In May and June, more than 40 representatives of areas involved in the NWMO’s site selection process had the opportunity to learn more about the nuclear fuel cycle at the annual conference of the Canadian Nuclear Society (CNS) in Saint John, New Brunswick.

The attendees included representatives from communities that initiated their areas’ involvement in the process, First Nation governments, neighbouring municipalities, and national, provincial, and regional Aboriginal organizations. Two members of the NWMO’s Council of Elders also attended, as did two of the Council’s youth members.

Designed as a forum for the exchange of views, ideas and information, the conference was also attended by nuclear industry representatives, independent subject experts, and elected government representatives and officials, both from Canada and other countries.

Brandi Cooper, a member of the White River Community Liaison Committee, was one of the community members who attended the conference. “The best part in my eyes was the networking aspect, and having so many experts on nuclear waste and the nuclear waste industry in the same place so that I could ask questions and have in-depth discussions with them,” she said. “It was also wonderful to hear about what was going on in other countries from the international guests that were in attendance.”

For Dean Whellan, Community Consultant for the Red Sky Métis Independent Nation, “The convention provided a great opportunity to observe information about nuclear topics with experts in the nuclear field. The format of the event and the ability to converse with NWMO staff and CNS members allowed for meaningful discussions and clarity on several questions. It was very educational and informative.”

The NWMO participated in several events at the conference, and co-organized two panel discussions: “International Development in Used Nuclear Fuel Repositories” and “Transportation of Used Nuclear Fuel.”

Attendees interested in learning more about transportation issues had the opportunity to visit the NWMO’s mobile transportation exhibit.

Some of the other topics covered at the conference included Nuclear 101, waste management and decommissioning, copper coating and laser welding for used nuclear fuel containers, and interweaving Aboriginal Traditional Knowledge into nuclear waste management.

The Canadian Nuclear Society (CNS)

Founded in 1979, the CNS is a federal, not-for-profit corporation that promotes the exchange of information on all aspects of nuclear science and technology and its applications. These include nuclear power generation, fuel production, uranium mining and refining, and management of radioactive wastes and used nuclear fuel.
In June, the Natural Sciences and Engineering Research Council of Canada (NSERC) awarded a five-year Collaborative Research and Development (CRD) grant to the University of Ottawa to conduct advanced research in the field of hydrogeochemistry. The work will be jointly funded by NSERC and the NWMO.

The research will be conducted at laboratories in the university’s new Advanced Research Complex. The laboratories will be used both to develop and test new methods and to advance knowledge in this unique field of geoscientific investigation.

The CRD grant also provides for the purchase of equipment that will improve analytical sensitivity and spatial resolution in the continuing effort to characterize and quantify solute migration within rock samples. With these tools, scientists will be better able to understand the geologic stability of the rock formations proposed to host a deep geological repository and how this contributes to long-term repository safety.

The program will help train 14 graduate students and three postdoctoral fellows.

The principal investigators, Drs. Tom Al and Ian Clark, welcomed the news of the award. As Dr. Al noted, “This collaborative grant will enhance Canadian expertise in the characterization of low permeability groundwater systems, allowing us to advance and maintain a leadership position – it is very much appreciated.”
NWMO Staff Participate in International Atomic Energy Agency Joint Convention

In May, the International Atomic Energy Agency hosted the Fifth Review Meeting of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. Canada is one of 69 countries that have signed the Joint Convention, which commits them to demonstrating that they are safely managing radioactive waste and used nuclear fuel.

The Joint Convention promotes open discussions on the safety of waste management. The periodic Review Meetings provide an international peer review of each national program for spent fuel and radioactive waste management, and seek to identify and share best practices.

The Canadian delegation was led by Ramzi Jammal, Executive Vice-President and Chief Regulatory Officer of the Canadian Nuclear Safety Commission (CNSC). The delegation included representatives from the CNSC, Natural Resources Canada, industry, and the NWMO.

As part of Canada’s presentation, Dr. Paul Gierszewski, the NWMO’s Director of Safety and Licensing, provided an update on progress made toward the long-term management of Canada’s used nuclear fuel since the Fourth Review Meeting of the Joint Convention took place in 2012. The update included the current inventory of Canada’s used nuclear fuel, the status of the site selection process, and information about the engineered-barrier system developed by the NWMO’s repository engineering team.

NWMO-Funded Graduate Student Conducts Work at the U.S. Department of Energy’s Argonne National Laboratory

Thalia Standish, a PhD candidate at Western University, is one of more than two dozen graduate students whose research is jointly funded by the NWMO and the Natural Sciences and Engineering Research Council of Canada (NSERC). Her supervisor, Professor David Shoesmith at Western University, holds a NSERC/NWMO Industrial Research Chair in Nuclear Fuel and Waste Container Corrosion.

Ms. Standish’s research area is the detection of corrosion in copper coatings. This work has a direct application to the design of the NWMO’s used fuel container, whose steel inner vessel is coated with corrosion-resistant copper.

To get a better look at what happens when steel is coated with copper, Ms. Standish recently applied to use the advanced photon source (APS) at the U.S. Department of Energy’s Argonne National Laboratory. The APS uses high-brilliance X-ray beams to produce highly detailed images in a matter of minutes.

(Continues on page 4)
Applications to use the APS go through a highly competitive peer review process. The research proposal submitted by Western University and the NWMO was rated 1.8 on a scale of 1 to 5 – 1 being “extraordinary”, and 2, “excellent.”

The detailed images Ms. Standish was able to scan using the APS will allow her to reconstruct a three-dimensional map of corrosion that might otherwise be invisible. They can also help in predicting total corrosion over time, and thus provide a basis for refining the design of the NWMO’s used fuel container.

“I am amazed at the excellent quality of the data and images we were able to get at APS,” said Ms. Standish. “It is incredible that we can image a fairly large area in such a short amount of time and still get top-quality images in which very small details are clearly visible.”

Canada has a comprehensive, long-term plan for safely managing our country’s used nuclear fuel. The plan includes a nine-step, multi-year process to identify an informed and willing host for a deep geological repository that will contain and isolate the fuel.

Areas in the vicinity of nine Ontario communities are currently engaged in learning more about Canada’s plan: Blind River, Central Huron, Elliot Lake, Hornepayne, Huron-Kinloss, Ignace, Manitouwadge, South Bruce, and White River.

“Providing timely and accurate information is one of the most important things we do as an organization,” explains John Fraser, the NWMO’s Director of Community Engagement. “We want communities to have as much information as possible about the project, and if people have questions, we are going to go the extra mile to answer them.”

So far this year, NWMO staff like John Fraser have travelled to some two dozen communities in Ontario, answering questions about the project and encouraging people to become involved in planning and decision-making. Along the way, they have participated in more than 10 open houses and have attended more than 50 meetings of community liaison committees.
Many of the meetings and open houses attended by NWMO staff have been focused on working with people in the area to develop the scope, location and timing of field studies.

In northern Ontario, for example, NWMO staff worked closely with people in the vicinity of Hornepayne, Manitouwadge and White River to establish where and when airborne geophysical surveys could be conducted.

The detailed geological mapping recently begun around Ignace was also preceded by extensive meetings with people in the area.

In southern Ontario, the NWMO has been working with Huron-Kinloss and South Bruce to plan field studies that could begin as early as 2016.

“We want people to understand our work and to know that planning for the next steps will be done with the community preferences in mind,” said Paul Austin, a Relationship Manager at the NWMO, and one of the people who have been involved in discussions with community members in and around Huron-Kinloss and South Bruce.

“Dialogue and learning will help guide the technical studies, and we need to understand community perspectives before proceeding.”
Planning Is Underway for Detailed Geological Mapping in Ignace Area

The NWMO is currently planning to conduct detailed geological mapping of bedrock geology in potential siting areas around the northern Ontario community of Ignace. This fieldwork, also known as detailed outcrop mapping, builds on preliminary geoscientific assessments completed in the area in 2014. It is one of a series of technical studies that will help identify a safe and secure location for a deep geological repository for Canada’s used nuclear fuel.

Through detailed geological mapping, geoscientists can develop a more detailed understanding of the structural character of bedrock in the area, including the aperture, type and location of fractures. Mapping also provides additional information about the distribution and thickness of overburden, or the looser materials (such as sand and gravel) that overlie bedrock in some areas.

Mapping in the Ignace area would begin with reconnaissance aircraft flyovers to confirm predicted bedrock outcrop locations. Geoscientists would then begin detailed geological mapping at these locations.

Airborne Geophysical Surveys Conducted in Ontario

In July, the NWMO began airborne geophysical surveys of some of the study areas in the vicinity of three northern Ontario communities: Hornepayne, Manitouwadge and White River.

Airborne surveys are being undertaken in locations where earlier assessments suggested there might be large areas of land with the potential to meet the technical safety requirements for a deep geological repository. Conducted by small, fixed-wing planes flying approximately 100 metres over the ground surface, they collected data about rock types, homogeneity, potential presence of faults and fractures, and the depth and extent of potentially suitable host rock formations.

“We collected millions of new data points, and it will take several months to complete our analysis,” said Dr. Mahrez Ben Belfadhel, the NWMO’s Director of Adaptive Phased Management Geoscience. “Once complete, we will share findings in the communities involved, and if further study is warranted, begin working with people in the area to plan next steps.”

Dr. Ben Belfadhel also emphasized that a great deal more study is required before a potential site can be identified. “We are only in Step 3 of a nine-step, multi-year process,” he cautioned. “At this early stage, we are not considering specific sites, only broad areas that have been identified for preliminary assessments.”

The surveys are one of a series of geoscientific studies that will help narrow down potentially safe and secure locations for a deep geological repository. The types of studies conducted in each area depend on local geology. In northern Ontario, where the underlying rock type is crystalline, they can include airborne geophysical surveys, direct observations of geological features, detailed geological mapping, and preliminary borehole drilling.
Canadian and International Researchers Attend NWMO Geoscience Seminar

Every June, the NWMO hosts a Geoscience Seminar where specialists and scientists in the Adaptive Phased Management (APM) technical program meet with international colleagues to discuss advances in site characterization techniques. This year’s conference was held in Toronto. Some 80 people attended, including researchers from 15 universities, the Canadian Nuclear Safety Commission, the Geological Survey of Canada, and the nuclear waste management organizations of Finland, Sweden, Switzerland, and the United Kingdom.

“The whole purpose of our geoscience program is to develop the tools to establish that the site chosen for Canada’s deep geological repository is safe,” said Eric Sykes, one of the NWMO geoscientists who attended the seminar. “The Geoscience Seminar is a terrific opportunity to discuss the latest advances in methods for identifying the geologic settings best suited for safely containing and isolating used nuclear fuel over the long term.”

During the seminar, NWMO staff provided an update on the work of the APM technical program, including repository engineering and safety assessment. This was followed by separate sessions on the status of repository planning in Finland, Sweden, Switzerland, and the United Kingdom. There were also 22 presentations on topics that covered broad areas of geoscience, focusing on applied research within both crystalline Canadian Shield and sedimentary geologic settings.

Ten of the graduate students whose work is being supported by the NWMO also made presentations.

NWMO Helps Canada’s Future Scientists Attend University Summer Program

Since 2009, the NWMO has been helping high-achieving science and technology high-school students attend SHAD, a month-long summer program hosted by 12 Canadian universities. The program offers workshops and lectures that focus on science, technology, engineering, and math.

Isaac Werner, a government relations analyst at the NWMO, travelled to five of the campuses hosting this year’s SHAD. He spoke to approximately 300 students about Canada’s plan for the long-term management of used nuclear fuel.

“These are all top students, and have shown exceptional initiative, creativity and leadership,” he explained. “They are exactly the sort of people we hope to get involved in moving the project forward in the decades to come. With a project that will take several generations to implement, it is important to involve the next generation and make sure they are ready and engaged when the time comes for them to manage Canada’s used nuclear fuel.”

The NWMO’s Corporate Social Responsibility Program

The NWMO’s Corporate Social Responsibility Program (CSRP) provides support to organizations that help young Canadians enhance their appreciation of science and develop scientific skills. SHAD is one of those organizations, along with Science North and Scientists in School.

Since 2014, the CSRP has also been providing support to local initiatives that enhance community well-being and collaboration in and around Phase 2 communities, with priority given to initiatives that promote education and benefit youth.

The CSRP’s focus on enhancing the lives and skills of young Canadians reflects the NWMO’s commitment to preparing them to assume leadership of a project whose implementation will span several generations.
Minister of Natural Resources Notes Progress in Canada’s Site Selection Process

In March, the NWMO presented its 2014 Annual Report, Progress Through Collaboration, to the Honourable Greg Rickford, Minister of Natural Resources Canada.

In his response, the minister stated that he was “pleased with the progress the NWMO has achieved toward the site selection process launched in 2010,” adding that “the Government of Canada remains committed to monitoring the activities of the NWMO to ensure that it fulfils its responsibilities under the Nuclear Fuel Waste Act to implement Canada’s plan for the long-term management of nuclear fuel waste.”

The Minister’s full statement can be viewed online at www.nrcan.gc.ca. The 2014 Annual Report is posted on the NWMO’s website at www.nwmo.ca/annualreport.