

PRELIMINARY ASSESSMENT OF POTENTIAL SUITABILITY

Phase 2 Study and Engagement



Getting Ready	Publication of siting process Offer of briefings
Step 1	Information and awareness building
Step 2	Learn More phase with initial screenings
Step 3	Preliminary assessments of potential suitability <i>Phase 1: Desktop study and engagement</i>
	<i>Phase 2: Field investigations and expanded engagement</i>
Step 4	Detailed site evaluations
Step 5	Community decisions on willingness
Step 6	Hosting agreement signed, subject to outcome of regulatory reviews
Step 7	Regulatory review process
Step 8	Construction and operation of underground demonstration facility
Step 9	Construction and operation of the deep geological repository

Over the course of a three-year nationwide dialogue between 2002 and 2005, Canadians laid out a plan for the long-term care of our country's used nuclear fuel. Called Adaptive Phased Management (APM), the plan was selected by the Government of Canada in 2007. It requires that all Canada's used nuclear fuel be safely contained and isolated over the long term in a deep geological repository located at a safe site with an informed and willing host. We are well on our way to implementing this plan.

In May 2010, the Nuclear Waste Management Organization (NWMO) launched a nine-step process to identify a safe location, and an informed and willing host for a deep geological repository and an associated Centre of Expertise. The objective of the process is to arrive at a single location that will ensure safety, security and protection of people and the environment over the long term.

Confirming a safe site with an informed and willing host will take several years of progressively more detailed technical, scientific, social, cultural and economic studies, as well as engagement with interested communities, potentially affected First Nation and Métis communities and surrounding municipalities. Extensive field investigations and detailed site assessments will be required before the NWMO, the community, and the regulator (the Canadian Nuclear Safety Commission) can be satisfied that any potential site is safe and a willing host can be confirmed.

The project will only be implemented in an area where robust safety requirements can be satisfied and community well-being fostered. It will only move forward with interested communities, potentially affected First Nation and Métis communities and other surrounding municipalities working together to implement it.

What Are Preliminary Assessments?

Preliminary assessments are the third of nine steps in the site selection process. They are designed to assess, in a preliminary way, potential suitability for safely hosting a deep geological repository, and to identify one or possibly two preferred sites for more detailed evaluation (Step 4). Preliminary assessments are initiated in collaboration with communities that expressed interest in learning more about the project and their potential suitability to host it.

Preliminary assessments are guided by four overarching questions:

1. Is there potential to find a safe site?

Why this question is important: Safety, security and protection of people and the environment are paramount and central to the site selection process.

This project will only proceed with the involvement of the interested community, potentially affected First Nation and Métis communities, and other communities in the surrounding area working in partnership to implement it.

2. **Is there potential to foster the well-being of the community through the implementation of the project, and what might need to be put in place (e.g. infrastructure, resources, planning initiatives) to ensure this outcome?**

Why this question is important: The project must be implemented in a way that will foster long-term well-being of the community.

3. **Is there potential for citizens in the community to continue to be interested in exploring this project through subsequent steps in the site selection process?**

Why this question is important: At a later step in the process, the community must demonstrate it is informed and willing to host the project.

4. **Is there potential to foster the well-being of the surrounding area and to establish the foundation to move forward with the project?**

Why this question is important: The project must be implemented in a way that will foster the long-term well-being of the surrounding area.

Two Phases of Study

Preliminary assessments are conducted in two phases, with opportunities throughout for stock-taking by communities and the NWMO.

PHASE 1

» **Who is engaged?** Phase 1 preliminary assessments are conducted with all communities that expressed interest in learning more, successfully completed an initial screening, and requested that the NWMO initiate a preliminary assessment.

» **What takes place?** Phase 1 assessments involve desktop studies designed to explore potential to meet safety requirements and foster community well-being. Community learning about the project continues, with engagement and reflection about its potential to fit with the community's long-term vision. Outreach begins to potentially affected First Nation and Métis communities and surrounding municipalities.

» **How long?** Phase 1 assessments take a year or more to complete.

» **How are findings used?** Findings from Phase 1 assessments guide the NWMO in identifying a smaller number of interested communities and study areas with strong potential to meet the requirements of the site selection process.

PHASE 2

» **Who is engaged?** Phase 2 preliminary assessments are conducted with communities and areas identified in Phase 1 as warranting further study, potentially affected First Nation and Métis communities and surrounding municipalities. Areas identified for Phase 2 study are not confirmed as suitable for hosting the project, and no communities at this stage have confirmed they are willing to host it.

» **What takes place?** Through field work, more detailed studies and broadened engagement, Phase 2 assessments expand upon work completed in Phase 1. The NWMO works with interested communities, potentially affected First Nation and Métis communities and surrounding municipalities to explore the suitability of an area to host the project through fieldwork, more detailed studies and broadened engagement. Engagement activities are designed to explore potential for the project to align with the vision and objectives of the area and to implement the project in partnership.

Field activities occur in sequence:

Initial field surveys

» Geophysical and environmental surveys, as well as geological mapping, are undertaken to further assess potential suitability and identify specific siting areas that have the potential to meet the NWMO's technical site evaluation factors.

Stock-taking

» Based on findings from initial surveys, studies in areas with lower potential to meet technical and community well-being requirements of the project may be concluded.

» Areas with strong potential to meet project requirements will be the focus of more intensive fieldwork.

Intensive fieldwork phase

» Limited borehole drilling and testing begin in selected study areas identified as potentially suitable.

» **How long?** Phase 2 assessments are expected to take a number of years to complete. However, not all communities will necessarily complete the full sequence of Phase 2 activities. Through regular stock-taking as studies progress, there may be a gradual narrowing to focus on sites with strong potential to be suitable for hosting a repository. Communities may withdraw at any point in Phase 2.

» **How are findings used?** Findings from Phase 2 assessments will guide the NWMO's identification of one or possibly two sites to be the focus of detailed site evaluations in Step 4 of the site selection process.

Focus of Phase 2 Preliminary Assessments

At the beginning of Phase 2, the NWMO will work with communities to confirm the plan for technical and safety assessments, as well as broadened engagement and well-being studies. Through progressively more detailed studies, the NWMO and communities will develop an expanded understanding of potential suitability for hosting the project.

The APM Project requires a specific site that meets or exceeds all licensing requirements, as well as the preferences of people in the area. The NWMO will need to be able to design, construct, operate and eventually close the facility safely in the location that is selected. There must also be an ability to safely transport used fuel to the site from the interim storage facilities where it is currently located. Among potentially suitable study areas, Phase 2 will explore whether it is possible to identify sites that have the potential to meet safety requirements and are also socially acceptable.

At this early stage in the site selection process, communities are still learning and engaging in dialogue within the community and with neighbours. More time and reflection will be required before they can arrive at informed decisions as to whether the APM Project would make a positive contribution to the long-term well-being of the community and the area and whether they are willing to host it. Ultimately, the project will only proceed with involvement of the interested community, potentially affected First Nation and Métis communities, and surrounding municipalities working together to implement it.

Phase 2 Technical and Safety Assessments

Technical evaluation of potentially suitable areas continues in greater detail in Phase 2 assessments, focusing on geoscientific suitability, engineering, transportation, environment and safety. This evaluation is required to ensure any potential site is able to safely contain and isolate used nuclear fuel for a very long period of time.

Geological field investigations will provide site-specific information that will be used to further assess geoscientific uncertainties identified during Phase 1 studies, and provide more insight into the suitability of each study area.

Activities will include a sequence of geophysical and environmental surveys, geological field mapping, and eventually deep borehole drilling and testing. Community members and those in the area will be engaged to help identify potentially suitable sites and explore questions related to securing rights to the land in the future.

Environment and safety evaluations will focus on specific areas guided by input from the community, First Nation and Métis communities in the vicinity and surrounding municipalities. Both field studies and discussions with local communities and First Nation and Métis communities will be needed to build understanding of the environmental conditions in these smaller potential siting areas.

Potential transportation routes and mode(s) to each site would be identified against technical and safety criteria. Transportation planning and evaluations also need to be aligned with community input, which requires taking into account social values and preferences, as well as understanding and addressing social questions and concerns. This also requires understanding and addressing regulatory requirements, and inviting input from communities along potential transportation routes, as a group with a shared interest.

Engineering designs, safety assessments, transportation assessments, and environment assessments will be further developed and refined over the course of Phase 2 to determine whether all technical and safety criteria can be met.

SAFETY AND THE SITE SELECTION PROCESS

A site must satisfy six safety functions to be considered suitable for hosting the APM Project:

- 1. Safe containment and isolation of used nuclear fuel.** The characteristics of the rock at the site must be appropriate to ensure long-term containment and isolation of used nuclear fuel from humans, the environment and surface disturbances caused by human activities and natural events.
- 2. Long-term resilience to future geological processes and climate change.** The rock formation at the siting area must be 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 geological and climate change processes such as earthquakes and glacial cycles.
- 3. Safe construction, operation and closure of the repository.** Conditions at the site must be suitable for the safe construction, operation, and ultimate closure of the repository.
- 4. Isolation of used fuel from future human activities.** Human intrusion such as future exploration or mining must be unlikely.
- 5. Amenability to site characterization and data interpretation activities.** The geologic conditions at the site must be amenable to being practically studied and described on dimensions that are important for demonstrating long-term safety.
- 6. Safe transportation.** The site must have a route that exists or is amenable to being created that enables the safe and secure transportation of used fuel from interim storage sites to the repository site.

Phase 2 Assessments of Community Well-Being, Interest and Potential for Willingness

Beyond ensuring safety, the NWMO's commitment to the communities and surrounding area engaged in the site selection process is that long-term well-being or quality of life will be fostered by participating in the APM Project. Broadened engagement with the community, potentially affected First Nation and Métis communities and surrounding municipalities will support more detailed reflection and assessment.

The site selection process encourages shared planning to ensure that, as much as possible, community needs and expectations are understood, and if possible, addressed in the design of implementation plans. It will be important to develop a more detailed understanding of project benefits, opportunities to work together, and how potential negative effects of the project can be managed. The NWMO and communities will need to develop a better and more detailed understanding of the project's potential to align with local priorities, objectives and aspirations. Detailed study will continue in this phase to understand specific economic contributions the project would make to area well-being, the social and economic pressures that would occur, and what advance planning is required to address these pressures.

The site selection process requires sustained interest in learning and participation from the community over an extended period. Phase 2 will further explore interest in the community and area while continuing to build awareness and understanding of the project.

Beyond sustained interest and participation, the project requires those who will be affected to be able to work together to envision and help plan implementation of the project. Phase 2 involves more intensive community learning and engagement designed to explore whether conditions can be fostered to advance study in the broader area. This engagement will be important to understanding the potential to foster well-being.

Work will continue at this stage to address priorities, concerns and challenges revealed during Phase 1 dialogues. Other areas of uncertainty that require further exploration are expected to be identified as the process continues.

Aboriginal Traditional Knowledge

Aboriginal peoples have a special relationship with the natural environment, and unique stewardship responsibilities that are part of this relationship. The knowledge that comes from this relationship with the land brings special understanding to the broad range of factors that should be considered in field studies, social assessments, and assessing benefits and effects to be managed.

The NWMO will work together with First Nation and Métis communities who wish to share and apply Traditional Knowledge to technical, safety and community well-being aspects of the site selection process. Traditional Knowledge will also guide the NWMO's engagement with Aboriginal communities and local Elders, providing guidance on spiritual and cultural considerations, and developing and maintaining effective and meaningful relationships between generations.

The NWMO expects that interweaving Aboriginal Traditional Knowledge into the identification and assessment of potentially suitable sites will lead to an expanded set of considerations to assess the suitability of a site, new and different approaches to data collection and interpretation, and a perspective on ways of life that will be important to informing more detailed studies. The NWMO will ensure that Aboriginal Traditional Knowledge and intellectual property is protected, as agreed with the Aboriginal people who chose to share that knowledge.

The Way Forward

With many communities engaged in exploring their interest and suitability for hosting the APM Project, the site selection process must provide a basis for progressively identifying a smaller number of study areas for more detailed assessments. The preferred site will need to ensure safety and security for people and the environment, and contribute to the well-being of both the community and surrounding area.

Phase 2 assessments will be led by the NWMO and communities, and are expected to take a number of years to complete. Over this period, there is much information to be gathered and data to be analyzed. There are also many questions to be answered and uncertainties to be explored collaboratively.

Assessments and dialogues completed in Phase 2 of Step 3 will help guide further narrowing down by identifying the one or possibly two sites with strong potential to meet the requirements for hosting the project. These sites will be invited to proceed to Step 4 for detailed evaluation. Step 4 studies may require three to five years to complete, and will support identification of the preferred location that would be the focus of a regulatory approval process led by the Canadian Nuclear Safety Commission.

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