Communities in Phase 1 Preliminary Assessments

Ten Ontario communities are currently participating in the first phase of preliminary assessments. Preliminary assessments take place in Step 3 of a nine-step, multi-year process and are conducted in collaboration with interested communities.

**Communities Participating in Phase 1 Preliminary Assessments**

- Blind River
- Brockton
- Elliot Lake
- Huron-Kinloss
- Manitouwadge
- Nipigon
- The North Shore
- South Bruce
- Spanish
- White River

Phase 1 assessments involve desktop studies designed to explore a community’s potential to meet the project’s strict safety requirements. Phase 1 assessments also involve community engagement and reflection about the potential for the project to foster the well-being of the community, and for the project to fit with the community’s long-term vision.

All Phase 1 communities have their own community liaison committees (CLCs) to help guide the NWMO in assessment activities, and help residents learn about the project and become involved in the process. CLC activities include helping plan open houses, maintaining a website to help keep residents informed as new information becomes available, and helping ensure community members’ questions and
concerns are addressed. CLCs have also helped organize information sessions to meet local needs and involve the entire community in learning more about the project.

Open houses in Phase 1 communities began in February of this year. In addition to attending these open houses and CLC meetings, NWMO staff have also attended numerous local events. These included the 45th annual Blind River Winter Carnival, where Norman Sandberg, NWMO Relationship Manager, was on hand to answer questions and join in the fun.

Preliminary Assessments Concluded in Arran-Elderslie and Saugeen Shores

In January, the NWMO concluded Phase 1 preliminary assessments in the Ontario communities of Arran-Elderslie and Saugeen Shores.

Early findings showed the two communities have limited potential to contain a suitable site for the project. The NWMO has identified that the Ordovician Cobourg Formation is the preferred host rock for a repository, should it be located in the Bruce region. It was also determined that a minimum depth of 500 metres is preferred in order to maintain the integrity of a repository in this formation. Arran-Elderslie does not contain enough of this geology at the preferred depth. In Saugeen Shores, where this formation is found at the preferred depth, there are a number of surface constraints that greatly reduce the prospect for finding areas that are large enough for hosting the repository’s surface and underground facilities.

The NWMO has advised Mayors Paul Eagleson of Arran-Elderslie and Mike Smith of Saugeen Shores of its decision to cease preliminary assessment work in their communities. The organization will work with both to assist their transition out of the process. The NWMO is committed to providing early feedback to communities in a timely way as key findings in its studies emerge.

“Our top priority is to ensure the long-term safety of people and the environment,” said Ben Belfatchel, NWMO Director of Adaptive Phased Management Geoscience. “If we discover limited potential in an area, we are committed to letting the community know on a timely basis.”

Preliminary assessments, including geoscientific and other technical and social studies, are still ongoing in three other Bruce County communities: Brockton, Huron-Kinloss and South Bruce. If any of these three are found to have overall strong potential, and choose in the future to move forward to the next phase of assessment, Arran-Elderslie and Saugeen Shores will be engaged in the expanded dialogue that would include potentially affected Aboriginal peoples and surrounding communities in the area.

It will take several more years of detailed technical, scientific, and social study and engagement before a preferred safe site for a used nuclear fuel repository can be confirmed.
Introducing Phase 2 Preliminary Assessments

The second phase of preliminary assessments has been initiated in three Ontario communities (Hornepayne, Ignace and Schreiber) and one Saskatchewan community (Creighton). Preliminary assessments are the third of nine steps in the site selection process.

Phase 2 assessments build on Phase 1 assessments with continuing technical evaluations of potentially suitable sites in greater detail. There are four areas of focus:

» **Geoscientific suitability.** Geoscientific evaluations will provide site-specific information that will examine whether a suitable location can be identified that will ensure safe, secure long-term containment and isolation of used nuclear fuel. Activities will include a sequence of airborne geophysical surveys, geological field mapping, and environmental surveys, and should the findings from these studies warrant, deep borehole drilling and testing. Community members and people in the area will be engaged to help refine the list of potentially suitable siting areas that would be socially acceptable, and explore any questions related to securing rights to the land.

» **Environment and safety.** These evaluations will focus on specific areas, and will be guided by input from the interested community, Aboriginal communities in the area, and surrounding communities. Field studies and discussions with the local community and Aboriginal peoples will build understanding of the environmental conditions of the areas being studied.

» **Potential transportation routes and mode(s).** Potential transportation routes and mode(s) to each site will be identified against technical safety criteria and regulatory requirements. Transportation planning and evaluations will be aligned with community input, which requires taking into account social values and preferences.

» **Engineering.** Over the course of Phase 2, engineering designs for the deep geological repository will be further developed and refined for specific study sites. The purpose is to determine whether all technical and safety criteria can be met.
Phase 2 will also explore whether an implementation plan can be developed to ensure safety, align with expectations of the community and area, and be economically feasible. Beyond ensuring safety, the NWMO commitment to the communities and surrounding area is that their long-term well-being will be fostered. Engagement in the community, with First Nations and Métis peoples, and with surrounding communities will be broadened to support more detailed reflection and assessment.

Engagement activities will focus on bringing together the community, Aboriginal communities in the area, and surrounding communities to explore whether there is the foundation to work together to implement the project. In January, NWMO staff met with the mayors and councils of the four Phase 2 communities to brief them on Phase 2 activities and to plan the next steps. These meetings were followed by open houses for community members and others interested in learning more about the project and the new phase of assessments.

There will be regular stock-taking by the NWMO and the community over the course of Phase 2 assessments, and a decision may be made partway through the work to conclude studies if at any point they suggest the community does not have strong potential to meet the requirements of the project.

Kathryn Shaver, NWMO Vice-President of Adaptive Phased Management Engagement and Site Selection, emphasized that any decision is still many years in the future. “We are still in the early stages of the site selection process,” she explained. “Phase 2 assessments will take three years or more to complete. The goal, working in collaboration with interested communities, Aboriginal communities in the area, and surrounding communities, is to identify one or maybe two communities to proceed to the next step for detailed site evaluations.”

Ultimately, the project will only proceed with involvement of the interested community, First Nations and Métis peoples, and surrounding communities working together in partnership to implement it.
Heads-Up: What’s Involved in the NWMO’s Airborne Geophysical Surveys

Beginning in spring 2014, the NWMO will conduct high-resolution airborne geophysical surveys in the vicinity of several communities that have begun Phase 2 preliminary assessments. Preliminary assessments are the third of nine steps in the site selection process for Canada’s plan for the safe, long-term management of used nuclear fuel.

These surveys are meant to gather additional geological information that will help build a more detailed understanding of geology both at the surface and at depth.

Data will be collected using a small fixed-wing plane. Depending on the size of the area and the number and type of aircraft, surveys may take anywhere from one to three weeks to complete.

Aircraft will fly approximately 100 metres above the surface, capturing the areas that have been identified as potentially suitable during Phase 1 preliminary assessments. To minimize noise disturbance while collecting data, adjacent lines will not be flown one after the other.

The airborne surveys will collect magnetic data using an instrument called a magnetometer, which may be mounted on the outside of the aircraft or towed below the aircraft on a cable. As the aircraft flies, the magnetometer records tiny variations in the strength of the Earth’s magnetic field, and the local effect of magnetic minerals in the Earth’s subsurface.

A map of the resulting data, commonly rendered as a coloured and shaded computer-generated image, can be used to assess the geological structure below the surface, and the shape and size of different rock types in the survey area.

The surveys will also collect gravity data using an instrument called a gravimeter, which is mounted inside the aircraft. This instrument measures variations in the strength of the Earth’s gravity field, and is particularly sensitive to rocks that have different densities and geometries at the depth where a repository could be located.

The NWMO will review the findings with communities and other interested people in the area. The findings will then be used to help identify areas suitable for geological and initial environmental mapping, as well as walking of the land. This fieldwork, in turn, will be used to help inform discussions with those in the area to identify locations for conducting borehole drilling and other testing.
Advancing the NWMO’s Technical Program: Postclosure Safety Assessments

The NWMO has prepared two separate postclosure safety assessments for a used fuel repository. The first, prepared in 2012, was based on a hypothetical crystalline rock setting, while the second, prepared in 2013, was based on a hypothetical sedimentary setting.

Postclosure safety assessments evaluate the long-term performance of a deep geological repository. They are meant to show, with an appropriate degree of confidence, that the repository will remain safe over a prolonged period, that is, beyond the time when active control of the facility can be relied on. Through identifying the factors that are important for safety, they provide insight for further work to increase confidence in repository design and safety assessments.

Postclosure safety assessments proceed on a stepwise basis, progressing from generic assumptions about the properties of potential host rocks to the specific characteristics of a proposed site for a repository. At this early stage in implementing Adaptive Phased Management, before specific sites have been identified for detailed examination, the NWMO has focused on generic studies to illustrate the long-term performance and safety of the multi-barrier repository system within geological settings representative of potential Canadian sites.

The two postclosure safety assessments calculated potential radiological and non-radiological impacts to humans and biota for several future scenarios. These scenarios included the expected normal evolution of the repository, the effects of variation in key repository features, events, and processes, and a number of disruptive events or “what-if” scenarios.

The NWMO submitted both postclosure safety assessments to the Canadian Nuclear Safety Commission (CNSC) for pre-project review. This reflects the NWMO’s commitment to seeking regulatory guidance early in the implementation of Adaptive Phased Management, the goal being to confirm that the NWMO’s approach is consistent with the CNSC Regulatory Guide G-320 (Assessing the Long Term Safety of Radioactive Waste Management). Both reports are available online at www.nwmo.ca/news?news_id=424.

The NWMO Issues its Second Triennial Report and Newest Strategic Plan

The NWMO submitted its second Triennial Report to the Honourable Greg Rickford, Minister of Natural Resources Canada, on March 28, 2014.

A requirement of the Nuclear Fuel Waste Act (NFWA), Learning More Together – Triennial Report 2011 to 2013 reports to Canadians on the NWMO’s achievements over the past three years in implementing Canada’s long-term management plan for used nuclear fuel. Consistent with the requirements of the NFWA, the Triennial Report also presents the NWMO’s forward-looking perspectives as set out in its strategic plan for the 2014 to 2018 period.

The Triennial Report can be viewed online at www.nwmo.ca/annualreport. Printed copies are also available upon request.

A separate copy of the NWMO’s new strategic plan (Implementing Adaptive Phased Management 2014 to 2018) is posted on the NWMO website at www.nwmo.ca/implementationplan. The plan presents our work program in seven key areas and highlights proposed activities to support continued progress. As in previous years, the plan was refined based on comments and ideas received from a draft submitted to the public.

Our progress in 2014 against the seven objectives will be described in the Annual Report to be published in March 2015.
Supporting Youth Involvement in Science: The Science Ambassador Program

The Science Ambassador Program is the newest youth science initiative to receive funding from the NWMO’s Corporate Social Responsibility Program. Based in Saskatchewan, the Science Ambassador Program enables senior undergraduate and graduate students in the sciences to spend extended periods of time in schools with a high proportion of students of Aboriginal ancestry.

The program is offered by the University of Saskatchewan Division of Science, College of Arts and Science. Science ambassadors work to find creative and culturally relevant ways to teach science, both in the classroom and through extracurricular science activities. They assist teachers by organizing and preparing hands-on materials, and help facilitate classroom discussions and demonstrations of scientific concepts. The focus is on students in Grades 5 to 9.

“We are really excited to be part of this program,” said Pat Patton, NWMO Director of Aboriginal Relations. “It’s a great opportunity for young people to learn more about science and encourage them to explore possibilities for careers and continuing education.”

The Science Ambassador Program is one of several youth science initiatives the NWMO’s Corporate Social Responsibility Program is proud to support. These include:

**Youth Science Canada.** The NWMO has supported Youth Science Canada since 2008. The program encourages Canadian youth to get involved in science by developing scientific and technological knowledge and skills through project-based science.

**Science North.** The Science North School Outreach Program augments existing science curriculum through hands-on, interactive classes conducted in local schools. Since 2012, the NWMO has been funding the costs of the program in northern Ontario communities participating in the site selection process.

**Scientists in School.** Engaging students from kindergarten through Grade 8, Scientists in School encourages a lifelong interest in science, technology, math, environmental stewardship, and engineering. Since 2013, the NWMO has been sponsoring in-class science workshops for elementary students in school boards serving the Bruce Huron area in Ontario.
NWMO Intern Awarded a Roy G. Post Scholarship

Arif Qureshi, a post-graduate intern at the NWMO, has been awarded a Roy G. Post Scholarship. Arif is the third Canadian to receive the scholarship, which helps outstanding students develop careers in the field of safe management of nuclear materials. The award was presented at the 2014 Waste Management Conference in Phoenix, Arizona.

Arif is currently completing his Master of Engineering studies at the University of Ontario Institute of Technology (UOIT). His research, conducted in partnership with the NWMO, focuses on used fuel transportation packages.

Arif’s interest in the transportation of used nuclear fuel grew out of an earlier internship at the NWMO. “There is a real focus on training the next generation of engineers and scientists,” he said. “And it is exciting to think that my research is already benefiting Canada by helping plan for the safe and secure transportation of used nuclear fuel.”

Arif’s other awards include the American Society of Mechanical Engineers best student paper, North America and Europe (2012), and best student paper at the 2012 International Conference on Nuclear Engineering. He has also served as president of UOIT’s engineering society and sat on the board of directors for the school’s student association.

Arif’s career goal is to work on projects related to the transportation of used nuclear fuel and the establishment of a long-term repository for Canada’s used fuel.