions of a formal agreement to host the facility with the NWMO.**
Step 6	**The NWMO and the community with the preferred site enter into a formal agreement to host the project.** The NWMO selects preferred site, and the NWMO and community ratify formal agreement.
Step 7	**A centre of expertise is established, and construction and operation of an underground demonstration facility proceeds.** The NWMO, in partnership with the community, will establish a centre of expertise involving the construction of an underground demonstration facility and surface facilities to demonstrate technologies that will be used to implement the project. The regulatory requirements for this step will be discussed with regulatory agencies.
Step 8	**Regulatory authorities review the safety of the project and, if all requirements are satisfied, give their approvals to proceed.** The regulatory review and approval process will involve an environmental assessment and a series of consecutive licensing phases related to site preparation and construction, and the operation of facilities associated with the project. Various aspects of transportation of used nuclear fuel will also need to be approved by regulatory authorities.
Step 9	**Construction and operation of the facility.** The NWMO implements the project, starting with site preparation and construction of the deep geological repository and associated surface facilities. Operation will begin after an operating licence is obtained. The NWMO will continue to work in partnership with the host community in order to ensure the commitments to the community are addressed throughout the entire lifetime of the project.

The Proposed Process for Selecting a Site – For Discussion

Step 1

The NWMO initiates the siting process with a broad program to provide information, answer questions and build awareness among Canadians about the project and the siting process.

The NWMO initiates the siting process with a program of information mailings, briefings and engagement activities designed to help build awareness and understanding of the NWMO, the project, steps in the siting process and the criteria to assess suitability of potential host communities.

The NWMO will ensure opportunities to learn more and will both seek opportunities to provide information and respond to requests for information. It will focus its outreach activities on the four nuclear provinces, including municipalities, regional planning commissions, the broad public, interested individuals and organizations, and First Nations, Métis and Inuit who have expressed interest in learning more. The information shared in the outreach program will be posted on the NWMO website for broad public access and review. Activity of this nature is expected to continue throughout the site selection process and in parallel with subsequent steps.

Step 2

For communities that would like to learn more, an initial screening is conducted.

A. A community expresses interest in learning more about the process.
A community expresses interest in learning more about the project and steps in the process with a request to the NWMO. The request must be made by accountable authorities (for example, elected representative bodies). This may involve: existing Municipal Council of a community; the community establishing a new community group involving community leaders; or other group as deemed appropriate by the community for learning more about the project.

B. The NWMO evaluates potential suitability of the community against list of initial screening criteria (outlined on page 25).
Initial screening of the potential suitability of the community based on available information and a short list of initial screening criteria. This evaluation will be reviewed by a group of experts, discussed in Section 6, brought together for this purpose. Unless all initial screening criteria can be met at this early point, the community will be excluded from further consideration.

C. The NWMO provides a detailed briefing to community.
The NWMO provides a detailed briefing, or series of briefings, about the project and the steps in the process to communities that are interested and not excluded by the initial screening. The NWMO will provide resources (funding and information, if desired) to the community to support the exploration of its interest in proceeding to the next step in the process.

Step 3

For communities that continue to be interested, a preliminary assessment of potential suitability is conducted over a 1- to 2-year period.

A. The community informs the NWMO of its interest in a preliminary assessment of its potential suitability.

Accountable authorities contact the NWMO to request preliminary information (in the form of a feasibility study) about whether a geographic area or areas in a community has the potential to meet the more detailed requirements for the project. No commitment from the community to participate in the project beyond conduct of preliminary assessment (feasibility studies) is required. For communities uninterested in proceeding, their involvement in the siting process ceases.

B. The NWMO conducts feasibility studies in collaboration with the community to assess whether the community contains potentially suitable sites.

The NWMO and accountable authorities from the community develop a memorandum of understanding outlining the scope of work, the means by which the NWMO and the community will work together throughout the feasibility studies, the approach to and terms of reference for a multidisciplinary peer review process, the way that citizens will be engaged and the nature of the funding provided by the NWMO to the community to support the process.

The NWMO, working with the community, will conduct feasibility studies, using pre-established geoscientific and community well-being related criteria, as outlined in Section 4, over a period of 1-2 years depending on availability of existing information.

The NWMO would provide resources to the community to support the exploration of its interest. The NWMO will publish on its website the results of the feasibility studies, the results of the peer review and its conclusions on the extent to which sites within the proposed areas are considered suitable.

C. Communities with potentially suitable sites assess whether they are interested in continuing to detailed site evaluation.

Communities with potentially suitable sites assess whether they are interested in continuing to detailed site evaluation. The NWMO will provide resources to the community to support its decision-making concerning whether or not to proceed to the next step in the process.

Step 4

For communities that continue to be interested, potentially affected surrounding communities are engaged and detailed site evaluations are completed over a 5-year period.

A. Communities with potentially suitable sites inform the NWMO of their interest in continuing to detailed site evaluation.

Accountable authorities in communities with potentially suitable sites express formal interest in being considered for the project and request detailed evaluation of their suitability. For potentially suitable communities not interested in proceeding, involvement in the siting process ceases.

B. Several activities will take place in the course of completing this step. These activities may be undertaken in parallel or sequentially.

» The NWMO and the interested community engage surrounding communities and potentially affected Aboriginal government in study of social, economic and cultural effects of the project at the broader regional level.

The NWMO will encourage interested communities to involve surrounding communities, the region and potentially affected Aboriginal governments as early as possible in conversations about the potential suitability of the community and the site, and interest in hosting the project. At this point in the process, the NWMO will work with the community to engage potentially affected surrounding communities, regions and jurisdictional levels, if not already involved, in discussions concerning the potential social, economic and cultural effects associated with locating the project in the community that has expressed interest and has potentially suitable sites. This would include effects that may be associated with transportation. Engagement of potentially affected communities will continue throughout the siting process. The NWMO will make funding available to accountable authorities in potentially affected surrounding areas, including First Nations, Métis and Inuit, as appropriate, to support their participation. A report will be produced and published on the NWMO website.

» The NWMO selects one or more suitable sites from communities expressing formal interest for detailed site evaluations.

At a point to be determined during the siting process, the NWMO will announce the closing of the formal expression of interest phase, ensuring a minimum of six months' notice in advance of the closing date. The NWMO will then select one or more sites from communities that have expressed formal interest, using the criteria identified in Section 4 as the basis for a decision-making process that will be developed with the participation of the communities involved. Results of this process will be shared with the communities and then published on the NWMO website.

» The NWMO conducts detailed site evaluations in collaboration with the community to further assess and, if appropriate, confirm the suitability of sites.

The NWMO and accountable authorities will develop a memorandum of understanding outlining the scope of work, the means by which the NWMO and community will work together throughout the detailed site evaluation, the approach to and terms of reference for a multidisciplinary peer review process, the way that citizens will be engaged and the nature of the funding provided by the NWMO to the community to support the process. The NWMO will conduct detailed field investigations involving geophysical surveys, characterization of the existing environment, drilling and sampling of boreholes, field and laboratory testing and monitoring activities. The NWMO will identify preferred transportation modes and potential routes and will welcome communities along the transportation route to raise questions or concerns to be addressed in the process. The NWMO will publish on its website the results of the detailed investigations and its conclusions on the extent to which proposed sites are suitable.

C. Communities with confirmed suitable sites assess whether they are willing to accept the project.

Communities with confirmed suitable candidate sites assess whether they are willing to accept the project, including engaging the community to assess and demonstrate this willingness. The NWMO provides resources to the community to assess and demonstrate its willingness to host the project.

Step 5

Communities with confirmed suitable sites decide whether they are willing to accept the project and negotiate the terms and conditions of an agreement with the NWMO.

A. Communities with confirmed suitable sites express willingness to accept the project.
The NWMO requires formal expression of interest from an accountable decision-making body, supported by a compelling demonstration of willingness among those living in the local area. Communities that are unwilling or cannot demonstrate willingness in a compelling manner will cease involvement in the siting process.

B. The NWMO and communities develop an agreement that outlines the basis upon which the project would potentially proceed in that community.
The agreement will include: the means by which the NWMO and community will work together to seek regulatory approval to implement the project—formal partnership structure; the need for and nature of provision of resources and funding for technical review and other assistance; the need for and nature of any decision-making and/or advisory bodies to support the process; mechanism to be used for dispute resolution; approach to ensuring the long-term sustainability and well-being of the community through the project, outlining specific inclusions; and approach to managing risk associated with the project and, where risk cannot be eliminated or reduced, the means by which it will be mitigated.

Step 6

The NWMO and the community with the preferred site enter into a formal agreement to host the project.

A. The NWMO selects preferred site.
The preferred site will be one that can be demonstrated to be able to safely contain and isolate used nuclear fuel, protecting humans and the environment over the very long term. Locating the facility at the preferred site will also help foster the well-being of the local community. The preferred site will be selected using the criteria outlined in Section 4, aided by a decision-making process that will be developed with the participation of communities involved.

B. The NWMO and community ratify formal agreement to host the project.
The accountable decision-making body enters into a formal agreement with the NWMO as to the conditions under which the project would proceed, subject to regulatory approval.

Step 7

A centre of expertise is established, and construction and operation of an underground demonstration facility proceeds.

The NWMO, in partnership with the community, will establish a centre of expertise involving an underground facility and surface facilities to demonstrate the technologies that will be used to implement the project. The regulatory requirements for this step will be discussed with regulatory agencies.

Step 8

Regulatory authorities review the safety of the project and, if all requirements are satisfied, give their approvals to proceed.

Prior to construction, the NWMO will have to demonstrate that the project meets or surpasses all environment, health, safety and security requirements set by regulatory authorities. The project will proceed only after all regulatory approvals are obtained. The regulatory process may evolve over time. It currently includes the following steps in assessing the safety and acceptability of the project:

- The project would be the subject of an environmental assessment involving public hearings.
- Upon acceptance of the environmental assessment, site preparation and construction licences from the Canadian Nuclear Safety Commission, involving public hearings, would be required.
- Once the facility is constructed, an operating licence from the Canadian Nuclear Safety Commission, involving public hearings, will be required.
- Various aspects of the transportation of used nuclear fuel will need to be approved by regulatory authorities.

Step 9

Construction and operation of the facility begins.

The NWMO begins implementing the project, starting with site preparation and construction of the deep geological repository and associated surface facilities, followed by operation after an operating licence is obtained. The NWMO will continue to work in partnership with the host community in order to ensure the terms of the agreement continue to be met throughout the entire period of construction, operation and closure of the facility.

4 Ensuring the Safety of a Site and Fostering Community Well-Being

The safety and appropriateness of any potential site will be assessed against a number of factors, both technical and social in nature. The site will be assessed in a series of steps. Each step is designed to evaluate the site in greater detail than the one before. A site may be found to be unsuitable at any stage of evaluation, at which point work at that site would cease and the site would no longer be considered for a deep geological repository.

The community would need to meet a minimum set of criteria in order to enter into the site selection process. These criteria would be the first applied in an initial screening step conducted by the NWMO (Step 2) using readily available information. If these criteria cannot be met, the proposed site would be excluded from the more detailed evaluation process and from further consideration. The proposed initial screening criteria, as mentioned earlier in this document, are as follows:

- The site must have enough available land of sufficient size to accommodate the surface and underground facilities.
- This available land must be outside of protected areas, heritage sites, provincial parks and national parks.
- This available land must not contain groundwater resources at the repository depth, so that the repository site is unlikely to be disturbed by future generations.
- This available land must not contain economically exploitable natural resources as known today, so that the repository site is unlikely to be disturbed by future generations.
- This available land must not be located in areas with known geological and hydrogeological features that would prevent the site from being safe, considering the outlined safety factors beginning on page 28.

Available land or individual sites that meet these initial criteria and are identified by communities for potential consideration by the NWMO would be the subject of a progressively more detailed evaluation in two primary areas:

- *First, ensuring safety*—that is the ability of the site to protect people and the environment, now and in the future.
- *Second, beyond safety*—the effect of the project on the sustainability and well-being of the host community.

The preferred site will be one that can be demonstrated to be able to safely contain and isolate used nuclear fuel, protecting humans and the environment over the very long term. Locating the facility at the preferred site will also help foster the well-being, or quality of life, of the local community. Should more than one site be suitable, the preferred site will be selected using the criteria outlined in the discussion that follows, aided by a decision-making process that will be developed with the participation of communities involved.

Protecting humans and the environment

Any site that is selected to host this facility must be demonstrated to be able to safely contain and isolate used nuclear fuel for a very long period of time. Any site selected will need to address scientific and technical siting factors that will acknowledge precaution and ensure protection for present and future generations.

The ability of a deep geological repository to safely contain and isolate used nuclear fuel relies on the form and properties of the waste, the human-made or engineered barriers placed around the waste and the natural barriers provided by the host rock formation in which the repository will be located.

The preferred site will be in a rock formation with desirable characteristics (geological, hydrogeological, chemical and mechanical), that are consistent with the expectations of the Canadian Nuclear Safety Commission, the guidance of the International Atomic Energy Agency and experience in other countries with nuclear waste management programs.

Six key safety-related questions will be asked of any site:

1. Are the characteristics of the rock at the site appropriate to ensuring the long-term containment and isolation of used nuclear fuel from humans, the environment and surface disturbances?

2. Is the rock formation at the site geologically stable and likely to remain stable over the very long term in a manner that will ensure the repository will not be substantially affected by natural disturbances and events such as earthquakes and climate change?

3. Are conditions at the site suitable for the safe construction, operation and closure of the repository?

4. Is human intrusion at the site unlikely, for instance through future exploration or mining?

5. Can the geologic conditions at the site be practically studied and described on dimensions that are important for demonstrating long-term safety?

6. Can a transportation route be identified or developed by which used nuclear fuel can safely and securely be transported to the site from the locations at which it is currently stored?

These key safety-related questions must be addressed through the development of a robust safety case. The safety case will need to demonstrate with confidence that the project can be safely implemented at the site and can meet or exceed the requirements of regulatory authorities.

The site, having met the requirements of the initial screening (Step 2), will be evaluated in these six areas through a series of steps.

- At the preliminary assessment stage (Step 3), the NWMO working with the community will conduct feasibility studies designed to explore the pre-established criteria identified later in this section. This will involve desktop studies using available technical information on the geographic areas of potential interest in order to assess, in a preliminary way, whether the community contains sites that may be suitable for developing a safe, underground repository. These studies may also involve limited field investigations depending on the extent of existing available information.

- More detailed site evaluations (Step 4) will involve field investigations at selected sites and the performance of safety assessments. Field investigations would include airborne and surface-based geophysical surveys, characterization of the existing environment, drilling and sampling of boreholes, field and laboratory testing and monitoring activities.

- A final, independent review of the safety of the project and site will be conducted by regulatory authorities (Step 8). The project will proceed only after this work has been completed and all regulatory approvals obtained.

The results of these assessments will be reported for all potential sites as the process continues.

Proposed Criteria to Ensure Safety

SAFETY FACTORS TO BE CONSIDERED	PERFORMANCE OBJECTIVES	EVALUATION FACTORS
Containment and isolation characteristics of the host rock	**1.** The geological, hydrogeological and chemical and mechanical characteristics of the site should: » promote long-term isolation of used nuclear fuel from humans, the environment and surface disturbances; » promote long-term containment of used nuclear fuel within the repository; and » restrict groundwater movement and retard the movement of any released radioactive material.	**1.1** The depth of the host rock formation should be sufficient for isolating the repository from surface disturbances and changes caused by human activities and natural events. **1.2** The volume of available competent rock at repository depth should be sufficient to host the repository and provide sufficient distance from active geological discontinuities and unfavourable heterogeneities. **1.3** The geochemical composition of the groundwater and rock porewater at repository depth should not adversely impact the safety of the repository. **1.4** The hydrogeological regime within the host rock should exhibit low groundwater velocities. **1.5** The mineralogy of the host rock and chemistry of the groundwater should be favourable to retarding radionuclide movement. **1.6** The host rock should be capable of withstanding natural stresses and thermal stresses induced by the repository without significant structural deformations or fracturing that could compromise the containment and isolation functions of the repository.

SAFETY FACTORS TO BE CONSIDERED	PERFORMANCE OBJECTIVES	EVALUATION FACTORS
Long-term stability of the site	**2.** The containment and isolation functions of the repository should not be unacceptably affected by future geological processes and climate changes.	**2.1** Current and future seismic activity at the repository site should not adversely impact the integrity and safety of the repository system during operation and in the very long term. **2.2** The expected rates of land uplift, subsidence and erosion at the repository site should not adversely impact the containment and isolation functions of the repository. **2.3** The evolution of the geomechanical, hydrogeological and geochemical conditions at repository depth during future climate change scenarios such as glacial cycles should not have a detrimental impact on the long-term safety of the repository. **2.4** The repository should be located at a sufficient distance from geological deformation zones or fault zones that could be potentially reactivated in the future.
Repository construction, operation and closure	**3.** The surface and underground characteristics of the site should be favourable to the safe construction, operation, closure and long-term performance of the repository.	**3.1** The strength of the host rock and in-situ stress at repository depth should be such that the repository could be safely excavated, operated and closed without unacceptable rock instabilities. **3.2** The soil cover depth over the host rock should not adversely impact repository construction activities. **3.3** The available surface area should be sufficient to accommodate surface facilities and associated infrastructure.

SAFETY FACTORS TO BE CONSIDERED	PERFORMANCE OBJECTIVES	EVALUATION FACTORS
Human intrusion	**4.** The site should not be located in areas where the containment and isolation functions of the repository are likely to be disrupted by future human activities.	**4.1** The repository should not be located within rock formations containing economically exploitable natural resources such as gas/oil, coal, minerals and other valuable commodities as known today. **4.2** The repository should not be located within geological formations containing exploitable groundwater resources (aquifers) at repository depth.
Site characterization	**5.** The characteristics of the site should be amenable to site characterization and site data interpretation activities.	**5.1** The host rock geometry and structure should be predictable and amenable to site characterization and site data interpretation.
Transportation	**6.** The site should have a route that exists or is amenable to being created that enables the safe and secure transportation of used fuel from existing storage sites to the repository site.	**6.1** The repository should be located in an area that is amenable to the safe transportation of used nuclear fuel. **6.2** The repository should be located in an area that allows appropriate security and emergency response measures during operation and transportation of the used nuclear fuel.

Fostering 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.

The NWMO encourages communities to consider this project in the context of their long-term interests. Such a broad approach would help highlight the resources (social, economic, environmental) of the community and pave the way for thinking about how the project may affect the community in a variety of dimensions.

The project offers significant employment and income to the host community, region and province, including the opportunity for the creation of transferable skills and capacities. However, with a project of this size and nature there is the potential to contribute to social and economic pressures that must be carefully managed to ensure the long-term health and sustainability of the community.

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. Although there is no single definition of community well-being, communities often include in their consideration elements relating to such things as economic health, the environment, safety and security, spiritual dimensions, social conditions, and enhancing opportunities for people and communities.

In order to identify what processes and supports the NWMO would need to put in place in order to ensure that the project helps foster the well-being of the community, the NWMO proposes to consider a range of factors. The NWMO would evaluate and work with potentially interested communities to identify a plan to address the factors outlined in the table that follows. A plan to foster the well-being of the community through the implementation of the project would be outlined in an agreement with the community (Step 5). Low performance on any of these factors would not exclude a community from consideration, although the ability of the community to benefit from the project, and the resources that would be required from the NWMO to support the community in achieving this benefit, would be a consideration in the selection of a site after all safety considerations have been satisfied.

Proposed Criteria to Assess Factors Beyond Safety

FACTORS TO BE CONSIDERED	EVALUATION FACTORS
Potential social, economic and cultural effects, including factors identified by Aboriginal Traditional Knowledge	Sites will be evaluated against the extent to which positive and negative effects on the host community can be addressed *during the implementation phase* of the project, including the following areas: » Health and safety of residents and the community » Sustainable built and natural environments » Local and regional economy and employment » Community administration and decision-making processes » Balanced growth and healthy, livable community
Potential for the project's enhancement of the community's and the region's long-term sustain-ability, including factors identified by Aboriginal Traditional Knowledge	Sites will be evaluated against the extent to which positive and negative effects of the project *on long term sustainability* of the host community and region can be addressed in the following areas: » Health, safety and inclusiveness/cohesion of the community » Sustainable built and natural environments » Dynamic resilience of the economy » Community decision-making processes » Balanced growth and healthy, livable community
Physical and social infrastructure in place and/or potential to be put in place to implement the project	Sites will be evaluated for the following: » The availability of physical infrastructure required to implement the project » The adaptability of the community, and the social infrastructure it has in place, to adapt to changes resulting from the project » The NWMO resources required to put in place needed physical and social infrastructure to support the project
Potential to avoid ecologically sensitive areas and locally significant features	Sites will be evaluated for the following: » Ability to avoid ecologically sensitive areas and locally significant features
Potential to avoid or minimize effects of the transportation of used nuclear fuel from existing storage facilities to the repository site	Sites will be evaluated for the following: » The availability of transportation routes (road, rail, water) and the adequacy of associated infrastructure and potential to put such routes in place » The availability of suitable safe connections and intermodal transfer points, if required, and potential to put them in place » The NWMO resources (fuel, people), and associated carbon footprint, required to transport used fuel to the site » The potential for effects on communities along the transportation routes and at intermodal transfer points.

5 Partnership and Community Support

Towards a Partnership with a Willing Community

In the proposed process, it is the community's decision whether it will enter the site selection process and then proceed through the steps. The community can decide at any time to cease its involvement in the process up until the signing of a formal agreement immediately prior to the launch of the regulatory review process. For each major step (for instance Steps 3 and 4), the terms and conditions of participation in that step are to be jointly developed by the NWMO and an accountable body from the community in a memorandum of understanding. This memorandum would outline the parameters of the partnership for the phase of work, including the agreed scope of work, the means by which the NWMO and community will work together, the approach to and terms of reference for a multidisciplinary peer review process, and the nature of the resources provided by the NWMO to the community to support its participation.

In the proposed process, the NWMO provides resources (funding and expertise, if desired) to an interested community to support its decision-making about the project. All reasonable costs will be covered for a potentially interested community to:

- conduct a community visioning exercise that may assist the community in identifying a long-term plan for its well-being and long-term sustainability, or build upon an existing plan, as early input to the community assessing whether it may be interested in the project (as early as Step 2);
- seek independent expert advice concerning the project and/or the results of the various site screening and site evaluation stages throughout the siting process (as early as Step 2);
- conduct activities to inform residents and assess interest in the project both in the community and in surrounding areas, including First Nations, Métis and Inuit as appropriate (as early as Step 2);
- establish a community office for the project, if desired, at any point in the process;
- assess and demonstrate its willingness to be a host community, including independent expert advice and peer review (Step 4);
- develop jointly with the NWMO the terms of an agreement that outlines the basis upon which the project would proceed (Step 5) and ratify this agreement (Step 6);
- participate with the NWMO in the regulatory review process (Step 8) (the project will proceed only after all regulatory approvals are obtained); and
- participate through the construction and operation of the facility (Step 9).

In order to ensure that the project is implemented in partnership with the community, and before the regulatory approvals process is initiated, the NWMO will require a formal expression of willingness from the community (Step 5). This is expected to include a formal expression of interest from an accountable decision-making body, supported by a compelling demonstration of willingness among those living in the local area. This may include documented support expressed through open community discussions or town hall meetings, a telephone poll, and/or a formal referendum.

A community's willingness is expected to be formally confirmed with the development and ratification of a formal agreement between the NWMO and the community. This agreement is expected to include: the means by which the NWMO and the community will work together to seek regulatory approval to proceed to implement the project—formal partnership structure; the need for, and nature of, provision of resources and funding for technical and other assistance; the need for, and nature of, any decision-making and/or advisory bodies to support the process; the mechanism to be used for dispute resolution; the approach for ensuring the long-term sustainability and well-being of the community through the project, outlining specific inclusions; and the approach to managing the risk associated with the project and, where risk cannot be eliminated or reduced, the means by which it will be mitigated.

Involving Surrounding Communities and Regions

The NWMO will encourage any community interested in hosting this project to involve surrounding communities, regions and potentially affected Aboriginal governments as early as possible in conversations about the potential suitability of the community and site.

Surrounding jurisdictions would be engaged once a community has expressed an interest in continuing to detailed site evaluation (Step 4), if not already involved. Potentially affected surrounding communities, regions and jurisdictional levels would be engaged by the NWMO and the community in discussion concerning the potential social, economic and cultural effects of the project in the broader region were the project to be located in the interested community. In order to support involvement, the NWMO will make resources available to elected representative bodies or their delegates in surrounding areas, including First Nations, Métis and Inuit as appropriate, to:

- participate in the conduct of a regional study of social, economic and cultural effects, including factors identified by holders of Aboriginal Traditional Knowledge participating in the process;
- cover the cost of activities to inform residents and identify questions and concerns about the project that need to be addressed; and
- support involvement of Aboriginal peoples.

Involving Communities on Potential Transportation Routes

During the detailed site evaluation phase (Step 4), the NWMO will identify preferred transportation modes and potential routes associated with each interested community under consideration. Communities along the transportation route will be invited to raise questions or concerns that will be documented and then addressed as appropriate and factored into decision-making. Communities along the transportation route might request funds to seek independent advice to assist them in formulating questions or concerns to be addressed in the process.

Involving Aboriginal Peoples

The siting process will respect Aboriginal rights and treaties and will take into account that there may be unresolved claims between Aboriginal peoples and the Crown. Aboriginal and treaty rights are protected under Section 35 of the *Constitution Act*, 1982. Aboriginal peoples also have a unique cultural, traditional and social connection to the land and have a special interest in preserving and protecting the environment while providing a sustainable future for generations to come.

Once a potential site and host community has been identified, and if not already involved, engagement of Aboriginal peoples will take place supported by agreements developed for this purpose (Step 4). These agreements will be developed in conjunction with the Aboriginal peoples in the area and will include support to help build capacity to participate, conduct independent research and develop culturally appropriate communication products.

Aboriginal Traditional Knowledge includes important knowledge about the land and ecology stemming from long contact with the land. It also includes knowledge about developing and maintaining effective and meaningful relationships between generations and within and between communities. The NWMO will look to Aboriginal peoples to share that knowledge with the NWMO to the extent that they wish to. The NWMO will ensure that Aboriginal intellectual property is protected, as agreed with the Aboriginal people who choose to share that knowledge with us.

Fostering Public Conversations and Discussion

Throughout the site selection process, the NWMO will encourage any community, interested individual or group to become involved by learning more and sharing their thoughts. The NWMO will provide briefings upon request to share information, answer questions and engage those interested in learning more about the project being sited, the site selection process or the phases of work being completed to assess the suitability of potential sites. A package of materials designed to help build awareness of the project and support small group conversations among interested citizens will be available on the NWMO website or will be mailed upon request. Throughout the site selection process, Canadians will be encouraged to review progress and share their thoughts by attending a public session, participating in e-dialogues, completing a survey on the website or by making a submission that will be posted on the NWMO website.

The NWMO will encourage any community, interested individual or group to contribute to shaping the knowledge platform on which this project will proceed. Research proposals that contribute to building understanding of important issues related to the site selection process, and that are general in nature rather than site-specific, will be considered. Proposals will be reviewed for their material contribution. The work that is proposed must add to rather than duplicate work that has been completed or already initiated by the NWMO. Proposals must identify the individual or organization that will take on this work, and this person or organization must be suitably qualified to complete it. A group of academic experts will be assembled to review, and select from, research proposals submitted.

6 Role of Third-Party Review in the Process

Third-party review and advice will be important components of the process to ensure safety of the site and the project overall. Third-party review will ensure that the NWMO process is thorough and incorporates the best available scientific, engineering and social science knowledge throughout the process. Third-party review is included in the process to review initial screening against exclusion criteria, review and confirm site evaluations, and review and confirm adherence to site selection principles and process.

» Review to confirm site evaluation results.
A review group will be established to review assessments conducted of the potential suitability of a site at each major stage of the process (Steps 2, 3 and 4).

The review group will be formed in collaboration with the communities that express interest early in the site selection process and who wish to have sites in their community assessed. Both the process for selection of review group members and the terms of reference for the review will be developed in collaboration with these communities.

As the suitability of any site will need to be assessed on both technical and non-technical dimensions, the review group will be multidisciplinary and include both technical and social experts. The findings, advice and reports of the review group will be available to all those involved in the siting process and to the public through the NWMO website.

The community will also be funded should it wish to independently seek expert advice throughout the process.

» Review to confirm adherence to site selection principles and processes.
The NWMO Advisory Council, which was formed in 2002 to meet the requirements of the *Nuclear Fuel Waste Act*, will review the NWMO's adherence to the site selection principles and process.

The Advisory Council is required, by the *Nuclear Fuel Waste Act*, to report every three years to the Government of Canada on its assessment of the activities of the NWMO, including the results of the NWMO's public consultations and analysis of any significant socio-economic effects of its activities. The Advisory Council's review of the integrity of and adherence to the site selection principles and process will be an important component of this. The Advisory Council's review will be published on the NWMO website as the minutes of its meetings are. Note that once a community has been selected to host the repository and centre of expertise and the host region is known, Advisory Council membership will be expanded to include representatives nominated by affected local and regional governments and Aboriginal organizations.

» Other review.

Other review will also be sought throughout the process.

For instance, while regulatory approvals will be sought only after a preferred site in a willing host community has been identified, the NWMO will begin discussions with regulatory agencies early in the process to ensure it understands, and is on the path to meeting, regulatory requirements as these may evolve over time. The NWMO will request preliminary reviews and feedback at critical stages of the siting process and safety evaluations from regulatory and policy agencies, such as Natural Resources Canada, the Canadian Nuclear Safety Commission (CNSC) and the Canadian Environmental Assessment Agency (CEAA).

Peer reviews will be conducted on the preliminary safety case by independent international experts such as the Nuclear Energy Agency (NEA) of the Organisation for Economic Co-operation and Development and/or the International Atomic Energy Agency (IAEA) of the United Nations. Such peer reviews are among the services these organizations provide to their Member countries. The NEA provides peer reviews as part of its mandate to help improve and harmonize the technical basis for dealing with nuclear waste issues in its member countries. The IAEA provides peer reviews as part of its mandate to perform services useful in research on, and development or practical application of, atomic energy for peaceful purposes, and to establish international standards of safety and provide for their application. These reviews will be published on the NWMO website.

7 Regulatory Review

Once an agreement has been developed between a community and the NWMO to host a site, the site and project will need to be assessed and approved through the formal regulatory process. Regulatory review will be an important component of the process to ensure safety and licensability of the site and the project overall. Regulatory review will assess and confirm that the project can be safely implemented at the site.

This process will involve a number of federal and provincial regulatory agencies, and some municipal agencies as well. The process will take place over a number of successive steps covering the entire life cycle of the project, from site preparation and construction to operation and then closure. The safety of the project will be assessed and confirmed at each step. Citizens are invited to participate in the regulatory process through the open public hearings that are conducted at each step.

Regulatory Review at the Federal Level

Regulatory oversight by the Government of Canada involves a number of agencies.

The Government of Canada, through Natural Resources Canada, monitors the NWMO on an ongoing basis to ensure compliance with the *Nuclear Fuel Waste Act*, including the full funding of the project and performance with respect to managing socio-economic effects.

The Canadian Nuclear Safety Commission (CNSC) will review and assess the project and site locations, and ultimately will be responsible for issuing licences authorizing the project to proceed to different phases of its life cycle development. An environmental assessment is required under the *Canadian Environmental Assessment Act* for the first step to ensure that the project is considered in a careful and precautionary manner such that it will not cause significant adverse environmental effects over the life of the project. Licensing requirements are designed to demand that the safety case be clearly demonstrated. Various aspects of the transportation of used nuclear fuel will also need to be approved by regulatory authorities.

Canada's regulatory requirements and processes are reviewed by the Government of Canada on a periodic basis and adjusted to incorporate new knowledge and understanding. The regulatory requirements that this project will need to meet, and the process that will be used to review the project, may also evolve in the years leading up to the review. For this reason, the NWMO will be in regular contact with regulatory authorities on an ongoing basis about its work in order to better understand the expectations of regulators as requirements may evolve over time, and incorporate these in the early work of the NWMO. The major steps in the Canadian regulatory process as they exist today are outlined in the following table and should be considered the minimum points at which the project will be assessed.

Steps in the Canadian Regulatory Process (2009)

» Environmental assessment
The project would be the subject of an environmental assessment under the *Canadian Environmental Assessment Act*, for facilities related to this project:
- The shallow underground storage facility, if a decision is made to construct this optional facility
- The deep geological repository

» Site preparation licence
A site preparation licence, involving a public hearing, would be required from the Canadian Nuclear Safety Commission (CNSC) before work could begin at the site.

» Construction licence
A construction licence, involving a public hearing, would be required from the Canadian Nuclear Safety Commission to construct:
- The shallow underground storage facility, if a decision is made to construct this facility
- The deep geological repository

» Operating licence
An operating licence, involving a public hearing, from the Canadian Nuclear Safety Commission will be required for the operation and/or modification of:
- The shallow underground storage facility, if a decision is made to construct and operate this optional facility
- The deep geological repository and associated surface handling facilities

» Transportation of used fuel
Responsibility for the regulation of the transportation of radioactive material is shared by Transport Canada and the Canadian Nuclear Safety Commission:
- Transportation plans will need to be reviewed by Transport Canada against requirements to promote public safety during the transport of radioactive material and Emergency Response Assistance Plans will need to be approved prior to transport.
- Transport Canada is primarily responsible for establishing and enforcing any transportation requirements for carriers, vehicles or other conveyances except for the radiation protection program for the carriers. The CNSC's primary responsibilities in this area are related to security and establishing and enforcing radiation protection associated with the packaging and transport of nuclear substances.

» Closing the facility
A licence would be required to:
- Close the underground shallow storage facility, if built
- Close the deep geological repository
- Decommission surface facilities

Review at the Provincial and Municipal Level

Some aspects of siting and/or construction of the project may be governed by provincial legislation. Transportation is one example; most provinces and territories include nuclear substances in legislation and regulations addressing the transportation of dangerous goods within that province or territory.

Emergency preparedness is a second example; responsibilities for nuclear emergency preparedness fall to several levels of government. Provincial governments are responsible for protecting public health and safety, property and the environment within their borders, which often includes provincial emergency preparedness legislation.

Environmental assessment and approvals is a third example; provincial legislation requiring the assessment of potential environmental effects of an activity, plan or program may apply to some aspects of this work.

In addition, legislation governing endangered species, environmental protection, heritage protection or preservation, water resources protection, occupational health and safety, and/or labour relations may be relevant. Municipalities, which derive their authority from provincial legislation, may have requirements that also need to be addressed.

International Treaties and Agreements

Canada has in place a comprehensive safeguards agreement with the International Atomic Energy Agency (IAEA) pursuant to the *Treaty on the Non-Proliferation of Nuclear Weapons*. The CNSC is responsible for implementing the *Canada/IAEA Safeguards Agreement and Additional Protocol*. Through its regulatory process, the CNSC performs compliance and auditing activities to ensure that all relevant licensees have in place measures, policies and procedures to comply with these international commitments. Safeguards are intended to provide assurance to the international community that Canada is not using nuclear material for the production of nuclear weapons or other nuclear explosive devices.

The NWMO, operating under the jurisdiction of the CNSC, will also be required to manage itself in accordance with the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*. Under the *Convention*, Canada must demonstrate that it is meeting international commitments to manage radioactive waste and spent fuel safely.

For more information or media inquiries, please contact:

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