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Nuclear Waste Management Organization

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Where the Site Selection Process Is Now

Fourteen communities – 13 in Ontario and one in Saskatchewan – are currently engaged in learning more about Canada's plan for the safe long-term management of the country's used nuclear fuel. They are in Step 3

(preliminary assessments) of a nine-step site selection process.

Conducted in collaboration with the communities, preliminary assessments are carried out in two phases, with the opportunity for stock-taking by the community

and the NWMO at the end of each. At present, 10 communities are participating in Phase 1 assessments, and four in Phase 2 assessments.

Communities Participating in Phase 1 Preliminary Assessments

- | | |
|---------------------|-----------------------|
| » Blind River, ON | » Manitouwadge, ON |
| » Brockton, ON | » The North Shore, ON |
| » Central Huron, ON | » South Bruce, ON |
| » Elliot Lake, ON | » Spanish, ON |
| » Huron-Kinloss, ON | » White River, ON |

Communities Participating in Phase 2 Preliminary Assessments

- | | |
|------------------|-----------------|
| » Creighton, SK | » Ignace, ON |
| » Hornepayne, ON | » Schreiber, ON |

Preliminary assessments are designed to assess, in a preliminary way, potential suitability of communities for safely hosting a deep geological repository, and to identify one or possibly two preferred sites for more detailed evaluation (Step 4).

Phase 1 preliminary 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.

Phase 2 assessments involve more intensive community learning and engagement, as well as a broader, more regional focus to include First Nations and Métis peoples and other communities in the surrounding area. Phase 2 is also when preliminary fieldwork begins.

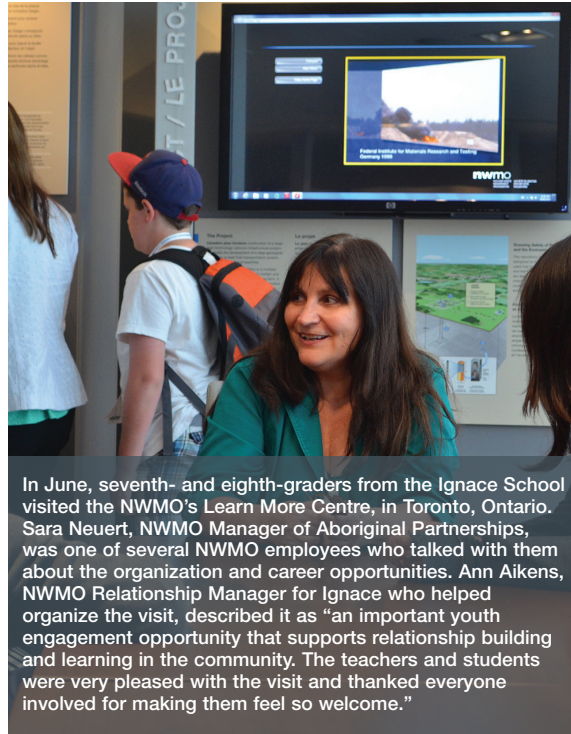
Canada has a comprehensive plan for the safe long-term management of the used fuel produced by nuclear power plants. The plan includes a process to identify an informed and willing host for a deep geological repository to safely contain and isolate Canada's used nuclear fuel.

Many more years of discussion and study will be required before any decision can be made about a location, and the project will only be implemented with the involvement of an interested community, Aboriginal peoples, and other communities in the surrounding area working together in partnership.

Engagement Continues in Communities



Erik Kremer, a Senior Engineer at the NWMO, with a visitor to the NWMO's booth at the 31st Annual Trade and Leisure Show in Creighton, Saskatchewan.



In June, seventh- and eighth-graders from the Ignace School visited the NWMO's Learn More Centre, in Toronto, Ontario. Sara Neuert, NWMO Manager of Aboriginal Partnerships, was one of several NWMO employees who talked with them about the organization and career opportunities. Ann Aikens, NWMO Relationship Manager for Ignace who helped organize the visit, described it as "an important youth engagement opportunity that supports relationship building and learning in the community. The teachers and students were very pleased with the visit and thanked everyone involved for making them feel so welcome."



Students at a NWMO open house in Walkerton, Ontario, in May 2014.

Community liaison committees (CLCs) play an active role in helping their communities learn more about Canada's plan for the long-term management of the country's used nuclear fuel, the site selection process, and the preliminary assessments being conducted in their communities. Find out the latest from the CLCs at www.clcinfo.ca.

Since April and through to the end of June, the NWMO's **mobile transportation exhibit** has visited Nipigon, South Bruce, Brockton, Spanish, Elliot Lake, The North Shore, Blind River, White River, Creighton, Hornepayne and Hornepayne First Nation, Huron-Kinloss, Manitouwadge, Constance Lake First Nation, Flin Flon, and Denare Beach.

In addition to visiting communities, the exhibit also travelled to Parry Sound for the annual conference of the Ontario Small Urban Municipalities, and to Sault Ste. Marie for that of the Federation of Northern Ontario Municipalities.

The exhibit provides a hands-on opportunity to learn more about plans for the safe and secure transportation of Canada's used nuclear fuel. It features a full-size used fuel transportation package (UFTP) that has been certified by the Canadian Nuclear Safety Commission, and comes with touch screens and panels that provide information about such topics as the rigorous safety tests the UFTP must pass, regulatory oversight and requirements, security measures, and the safety record in Canada and other countries that routinely transport radioactive materials.



Students from the Mildmay-Carrick Public School visiting the mobile transportation exhibit. Paul Austin, a Relationship Manager at the NWMO, described the students who visited the exhibit as "curious about absolutely everything," adding that they spent the most time examining the used fuel transportation package. "They were pretty amazed by how massive and solid the actual package is."

Nipigon Withdraws From Site Selection Process

In June, the Township of Nipigon passed a resolution and advised the NWMO that it was discontinuing its involvement as a potential host community for the safe and secure long-term management of Canada's used nuclear fuel.

The decision followed review of an interim report, prepared by the NWMO at the request of the Township, on preliminary assessment work completed in the community so far.

Kathryn Shaver, NWMO Vice-President of Adaptive Phased Management Engagement and Site Selection, said that the NWMO respects the Township's decision, and appreciates the thought and care that went into making it. "The site selection process is driven by communities," she added. "Nipigon has made a decision about its involvement, and the fact that it chose to withdraw is a clear demonstration of the process working as designed."

The findings shared with Nipigon have no impact on the 14 other communities involved in various stages of learning. Studies underway in these communities are ongoing, and findings will be made available as they are completed.

The technical reports that were shared with the Township are available on the NWMO's website at www.nwmo.ca/sitingprocess_feasibilitystudies/Nipigon.

Airborne Geophysical Surveys

In April, high-resolution airborne surveys were completed in Creighton, Ignace, and Schreiber. These surveys gathered additional geological information that will help build a more detailed understanding of geology both at the surface and at depth.

In light of feedback from the community and the Northeast Superior Regional Chiefs' Forum, the NWMO decided to postpone airborne surveys in the vicinity of Hornepayne. These will now occur at a later date.

"Adapting plans is an expected part of the process," said John Fraser, NWMO Relationship Manager for Hornepayne, adding that "we've heard from people in the area that we can better support learning by structuring activities in a different order."

The NWMO's work in Hornepayne will continue to focus on activities aimed at increasing knowledge and understanding about the project and the process to identify an informed and willing host.



Members of the Ignace Community Nuclear Liaison Committee at the Dryden Regional Airport. They were there to learn more about airborne geophysical surveys and see one of the planes used in conducting them.



Jamie Matear, NWMO Senior Advisor in Aboriginal Relations, and Aaron DesRoches, NWMO Associate Engineer, at the Dryden Regional Airport.

The NWMO Attends Municipal Conferences

Every year, municipal associations hold conferences and trade shows where members of municipal councils and senior staff can exchange information and ideas on a variety of topics. NWMO staff attend many of these events, which provide opportunities to inform community leaders about Adaptive Phased Management and the status of

the site selection process.

This spring, the NWMO hosted information displays at Ontario regional municipal conferences in Fort Frances, Parry Sound, and Sault Ste. Marie. Staff were also on hand at the Federation of Canadian Municipalities Conference in Niagara Falls.

Adrian Smith, NWMO Senior Advisor

of Social Research and Dialogue, notes that the NWMO has become a welcome and familiar face at these events. “Delegates tell us they really appreciate the information and updates,” he added. “It’s also a great opportunity for the NWMO to learn more about communities’ needs and concerns.”

Minister of Natural Resources Canada Comments on the NWMO’s Triennial Report for 2011 to 2013



The Honourable Greg Rickford, Minister of Natural Resources Canada and Minister for the Federal Economic Development Initiative for Northern Ontario.

In March, the NWMO presented its second Triennial Report, *Learning More Together*, to the Honourable Greg Rickford, Minister of Natural Resources Canada. The report documents the NWMO’s work over the preceding three years (2011 to 2013) and also outlines the organization’s work plan for the upcoming five years (2014 to 2018).

In his statement responding to the report, the Minister expressed satisfaction with progress so far in the site selection process. He also expressed appreciation to “all of the communities and citizens that have come forward to help shape the direction of this plan, and at the same time, contribute to such an issue of national importance. Community involvement and engagement is an essential ingredient of this process.”

The Minister’s full statement can be viewed online at www.nrcan.gc.ca. The Triennial Report is posted on the NWMO’s website at www.nwmo.ca/annualreport.

The NWMO's International Research Partnerships: Spotlight on Underground Research Laboratories

The NWMO conducts joint research at four different underground research laboratories (URLs): the Mont Terri Underground Research Laboratory and Grimsel Test Site, both in Switzerland, the Äspö Hard Rock Laboratory in Sweden, and the ONKALO Underground Characterization and Research Program in Finland. URLs provide a unique environment to work collaboratively with international partners to test and demonstrate components of the planned deep geological repository. This work plays a vital role in helping ensure that used fuel will be safely contained and isolated in a stable rock formation.

Mont Terri Underground Research Laboratory

The Mont Terri rock laboratory is a research facility located near St-Ursanne, Switzerland. Opalinus clay, a proposed host rock for the deep geological disposal of radioactive waste in Switzerland, is the focus of more than 40 experimental and demonstration studies within the Mont Terri URL.

The NWMO has been an active partner in the Mont Terri Project since 2008. The experiments being conducted there are relevant to the NWMO site characterization, engineering, and safety assessment activities. Through the Mont Terri Project, the NWMO is able to participate in state-of-science testing and demonstration in collaboration with international partners, some of which are nuclear waste management agencies. The NWMO is involved in 12 demonstrations which include: assessments of microbial activity; benchmarking of predictive numerical methods; investigations of corrosion processes and gas generation; and a full-scale emplacement experiment to evaluate the response of the rock mass to excavation, canister emplacement and thermal processes that would occur within a deep geological repository.

Grimsel Test Site

The Grimsel Test Site (GTS) is located in the Swiss Alps and supports a wide range of projects focused on the geological disposal of radioactive waste in crystalline rock. The GTS is intended to provide an environment that is analogous to that of a proposed repository site. The goal of the work there is the development and testing of specialized equipment, methodologies, and models under 'real' conditions. The NWMO joined the GTS in 2013, and is actively involved in the Gas Permeable Seal Test, a multi-year experiment designed to demonstrate the construction and performance of a full-scale engineered repository opening seal.

Äspö Hard Rock Laboratory

The Äspö Hard Rock Laboratory is a research facility in which experiments are performed at a depth of approximately 500 metres below ground surface. Since 2004, the NWMO has been conducting tests there with the Swedish Nuclear Fuel and Waste Management Company. The purpose of this collaboration is to improve understanding of key processes in a repository in crystalline rock. The NWMO's involvement facilitates collaboration and sharing of information in relation to repository technology development, multi-barrier performance, damage to the rock mass associated with excavation, fracture parameterization, and specialized site characterization techniques.

ONKALO Underground Research Laboratory

The ONKALO Underground Research Laboratory is located approximately 450 metres below ground surface at Olkiluoto, Finland. Research in this URL involves the assessment of methods for geoscientific characterization – including geology, hydrogeology and geochemistry – and evaluation and development of both excavation and canister emplacement techniques in a crystalline rock environment. Investigations at ONKALO include a full-scale demonstration experiment, as well as detailed studies on buffer design and handling methods for clay-based buffer materials. The NWMO is participating in the fracture parameterization project. The project is a four-year undertaking that aims to develop a strategy and provide guidelines for determination of the parameters necessary for assessing fracture stability at the deposition tunnel scale for repository design and post-closure analysis.



Grimsel Test Site (Switzerland): Gas Permeable Seal Test Experiment – In-Situ Instrumentation Prior to Seal Emplacement. Courtesy of I. Blechschmidt (Swiss National Cooperative for the Disposal of Radioactive Waste).

Co-Operation Agreement Between the NWMO and the Korea Radioactive Waste Agency

The NWMO's newest memorandum of understanding is with the Korea Radioactive Waste Agency (KORAD). The presidents of the two organizations, Ken Nash of the NWMO and Dr. John In Lee of KORAD, signed the agreement in Gyeongju, Korea, on May 16.

Ken Nash, speaking after the signing ceremony, noted that “the NWMO continues to take advantage of technology gains by co-operating with our sister organizations around the world. This is an integral part of our business planning strategy and allows us to leverage our technology investment.”

The agreement commits the two organizations to exchange scientific and engineering information. There will also be an exchange of information on how best to meet societal expectations in developing deep geological repositories for the long-term management of used nuclear fuel.

The agreement with KORAD is the first one with an agency involved in managing used CANDU nuclear fuel. This is the same type of used nuclear fuel



Ken Nash of the NWMO with Dr. Jong In Lee of the Korea Radioactive Waste Agency in May after signing an agreement to share scientific and engineering information between the two organizations.

produced in Canada, and as such, the agreement provides important new opportunities to co-operate in the development of engineered barrier systems specifically designed for CANDU fuel.

The NWMO has similar agreements with its counterparts in Sweden, Finland, France, Switzerland, and the United Kingdom.

Partnering with other radioactive waste management organizations allows the NWMO to foster international co-operation on research, development, and demonstration of technology, learn more from other countries' experience, and keep abreast of developments in repository design and safety case developments for various host rock formations.

The NWMO Sponsors Canada-Wide Science Fair

Through its Corporate Social Responsibility Program, the NWMO sponsored this year's annual Canada-Wide Science Fair in Windsor, Ontario. This year's fair took place in May. Organized by Youth Science Canada, the fair brings together finalists from regional science fairs to meet and compete in a national championship round. The NWMO has sponsored Youth Science Canada since 2012.

“The sophistication of these projects is pretty amazing,” said Pat Dolcetti, NWMO Regional Communications Manager. “When you add in the enthusiasm of the participants, one gets a really good feeling about the future of science in Canada.”

More than 460 students attended the fair, competing in seven challenge divisions and three age categories for medals and other prizes worth over \$1 million. The NWMO's sponsorship

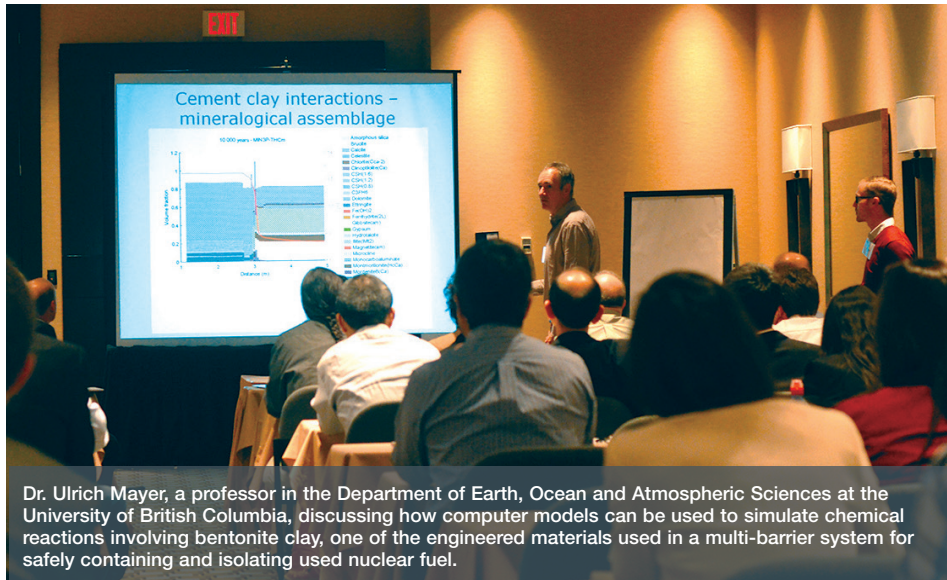
covered registration fees for participants from regions involved in the site selection process. It also sponsored bronze medals, which recognized excellence in 120 projects at the fair.

Science fairs are one of several initiatives the NWMO helps support through its Corporate Social Responsibility Program. Through this support, the NWMO engages with youth by encouraging their pursuits in science and technology.

The NWMO's Geoscience Seminar

Since 2002, the NWMO has been hosting an annual Geoscience Seminar. This year's seminar was held the second week in June. The more than 75 attendees included researchers from 10 Canadian universities, the University of Bern, the Geological Survey of Canada, the Paul Scherrer Institute, and the NWMO's sister organizations in Finland and Sweden.

Mark Jensen, NWMO Director of Deep Geological Repository Geoscience and Research, describes the seminar as a unique opportunity to showcase the many different geoscientific projects sponsored by the NWMO, both in Canada and abroad. "At the same time, there is the opportunity to share this knowledge,



Dr. Ulrich Mayer, a professor in the Department of Earth, Ocean and Atmospheric Sciences at the University of British Columbia, discussing how computer models can be used to simulate chemical reactions involving bentonite clay, one of the engineered materials used in a multi-barrier system for safely containing and isolating used nuclear fuel.



Poster presentation at the NWMO's 12th annual Geoscience Seminar.

collaborate, and learn firsthand about international program advances in countries preparing to develop their own deep geological repositories."

More than 25 presentations were made during the two-day seminar. They addressed a wide range of topics, including experimental work at international underground research laboratories, techniques for the numerical simulation of long-term geological processes, and site-specific evidence to assess geosphere stability, seismicity, and geomechanics.

The seminar plays an important role in the Adaptive Phased Management technical program, bringing together NWMO staff, researchers at universities, and graduate students to advance geoscientific research related to the long-term safety of deep geological repositories.

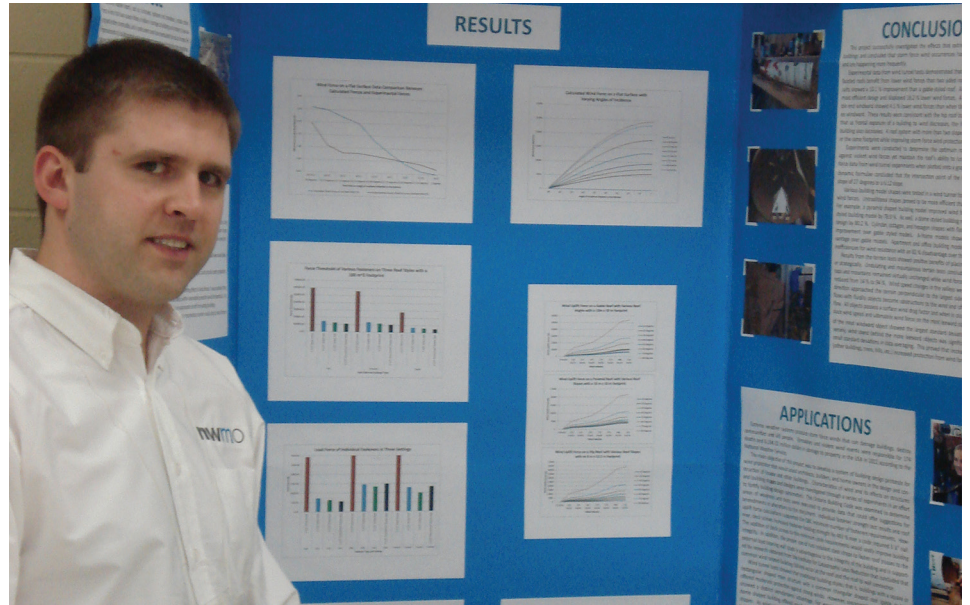
NWMO Employees Volunteer at Toronto Science Fair

In April, NWMO employees once again volunteered at local science fairs.

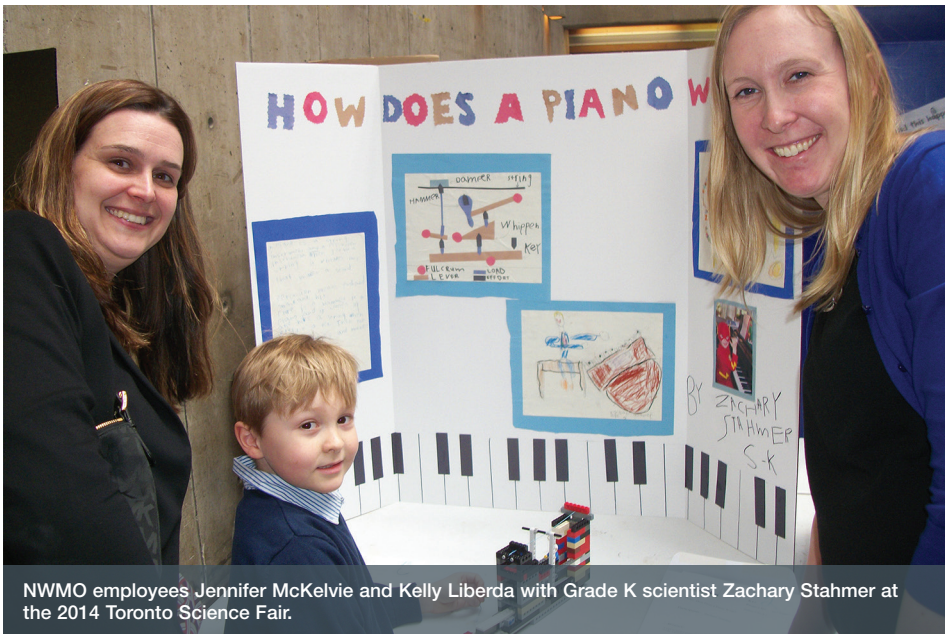
Christopher Lawrence, an engineer at the NWMO, served as a judge at the Bluewater Regional Science and Technology Fair in Owen Sound. He judged senior- and junior-level students.

Mr. Lawrence was especially struck by the range of projects on display: "There were so many great projects out there and so many bright young students who hold the future of science in their hands. It was great to go around and discuss the projects with the students while acting as a judge for special technology awards."

The NWMO's Ulf Stahmer, Kelly Liberda, and Jennifer Mckelvie all lent a hand at the 2014 Toronto Science Fair. This year's fair was held on the University of Toronto's Scarborough campus.



Christopher Lawrence at the Bluewater Regional Science and Technology Fair, April 2, 2014. The winners went on to compete in the 2014 Canada-Wide Science Fair in Windsor, Ontario.



NWMO employees Jennifer McKelvie and Kelly Liberda with Grade K scientist Zachary Stahmer at the 2014 Toronto Science Fair.

Mr. Stahmer, whose son Zachary (pictured on the left) participated in the Toronto Science Fair, has long been a big supporter of promoting science in schools. "It's incredibly important to give kids the foundation to understand and advance science," he explains. "One of these days, they're going to be the ones managing used nuclear fuel, and I'd like to think that I'm helping to give them a head start."

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