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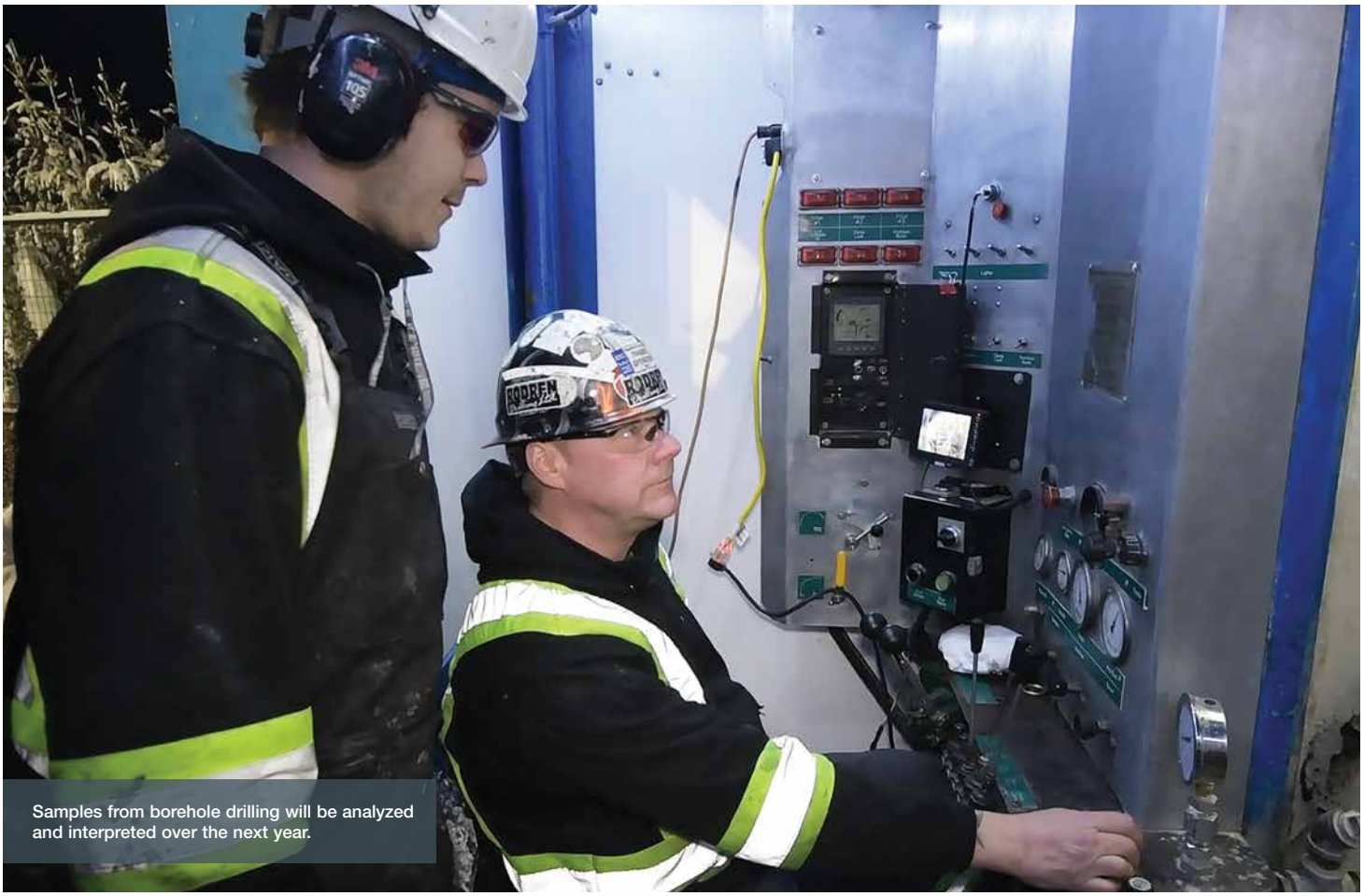
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nwmo news

Nuclear Waste Management Organization

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Drilling phase of first borehole completed



Samples from borehole drilling will be analyzed and interpreted over the next year.

In January, the Nuclear Waste Management Organization (NWMO) completed the drilling of our first borehole, near Ignace. The purpose of this borehole is to obtain initial core samples and provide access to the rock at depth for further investigations.

The study of the core samples retrieved is part of the site evaluation program to build an understanding of the characteristics of the rock at or near a potential repository site for Canada's used nuclear fuel.

Drilling began on Nov. 6, 2017, in a rock formation known as the Revell Batholith, located south of Highway 17, about 35 kilometres west of Ignace (between Ignace and Wabigoon Lake Ojibway Nation). This area is one of several involved in the site selection process.

(Continued on page 2)

Drilling phase of first borehole completed (Continued from page 1)

"Completing the drilling of our first borehole to obtain initial core samples and provide access to the geological conditions at depth marks another significant milestone in Canada's plan for the safe, long-term management of used nuclear fuel," says Dr. Mahrez Ben Belfadhel, Vice-President of Site Selection. "I'm happy to say it's been great work and collaboration from everyone involved in this learning process, particularly in Ignace and Wabigoon Lake Ojibway Nation, as well as other First Nation, Métis and municipal communities."

Further activities to analyze the core samples and explore the borehole at depth are now underway. Geoscience, environmental, engineering, and repository safety specialists will continue to work through 2018 to complete the borehole analyses, interpret data and share the findings.

Various studies are also underway in the vicinity of four other Ontario communities involved in the site selection process: Manitouwadge, Hornepayne, Huron-Kinloss, and South Bruce.



Consultation with six First Nation and Métis communities

Prior to drilling our first borehole in the Ignace and Wabigoon Lake Ojibway Nation area, we successfully completed consultation with six First Nation and Métis communities.

The Ontario Ministry of Natural Resources and Forestry (MNRF) delegated the procedural aspects of the duty to consult to the NWMO prior to issuing permission to access Crown land for borehole drilling. After consulting the six communities the MNRF had identified as being potentially impacted, we received permission to drill.

The successful conclusion of the first of many consultation processes and the commencement of drilling soon after signified major milestones for the NWMO.

Our team has now turned our focus to preparing for the next two planned boreholes in the area.

MEET THE EXPERT



Geoff Crann

Manager, Site Services

Canada's plan for the safe, long-term management of used nuclear fuel is powered by people in a wide variety of professions. People like Geoff Crann.

Geoff Crann has more than 20 years of experience undertaking site investigations in the oil, gas and wind industries, but this is atypical for him – living and working in the same place.

Geoff recently moved with his family to Ignace, Ont., to oversee drilling and testing programs for the NWMO, making sure they are in compliance with all health and safety, cultural, environmental, and technical standards. "In the last 20 years, every time I've gone to work, I've gotten off a plane in another country or province," says Geoff, who has completed contract drilling projects in 19 countries, as well as Halifax and Vancouver within Canada.

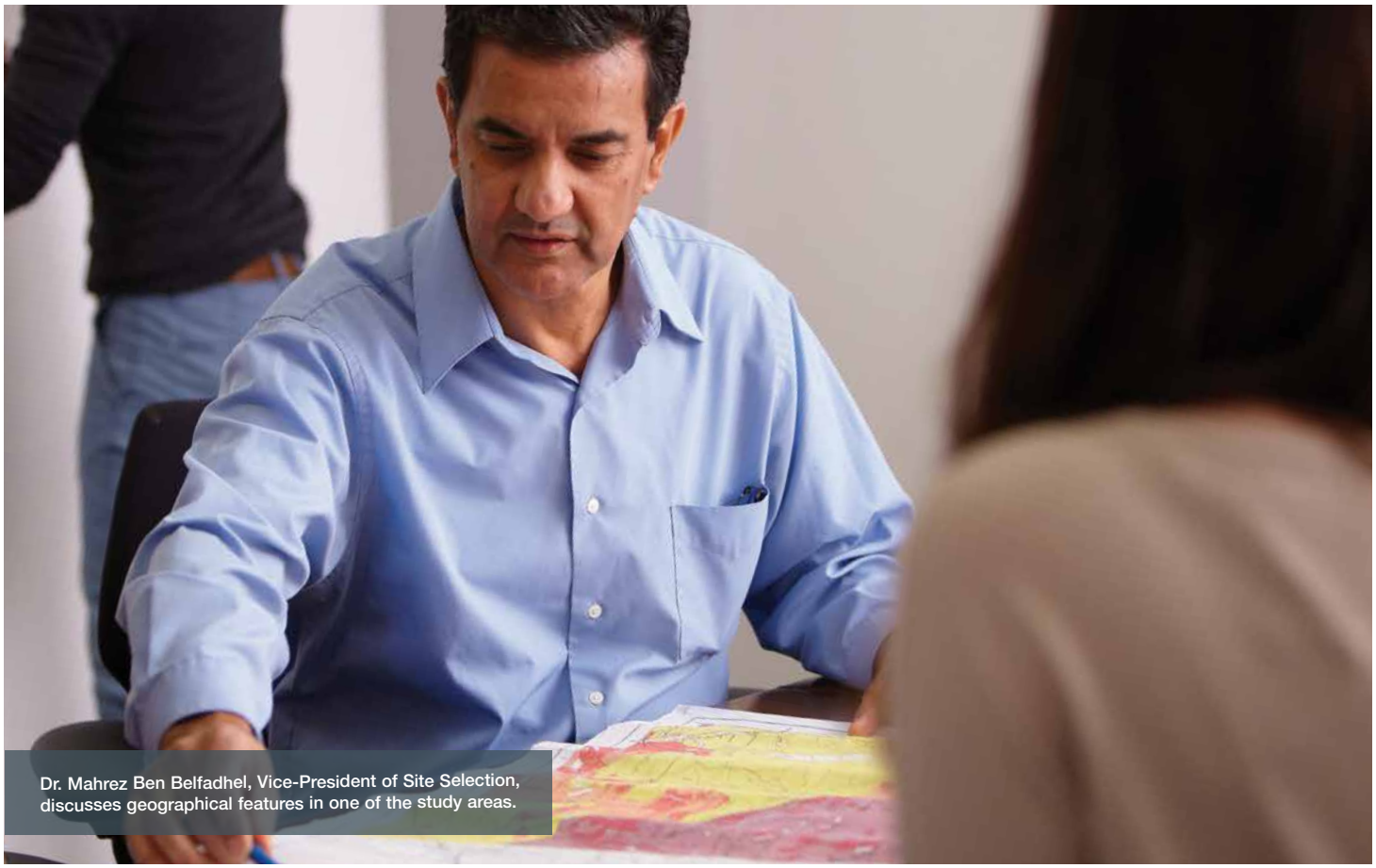
"Now when I head out to work, I'm actually in my home province and my new hometown."

Originally from the United Kingdom where he obtained a degree in engineering geology and geotechnics from Portsmouth University, Geoff has been in Canada since 2001, and his wife hails from Midland, Ont. – their last home.

The couple and their two children now live near the Learn More Centre in Ignace. The reception they have received thus far has been more than welcoming. "Everyone has been so friendly and so helpful," Geoff says. "The town has a very good feel."

Working and living in Ignace will allow him to remain much more rooted. "It's very exciting to be involved with this interesting and technically unique program, and my family and I are also looking forward to getting to know this beautiful area."

Blind River, Elliot Lake and area no longer part of site selection



Dr. Mahrez Ben Belfadhel, Vice-President of Site Selection, discusses geographical features in one of the study areas.

The NWMO recently narrowed our focus to five areas that now remain in the site selection process. Studies are continuing in the vicinities of Ignace in northwestern Ontario, Manitouwadge and Hornepayne, north of Lake Superior, and South Bruce and Huron-Kinloss in the Bruce-Huron area.

The area around Blind River and Elliot Lake will no longer be considered to host the project.

Technical studies and engagement with people in the area identified a number of factors that would pose challenges in siting a repository. These included complexities associated with the geology, limited access and rugged terrain, and low potential to develop the breadth of partnerships needed to implement the project.

"We are grateful to have worked with communities in this area and for the outstanding leadership they have shown on behalf of all Canadians through their involvement in this process," says Dr. Mahrez Ben Belfadhel, Vice-President of Site Selection. "The decision to narrow our focus is part of an ongoing rigorous process to identify a single safe site in an area with an informed and willing host and strong potential for the partnerships that will be required to implement the project."

In recognition of their leadership, the municipal and First Nation communities that led siting activities are eligible for funding to support investments in community sustainability and well-being. Blind River, Elliot Lake and Sagamok Anishnawbek First Nation will receive $600,000. The neighbouring communities of Spanish and the Township of The North Shore will receive $300,000. The contributions will be made to their community well-being reserve funds.

Since 2010, the NWMO has been engaged in a multi-year, community-driven process to identify a preferred site for a deep geological repository for Canada's used nuclear fuel. Originally, 22 communities stepped forward to begin a process of study and engagement, involving First Nation and Métis communities, as well as municipalities in the surrounding areas.

The NWMO expects to be in a position to select a preferred site by about 2023.

The NWMO participates in international subsurface science and exploration





NWMO Geoscientist Dr. Jennifer McKelvie (top picture) and other pioneering scientists from around the world attended a workshop on subsurface science and exploration, followed by a visit to SNOLAB, a science laboratory two kilometres underground.

Pioneering scientists from organizations around the world, including the NWMO, met recently in Ontario to explore the world of underground microbes.

They first attended a two-day workshop on subsurface science and exploration hosted by the Canadian Institute for Advanced Research (CIFAR), with additional sponsorship from the NWMO and University of Toronto. Following the workshop, the group visited SNOLAB, an advanced science laboratory located two kilometres below the surface in the Vale Creighton Mine near Sudbury, Ont.

The NWMO is involved in this research because of the need to understand the chemical, physical and biological interactions that could occur in a deep geological repository.

“By participating in this research workshop, we can ensure our work is consistent with the state of science in this area,” says Dr. Jennifer McKelvie, a geoscientist at the NWMO, who attended both the workshop and the tour of SNOLAB. “This was a great opportunity for the world’s best minds to come together and talk about microbes in the subsurface, and go underground.”

The workshop was developed under the leadership of Barbara Sherwood Lollar, a University of Toronto professor in earth sciences, who receives research funding from the NWMO. She has been instrumental in discovering the age of isolated groundwater found in the Canadian Shield, and revealing new information about the micro-organisms it may sustain.

The research methods being developed for low organic, low water, low biomass environments are not only relevant in designing a deep geological repository for used nuclear fuel, but they may also be applicable to developing missions to Mars, Europa, Enceladus, and the other planets and moons in our solar system, Jennifer says.

Canadians share engagement experience with IAEA in Vienna



Kevin Kahoot, Mayor of Ear Falls, Ont. (light blue shirt) and Brandon Petahtegoose from Atikameksheng Anishinawek First Nation (to his right) recently spoke at an IAEA meeting in Vienna.

Two members of groups familiar with the NWMO's site selection process recently spoke about their experiences at an International Atomic Energy Agency (IAEA) meeting in Vienna.

The purpose of the meeting was to bring together people who have been involved in site selection processes for nuclear waste programs around the world to share their insights on best practices. This information will be used as input for a new IAEA document on local engagement.

"I was very honoured to provide my perspective on how the NWMO engages Indigenous communities, and in particular, young people," said Brandon Petahtegoose from Atikameksheng Anishinawek, Ont., who is a member of the Council of Elders and Youth. "I am so happy and humbled to contribute to this international project."

"Ear Falls is proud that its community made significant contributions to advancing an important Canadian infrastructure project, and I am thrilled to communicate what we learned to the broader worldwide audience," said Kevin Kahoot, Mayor of Ear Falls, Ont. Ear Falls is a community 480 kilometres west of Thunder Bay that was actively involved in the NWMO's site selection process until 2013. Mr. Kahoot is also a member of the NWMO's Municipal Forum.

Also providing input to the IAEA meeting were NWMO staff who work closely with local communities – Jessica Perritt, Senior Advisor, Indigenous Knowledge, and Michael Borrelli, Senior Advisor, Municipal Relations.

The meeting, formally known as the "Technical Meeting on Learning From Experience of Local Involvement in Radioactive Waste Programmes," was held at the IAEA headquarters in early December 2017.

The NWMO shares technical expertise with international visitors

The NWMO recently welcomed our Ukrainian counterpart, State Agency of Ukraine on Exclusion Zone Management, to Ontario to learn more about Canada's plan for the safe, long-term management of used nuclear fuel.

The delegation from Ukraine visited both the NWMO's Toronto corporate office and Oakville proof test facility. They received an overview of the NWMO's site selection process and technical program, information that will be helpful as Ukraine takes the next steps in the continued long-term management of its own radioactive waste.

"We are interested in sharing insights and information with our Canadian counterparts and learning more about the NWMO's project," says Vitalii Petruk, leader of the Ukrainian delegation.

The visit demonstrates the Canadian organization's commitment to co-operate with other organizations and share its leading practices for safely managing used nuclear fuel.

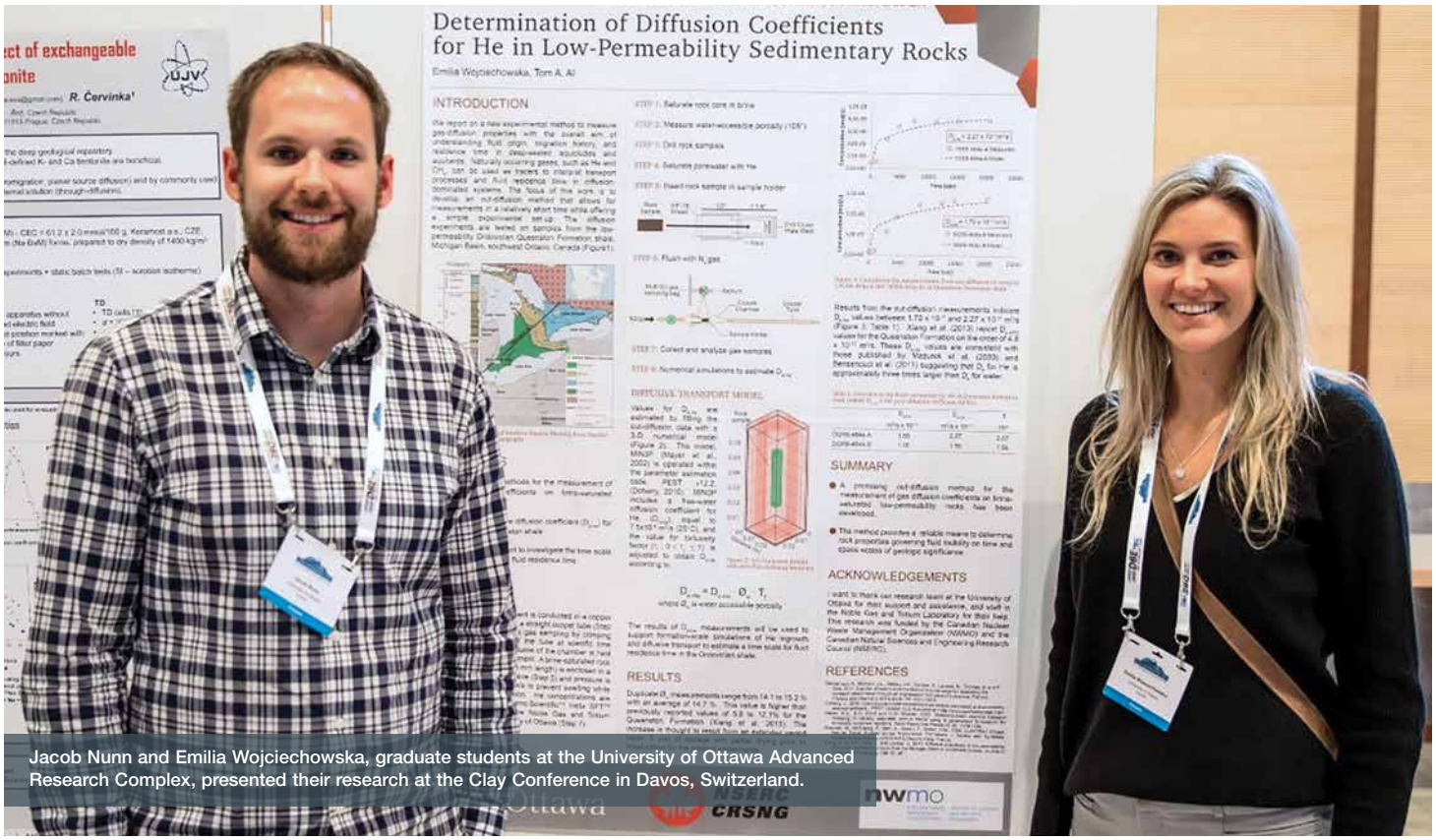
"We are happy to share our homegrown Canadian research and innovation, which is in demand around the world," said Dr. Mahrez Ben Belfadhel, Vice-President of Site Selection for the NWMO, one of the hosts of the delegation.

The NWMO has co-operation agreements in place with international counterparts in Japan, France, Switzerland, Finland, Sweden, the United Kingdom, and South Korea.



Members of the Ukrainian delegation visit our proof test facility and learn about the NWMO's used fuel container.

Geoscience grad students present findings at Davos conference



Jacob Nunn and Emilia Wojciechowska, graduate students at the University of Ottawa Advanced Research Complex, presented their research at the Clay Conference in Davos, Switzerland.

Two graduate students from the University of Ottawa's Advanced Research Complex (ARC) recently presented their research findings at the 7th Clay Conference in Davos, Switzerland. Their work is sponsored by the NWMO and Natural Sciences and Engineering Research Council of Canada (NSERC).

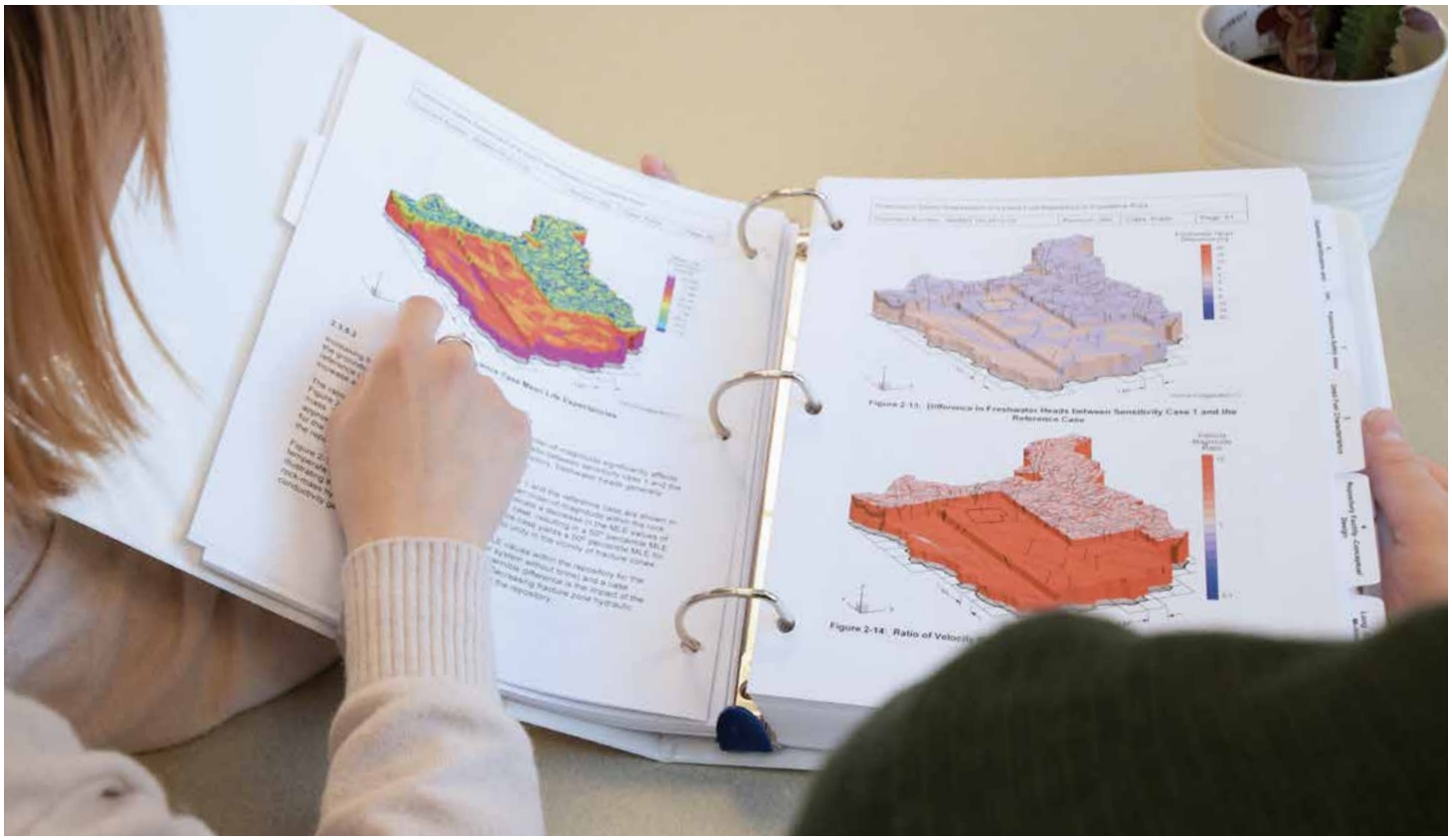
Jacob Nunn and Emilia Wojciechowska are researching how natural clay and clay-rich rock formations deep underground act as barriers to the movement of chemical elements.

This research is important in advancing the basis to understand the integrity of ancient natural bedrock formations as long-lasting protective barriers. It augments an existing body of knowledge on the suitability of these formations to safely host the NWMO's deep geological repository. The system is designed to safely contain and isolate used nuclear fuel from people and the environment for an almost indefinite time frame.

"Our laboratory methods of understanding bedrock properties, now under development at the ARC, are completely new," says Mr. Nunn. "They serve to extend the current state of knowledge of rock's integrity in a manner that is directly transferable to the Adaptive Phased Management project."

The 7th International Conference on Clays in Natural and Engineered Barriers for Radioactive Waste Confinement was sponsored by the NWMO and 13 other radioactive waste management organizations. Hosted by Nagra, the Swiss radioactive waste management implementing organization, the triennial conference was attended by more than 400 participants representing 20 countries.

New detailed safety case posted on our website



The NWMO recently published a new comprehensive safety case.

The technical report, which is the sixth in a series, analyzes in detail the long-term performance and safety of the repository system within a hypothetical crystalline rock setting.

The NWMO is currently involved in a multi-year site selection process. Once a site is selected, a full location-specific safety case will be prepared.

"Safety assessments are important steps in establishing that the repository will meet its safety objective, which is the containment and isolation of used nuclear fuel from people and the environment," says Dr. Paul Gierszewski, Director of Safety and Technical Research. They incorporate details of the site geology, the properties of the waste material, and the engineered design, and provide quantitative insight into long-term performance by considering a range of possible future scenarios.

The sixth case study shows that all postclosure safety criteria can be met with substantial margins at a suitable site. This result is consistent with previous assessments of a deep geological repository in Canada, as well as assessments by nuclear waste management organizations in other countries. The study, called *Postclosure Safety Assessment of a Used Fuel Repository in Crystalline Rock*, is available at www.nwmo.ca/reports.

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