



Progress Through Collaboration

Annual Report 2014

nwmo

NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES



**The Honourable Greg Rickford
Minister, Natural Resources Canada
Ottawa, Ontario K1A 0A6**

March 2015

Dear Minister,

We are pleased to submit to you the annual report of the Nuclear Waste Management Organization (NWMO) for fiscal year 2014.

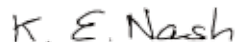
We submit this report in compliance with sections 16(1) and 23(1) of the *Nuclear Fuel Waste Act*.

In fulfillment of our obligations under section 24 of the *Act*, we are also making this report available to the public.

Respectfully submitted,



Pierre Charlebois
Chairman



Ken Nash
President and CEO



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Corporate Overview



WHO WE ARE

Our mission is to provide the highest quality of care to our patients and to support the health and well-being of our communities. We are committed to excellence in patient care, safety, and financial performance. Our focus is on providing a patient-centered experience that meets the needs of our diverse population.

SURVIL DE LA SÛRETÈ

Notre mission est de fournir la plus haute qualité de soins à nos patients et de soutenir la santé et le bien-être de nos communautés. Nous sommes engagés à l'excellence en matière de soins aux patients, de sécurité et de performance financière. Notre objectif est de fournir une expérience centrée sur le patient qui répond aux besoins de notre population diversifiée.

WHAT WE DO

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NWMO Mandate

The Nuclear Waste Management Organization (NWMO) was established in 2002 by Canada's nuclear electricity producers in accordance with the *Nuclear Fuel Waste Act (NFWA)*. Operating on a not-for-profit basis under the *Canada Not-for-profit Corporations Act*, the NWMO is responsible for designing and implementing Canada's plan for the long-term management of used nuclear fuel. Used nuclear fuel is created by generating electricity in nuclear power plants.

Ontario Power Generation (OPG), New Brunswick Power Corporation, and Hydro-Québec (HQ) are the founding Members of the NWMO, and along with Atomic Energy of Canada Limited (AECL), are required to fund the NWMO's operations.

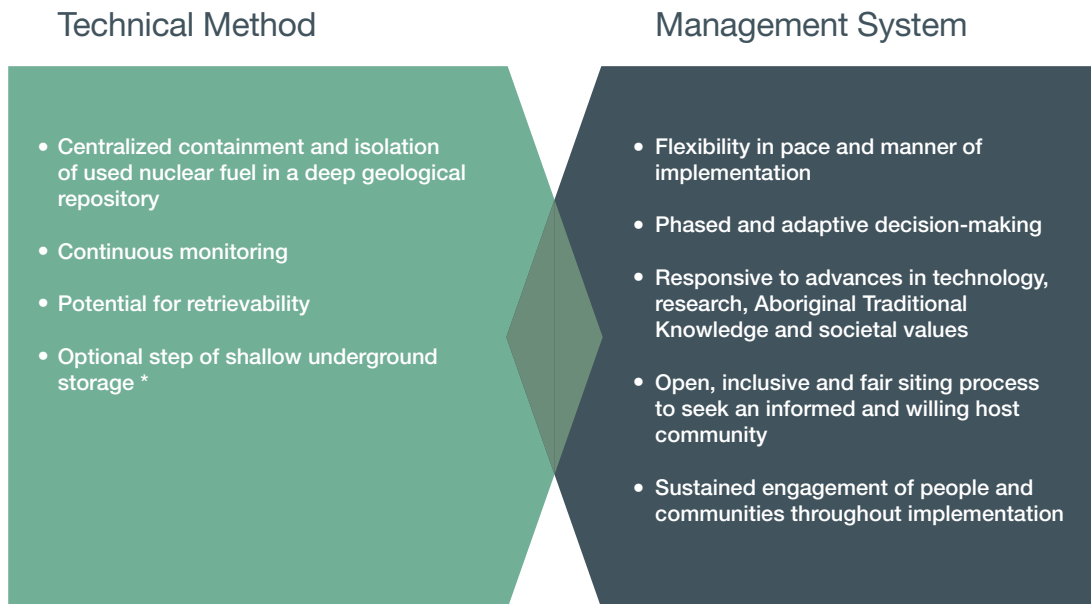
The *NFWA* required the NWMO to study approaches for the long-term management of used nuclear fuel and recommend to the Government of Canada a preferred approach. The NWMO initiated this study in 2002, and in 2005, after a three-year dialogue with Canadians from coast to coast, submitted to the Minister of Natural Resources a proposed approach for the long-term management of Canada's used nuclear fuel.

In June 2007, the Government of Canada selected Adaptive Phased Management (APM) as Canada's plan for the long-term management of used nuclear fuel.

The technical end point of APM is the centralized containment and isolation of the used fuel in a deep geological repository located at a safe site with an informed and willing host. The plan also involves the development of a used fuel transportation system to transport used nuclear fuel to the repository site.

The management system involves realistic, manageable phases, each marked by explicit decision points with continuing participation by interested Canadians.

Adaptive Phased Management at a Glance



* Temporary shallow storage at the deep geological repository is optional and not currently included in the NWMO's implementation plan.

The NWMO is now responsible for implementing APM, subject to all the necessary regulatory approvals. In implementing APM, the organization is committed to proceeding in stages, in an open, transparent, and inclusive manner, taking the time that is needed to collaboratively plan and then confirm each step with Canadians before moving forward to the next step.

All Canada's used nuclear fuel is safely stored on an interim basis in licensed facilities at the nuclear reactor sites where it is generated in Ontario, Quebec, and New Brunswick, and at AECL's facilities in Manitoba and Ontario. Used nuclear fuel remains hazardous for hundreds of thousands of years. Canada's plan is responsive to values and objectives identified by Canadians, and it is being implemented using the best available knowledge, including the physical sciences, social science and Aboriginal Traditional Knowledge. It is designed to safely contain and isolate the material from people and the environment essentially indefinitely.

An early milestone in implementing APM was the collaborative design of a nine-step process to select a site for Canada's used nuclear fuel repository and Centre of Expertise that will be a hub for national and international collaboration. That process was finalized in 2010, after extensive input from Canadians, and in May of the same year, the NWMO proceeded to the first step in implementing it by initiating a broad program to provide information, answer questions, and build awareness among Canadians about APM and the siting process itself.

The site selection process is community-driven. It is designed to ensure, above all, that the site selected is safe, secure, and has an informed and willing host. The process must meet the highest scientific, professional and ethical standards. The safety and appropriateness of any potential site will be evaluated through a series of progressively more detailed scientific, technical and social assessments over numerous steps spanning many years. A robust safety case will need to demonstrate with

confidence that the project can be safely implemented at the site and can meet or surpass the requirements of regulatory authorities.

The *NFWA* requires the nuclear fuel waste owners – OPG, HQ, NB Power and AECL – to establish segregated trust funds to finance the long-term management of used fuel. These funds were established in 2002. Contributions are made annually by the waste owners, and audited financial statements are posted on the NWMO website at www.nwmo.ca/trustfunds.

In 2008, as required by the legislation, the NWMO proposed a funding formula to determine the deposits to be made each year by the waste owners to pay for APM implementation. The proposed formula was approved by the Minister of Natural Resources in April 2009.

The *NFWA* also required the NWMO to establish an Advisory Council whose independent comments on the organization's work and triennial reports are made public. The Advisory Council meets regularly and provides ongoing advice and guidance on NWMO work plans and activities.



Used Nuclear Fuel

Canada has been generating electricity from nuclear power for more than half a century. In that time, just over 2.5 million used fuel bundles have been produced. Each bundle is about the size and shape of a fireplace log, with a total weight of approximately 24 kilograms.

Used nuclear fuel remains hazardous for a long period of time, and the material must be contained and isolated from people and the environment essentially indefinitely. Canada's used nuclear fuel is currently safely managed in facilities licensed for interim storage at nuclear reactor sites in Ontario, Quebec, and New Brunswick, and at Atomic Energy of Canada Limited's (AECL) sites in Manitoba and Chalk River Laboratories in Ontario.

Canadian nuclear power plants are fuelled by natural (un-enriched) uranium oxide, formed into ceramic pellets which are encased in Zircaloy tubes that are welded together in a cylindrical fuel bundle. Once the fuel bundle has been used to generate electricity, it is removed from the reactor. Physically, a used bundle looks the same as it did when it was placed in the reactor.

When used nuclear fuel is removed from a reactor, it is considered a waste product, is radioactive and requires careful management. It is first

placed in a water-filled pool where its heat and radioactivity decrease. After seven to 10 years, the used bundles are placed in dry storage containers, silos or vaults.

Dry storage containers have a minimum design life of 50 years. Although its radioactivity decreases with time, the used fuel will remain a potential health risk for many hundreds of thousands of years. For this reason, used fuel requires careful management.

Currently, about 90,000 used nuclear fuel bundles are generated in Canada each year. A small amount of used nuclear fuel is also created at research and development facilities operated by AECL, and Canadian university facilities. If the entire inventory of used nuclear fuel bundles could be stacked end-to-end like cordwood, it would fit into a space the size of about seven hockey rinks, from the ice surface to the top of the boards.

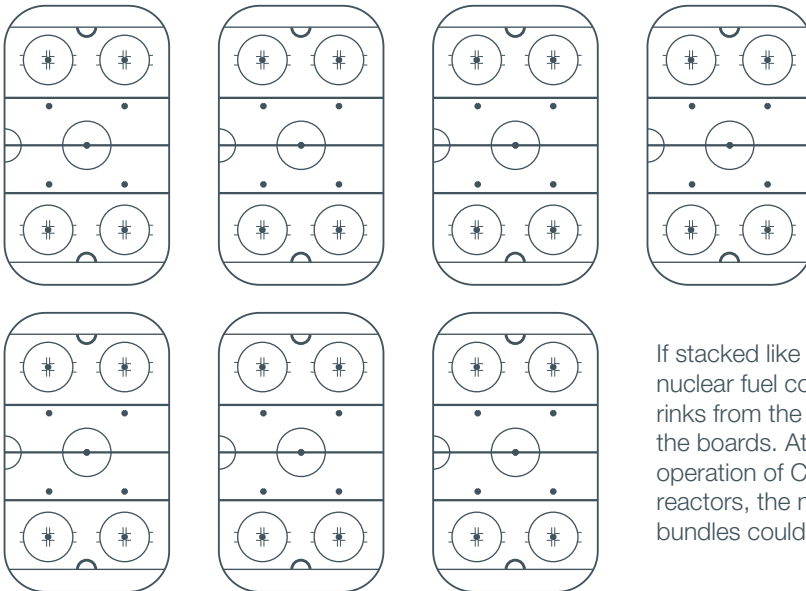
The NWMO has a legal obligation to provide long-term management of all Canada's used nuclear fuel, that which exists now and that which will be produced in the future. There are other heat-generating wastes generated in Canada (such as cobalt-60 sources produced in Canadian CANDU reactors and used in industrial and therapeutic radiation devices) that the NWMO is not mandated to manage. These are not currently planned for the deep geological repository to be built as part of Adaptive Phased

Management, Canada's plan for the safe and secure long-term management of used nuclear fuel.

The table on page 15 summarizes the current inventory of nuclear fuel waste in Canada as of June 30, 2014.

The inventory is expressed in terms of number of used CANDU fuel bundles and does not include fuel that is currently in the reactors, which is not considered to be "nuclear fuel waste" until it has been discharged from the reactors.

CANDU Fuel Bundles



**>2.5
million**

There are currently just over 2.5 million used nuclear fuel bundles in Canada.

If stacked like cordwood, all this used nuclear fuel could fit into seven hockey rinks from the ice surface to the top of the boards. At the end of the planned operation of Canada's existing nuclear reactors, the number of used nuclear fuel bundles could total about 4.6 million.

Table 1: Summary of Nuclear Fuel Waste in Canada as of June 30, 2014

Location	Owner	Wet Storage (No. of Bundles)	Dry Storage (No. of Bundles)	Total (No. of Bundles)	Current Status
Bruce A	OPG ⁽²⁾	337,049	119,808	456,857	4 units operational
Bruce B	OPG ⁽²⁾	354,338	259,958	614,296	4 units operational
Darlington	OPG	336,327	129,747	466,074	4 units operational
Douglas Point	AECL	0	22,256	22,256	Permanently shut down
Gentilly-1	AECL	0	3,213	3,213	Permanently shut down
Gentilly-2	HQ	33,341	96,600	129,941	Permanently shut down end of 2012
Pickering A	OPG	403,303	280,726	684,029	2 units operational, 2 units permanently shut down
Pickering B	OPG				4 units operational
Point Lepreau	NBPN	39,970	87,480	127,450	Operational
AECL Whiteshell	AECL	0	2,268	2,268	Permanently shut down ⁽¹⁾
AECL Chalk River	AECL	0	4,921	4,921	Mostly fuel from NPD (permanently shut down) and with small amounts from other CANDU reactors ⁽³⁾
Total		1,504,328	1,006,977	2,511,305	19 units in operation 7 units shut down (including prototype and demonstration reactors)

AECL Atomic Energy of Canada Limited
 HQ Hydro-Québec
 NBPN NB Power Nuclear
 NPD Nuclear Power Demonstration
 OPG Ontario Power Generation

- (1) 360 bundles of Whiteshell fuel are standard CANDU bundles. The remaining bundles are various research, prototype and test fuel bundles, similar in size and shape to standard CANDU bundles.
- (2) Bruce reactors are leased to Bruce Power for operation.
- (3) In addition to the totals shown in Table 1, AECL also has some 22,000 components of research and development fuels, such as fuel elements, fuel pellets and fuel debris, in storage at Chalk River. While the total mass of these components is small compared to the overall quantity of CANDU fuel, their varied storage form, dimensions, etc. require special consideration for future handling. There are also small quantities (a few kilograms) of non-CANDU fuel associated with several research reactors in Canada.

Assuming a rounded average of 20 kilograms of heavy metal in a fuel bundle, 2.5 million bundles is equivalent to approximately 50,000 tonnes of heavy metal (t-HM – a standard international unit for measuring quantities of used nuclear fuel).

VISION

Our vision is the long-term management of Canada's nuclear waste in a way that safeguards people and respects the environment, now and in the future.

MISSION
a management approach for the long-term care of nuclear fuel that is socially acceptable, technically sound, environmentally responsible and economically feasible.

The purpose of NWMO is to develop and implement, collaboratively with Canadians, the long-term care of Canada's used nuclear fuel.

VALUES

Integrity – We will conduct ourselves with respect for all persons and organizations with whom we deal.

Excellence – We will pursue the best knowledge, understanding and innovation in our analysis, engagement processes and decision-making.

Engagement – We will seek the participation of all communities and be responsive to a diversity of views and interests. We will communicate and consult actively, promoting reflection and facilitating a constructive dialogue.

Accountability – We will be fully responsible for our actions and efficient management of resources, and be transparent to all Canadians.

Transparency – We will be open and transparent in our communications and decision-making, so that Canadians can understand our actions and the decisions we make.

The fundamental beliefs that guide us in our work include:



Vision, Mission and Values

Vision

Our vision is the long-term management of Canada's nuclear waste in a manner that safeguards people and respects the environment, now and in the future.

Mission

The purpose of the NWMO is to develop and implement, collaboratively with Canadians, a management approach for the long-term care of Canada's used nuclear fuel that is socially acceptable, technically sound, environmentally responsible and economically feasible.

Values

Integrity

We will conduct ourselves with openness, honesty and respect for all persons and organizations with whom we deal.

Excellence

We will pursue the best knowledge, understanding and innovative thinking in our analysis, engagement processes and decision-making.

Engagement

We will seek the participation of all communities of interest and be responsive to a diversity of views and perspectives. We will communicate and consult actively, promoting thoughtful reflection and facilitating a constructive dialogue.

Accountability

We will be fully responsible for the wise, prudent and efficient management of resources, and be accountable for all our actions.

Transparency

We will be open and transparent in our process, communications and decision-making, so that the approach is clear to all Canadians.

Introducing Pierre Charlebois, the NWMO's New Chair of the Board

The NWMO is pleased to announce the appointment of Mr. Pierre Charlebois as its new Chair of the Board. The two-year appointment was made in September 2014.

A member of the NWMO's Board of Directors since 2008, Mr. Charlebois was previously Executive Vice-President and Chief Operating Officer at Ontario Power Generation (OPG), and was responsible for operating its nuclear, hydro, and fossil businesses, including overseeing major capital projects. He also served as Chairman of the Canadian Nuclear Association from 2007 to 2009. From December 2003 to November 2006, Mr. Charlebois was the Chief Nuclear Officer, responsible for overseeing OPG's nuclear generation business and its performance. Mr. Charlebois graduated from the University of Ottawa in 1975 with a bachelor's degree in Applied Science. He is a member of the Professional Engineers of Ontario.

Mr. Charlebois succeeds Dr. Gary Kugler, who served as Chair from 2006 to 2014. During that time, the NWMO made significant strides in fulfilling its mandate. In 2007, the Government approved Adaptive Phased Management (APM) as Canada's plan for the long-term management of the country's used nuclear fuel. Between 2008 and 2009, the NWMO worked collaboratively with Canadians to identify the principles and steps that should guide the site selection process, and in 2010, it initiated that process in collaboration with interested communities. The APM technical program made significant progress on engineering designs, updated cost estimates, and advanced applied research activities that will support the development of a safety case and licence submission for a used fuel geological repository.

The NWMO thanks Dr. Kugler for his leadership and service, and wishes him all the best.



Chairman's Message

Collaboration is the theme of this year's Annual Report. It was key to the design of Canada's plan for the long-term management of used nuclear fuel and is at the core of how the approach is being implemented.

When the *Nuclear Fuel Waste Act (NFWA)* was proclaimed in 2002, Canada was one of many countries facing an important national challenge: how to safely manage used nuclear fuel over the very long term. In accordance with the legislation, and to meet the challenge, Canadian nuclear waste producers established the NWMO with a mandate to design and implement a plan.

From the outset, the organization has advanced its mandate by working together with interested and potentially affected people, including First Nation and Métis communities. Guided by values and objectives identified

through dialogue, a plan called Adaptive Phased Management (APM) was developed. It has as its end point the construction of a deep geological repository where used fuel will be safely and securely contained and isolated.

It was also with the guidance of Canadians that a nine-step process was developed for identifying an informed and willing host for the repository and associated Centre of Expertise. This process is now being implemented collaboratively with communities.

By the end of 2014, 13 communities from Ontario and Saskatchewan were still engaged in learning more about APM and

were participating in Step 3 of the site selection process. These preliminary assessments, conducted in two phases, are carried out in collaboration with communities that expressed interest in learning about the project, First Nation and Métis communities, and municipalities in the area. The assessments focus on both the geological aspects of the region and community willingness to participate in the process.

The NWMO's commitment to working collaboratively was noted by the Minister of Natural Resources Canada in March 2014. Commenting on the NWMO's 2011–2013 triennial report, he singled out the “communities and citizens that have come forward to help shape the direction of this plan.” He also cited the key role of “community involvement and engagement” in the NWMO's work.

In addition to its collaboration with interested citizens, the NWMO continues to work closely with several important advisory bodies, including its Advisory Council, Council of Elders and Municipal Forum. These groups have been instrumental in guiding our engagement with First Nation and Métis communities, and municipalities.

By the end of 2014, 13 communities from Ontario and Saskatchewan were still engaged in learning more about APM and were participating in Step 3 of the site selection process.

In 2014, the NWMO advanced the design and development work for the used fuel transportation, handling, and storage at potential future siting areas. To learn and benefit from international experience, the Board of Directors supported the establishment of the APM-Geoscientific Review Group and an independent group of experts for the engineered barrier design. The NWMO also maintains regular contact with experts in other countries engaged

in similar programs, exchanging experience and technical information. Our unique Canadian collaborative approach to site selection has, in fact, received significant international interest.

Looking ahead, collaboration will play an even greater role in all aspects of our work, from meaningful engagement and planning with people in areas involved in the site selection process, to sharing knowledge about technical information and best practice with experts around the globe. In that spirit, I invite you to learn more about APM and the NWMO, and to get involved in what is truly a collaborative endeavour.



Pierre Charlebois
Chairman



President's Message

The NWMO is now into its eighth year of implementing Canada's plan, known as Adaptive Phased Management (APM), for the long-term management of our country's nuclear fuel waste.

Like almost all other countries with nuclear power, Canada's plan involves safely containing and isolating nuclear fuel waste in a deep geological repository where it can be monitored and retrieved if necessary. What is distinctive about the Canadian approach is the process we are using to identify a safe and secure location. This process involves Canadians in decision-making every step of the way. It is guided by the best scientific information, by the well-being of interested communities, by Aboriginal Traditional Knowledge, and by respect for Treaty rights and the cultural values of Aboriginal peoples.

The deep geological repository will only proceed with the involvement of the NWMO, interested communities, First Nation and Métis communities, and other neighbouring municipalities.

The year 2014 began with 17 communities at various stages of learning about the plan and considering their interest in hosting the project. By year's end, the number of communities engaged in the site selection process had been narrowed to 13, based on preliminary desktop assessments of potential geological suitability and potential for the project to contribute to community well-being.



Fieldwork, involving airborne geophysical surveys and observation of general geological features, was initiated in four communities during 2014. This work was conducted with the guidance and involvement of the local Aboriginal and non-Aboriginal community members. At the same time, the NWMO broadened its engagement activities beyond communities interested in learning more to include their neighbours in the surrounding area: First Nation and Métis communities, as well as other close-by municipalities that could be affected by the project.

In recognition of the increasingly central role First Nation and Métis communities have in the site selection process, the NWMO created a new position: Associate Vice-President of Aboriginal Relations.

As always, safety is our highest priority. In 2014, we continued our work with 12 universities and several international partners to ensure we are using the best available scientific information. We expanded our technical program to include an international peer review of our design for the engineered barrier system. We also reviewed our assessment of potential suitability of the geology near the communities in the site selection process with the APM-Geoscientific Review Group comprising internationally recognized experts. The year's highlights also included completion of: two used fuel container prototypes; further testing of the copper corrosion barrier; and welding techniques for the repository container.

In recognition of the increasingly central role First Nation and Métis communities have in the site selection process, the NWMO created a new position: Associate Vice-President of Aboriginal Relations.



Starting in 2015, the development of a safe and socially acceptable plan for transportation will become an important new NWMO strategic objective. This reflects not only the importance of transportation as an element of the APM program, but also the feedback we have received from communities and Canadians in general. We will step up our study of road and rail options for moving used nuclear fuel, and expand work to address public questions and concerns associated with transportation.

I hope you will read this report with interest and become involved with us in the critical work that lies ahead. As the NWMO moves forward, we will continue to adapt our plans in response to evolving societal expectations, insight from Traditional Knowledge, and the best science and technology available.

K. E. Nash

Ken Nash
President and CEO



Our Work

The NWMO is responsible for implementing Adaptive Phased Management (APM) – Canada’s plan for the long-term management of used fuel produced by Canadian nuclear electricity generators. The NWMO is committed to carrying out its work collaboratively with interested and potentially affected individuals and organizations in a manner that is socially acceptable, technically sound, environmentally responsible, and economically feasible.

The NWMO’s work in 2014 was guided by seven strategic objectives previously identified in collaboration with interested Canadians. It is against these that the organization reports on its activities for the year:

- » Build sustainable, long-term relationships with interested Canadians, and Aboriginal peoples of Canada, and involve them in setting future directions for the safe, long-term management of used nuclear fuel.
- » Implement collaboratively with Canadians the process for siting a deep geological repository for the safe, long-term management of used nuclear fuel in an informed, willing host community.
- » Refine and further develop the generic designs and safety cases for a repository for used nuclear fuel in both crystalline and sedimentary rock formations, and conduct technical research and development to ensure continuous improvement, consistent with best practices.
- » Ensure funds are available to pay for the safe, long-term management of Canada’s used nuclear fuel.

- » Adapt plans for the management of used nuclear fuel in response to new knowledge, international best practices, advances in technical learning, insight from Aboriginal Traditional Knowledge, evolving societal expectations and values, and changes in public policies.
- » Maintain an accountable governance structure that provides confidence to the Canadian public in the conduct of the NWMO’s work.
- » Build and sustain an effective organization with the social, environmental, technical and financial capabilities for the safe, long-term management of Canada’s used nuclear fuel.

In addition to implementing APM, the NWMO has services contracts in support of the proposed deep geologic repository for low- and intermediate-level waste owned by Ontario Power Generation (OPG). These contracts extend through the regulatory approvals phase, and will include the design, construction, and commissioning of the project. This work, which is separate from APM, is profiled in the chapter *Other Activities: Ontario Power Generation’s Deep Geologic Repository Project for Low and Intermediate Level Waste*.

Progress on APM in 2014: The Year at a Glance

Building Sustainable Relationships

The NWMO continued to engage with the many groups involved in the long-term management of Canada's used nuclear fuel, including communities engaged in learning, First Nation and Métis organizations, municipal associations, federal and provincial governments, and young Canadians.

Collaboratively Implementing the Site Selection Process

By year's end, all communities engaged in learning more about APM and the site selection process had advanced to preliminary assessments (Step 3 in a nine-step, multi-year process). Initial fieldwork began in the communities that had progressed to the second and more detailed phase of preliminary assessments, and was complemented by broadened engagement within the communities, and with First Nation and Métis communities, and municipalities in surrounding areas.

Optimizing Repository Designs and Further Increasing Confidence in Safety

The NWMO further developed the Canadian used fuel engineered barrier design and proof testing plans, with conceptual repository designs, pre-closure safety, and ALARA (as low as reasonably achievable) assessments, prepared for both crystalline and sedimentary environments. The NWMO further enhanced its technical understanding and competencies through ongoing collaborative technical and research programs with universities and international organizations.

Providing Financial Surety

The NWMO, in compliance with the *Nuclear Fuel Waste Act*, set the levels of trust fund deposits to be made by Canada's used nuclear fuel owners.

Adapting Plans

The NWMO engaged in continuous learning so as to be able to adapt its plans should new technologies emerge or societal expectations change. It continued to solicit advice and guidance from a wide range of groups, and public input was sought on its implementation plan. Through international exchanges, it continued to keep abreast of best practice.

Ensuring Governance and Accountability

Multiple layers of oversight and peer review, complemented by externally audited international certifications, helped ensure that the NWMO's work was both transparent and guided by the highest scientific and professional standards. Independent review of the NWMO's technical program was expanded from one group to two: the APM-Geoscientific Review Group and an independent group of experts for the engineered barrier design.

Building and Sustaining an Effective Organization

The NWMO continued to enhance its staffing and contractor capability through a variety of initiatives, including joint projects with universities, staff training and development, and investment in business systems and processes.

Additional Work

The NWMO continued to assist OPG in the regulatory review process under the *Nuclear Safety and Control Act* for a licence to prepare a site and to construct a deep geologic repository facility for low- and intermediate-level waste.



Building Sustainable Relationships

Strategic Objective: The NWMO will build sustainable, long-term relationships with interested Canadians and Aboriginal peoples of Canada, and involve them in setting future directions for the safe, long-term management of used nuclear fuel.

Safely managing Canada's used nuclear fuel is important to a broad spectrum of Canadian society. Engaging and involving them in decision-making helps ensure Adaptive Phased Management (APM) continues to respond to the values and concerns of Canadians as the project moves forward.

The NWMO works to build sustainable relationships with many different communities, individuals, and organizations, and involve them in planning and implementing APM. These include interested communities engaged in learning more about the plan, First Nation and Métis organizations and communities, neighbouring municipalities, federal and provincial

governments, and the young people who will one day assume responsibility for the long-term management of Canada's used nuclear fuel.

In 2014, the NWMO continued to promote the learning, capacity building and knowledge transfer that help support ongoing public involvement in its work. At the same time, it continued to develop strong relationships with communities engaged in learning more about APM. The NWMO also prepared for the next phase in the site selection process by ensuring its own processes support collaboration among interested communities, First Nation and Métis communities in the area, and surrounding municipalities.



Building Relationships With Interested Communities and Surrounding Municipalities

The process for selecting a site for Canada's used nuclear fuel repository was designed to be led by communities interested in learning about the project and potentially hosting the facilities. Building relationships of mutual respect and understanding and earning trust are critical first steps in setting the foundation for partnership. As the site selection process moves forward, municipalities surrounding communities engaged in learning will play an increasingly important role in reflections on regional well-being and the potential for them, interested communities, and First Nation and Métis communities to work together to implement the project.

Facilitating learning about safety and sustaining dialogue to reflect on the potential to foster well-being in an area through the implementation of the project was an important focus of activities in communities. NWMO relationship managers, social research staff, communications staff, and subject matter experts participated on a regular and ongoing basis in locally based discussions in interested communities and the surrounding area. Together, they participated in more than 200 community liaison committee (CLC) meetings and other local activities over the course of the year.

In 2014, NWMO staff continued to meet with and engage people in interested communities. In addition to residents, these people included:

- » Members of municipal councils;
- » Representatives from local economic development offices and chambers of commerce;
- » First responders, social services providers, and educators;
- » Members of clubs, and other local and regional organizations;
- » Trappers associations and camp owners; and
- » Members of CLCs (discussed in the chapter *Collaboratively Implementing the Site Selection Process*).

For more information about engagement with individual communities, please see the chapter *Collaboratively Implementing the Site Selection Process*.

Well-Being in Potential Host Communities and the Surrounding Area

The project will only proceed at a site that can safely contain and isolate used nuclear fuel, and with the involvement of the interested community, First Nation and Métis communities in the area, and surrounding municipalities, working together to implement it.

Beyond ensuring safety, the NWMO's commitment to communities and the surrounding area is that long-term well-being or quality of life will be fostered by the APM Project. Broadened engagement with interested communities, potentially affected First Nation and Métis communities, and surrounding municipalities is therefore essential to the site selection process.

NWMO staff were also invited to participate in a wide range of community events, fairs, festivals, service club meetings, regional events, and trade shows over the course of the year.

To support learning and involvement of municipalities, and First Nation and Métis communities, the NWMO continued to make funding and resources available through its Learn More Program, as detailed online at www.nwmo.ca/sitingprocess_feasibilitystudies_resources. These funding and resources are designed to cover administrative and other costs incurred by communities in learning more about Canada's plan and considering their interest. Over the course of the year, the NWMO organized 15 tours of interim waste storage sites. Six were for representatives of communities engaged in learning more about APM, and nine were for neighbouring groups, including First Nation and Métis communities, and nearby municipalities. The NWMO also supported a number of regional meetings to support learning and contributed to a variety of local events.



Involving First Nation and Métis Communities and Organizations

Learning From First Nation and Métis Peoples

From its inception, the NWMO has sought to develop its processes and plans with the involvement of interested communities, and First Nation and Métis peoples – laying the foundation for ongoing engagement and partnership development that is respectful of community practices and approaches to decision-making. Through engagement with potentially affected First Nation and Métis communities, the NWMO is seeking to understand how the project might benefit each area, and be respectful of Aboriginal and treaty rights.

The NWMO also seeks to work together with First Nation and Métis communities to respectfully apply Traditional Knowledge to both technical safety and community well-being aspects of the site selection process, and guide engagement with those communities.



Because each First Nation and Métis community is unique in its history, culture, and traditional and contemporary ways of life, each will have its own unique goals, aspirations, and perspectives on the potential for the project to be a good fit and foster well-being in its area.

In 2014, the NWMO built new relationships with potentially affected First Nation and Métis communities, while continuing to maintain and strengthen existing relationships with national, provincial, and regional Aboriginal organizations.

The agreements the NWMO has with these organizations have helped support broad-level First Nation and Métis participation in learning more about the project, capacity building, and two-way information sharing at each stage of implementing APM. The agreements have also provided guidance and assistance in engaging with member communities.

Several First Nation organizations invited NWMO staff to meet them, make presentations and speak with their community members. These included Nishnawbe Aski Nation (Treaty 9), Prince Albert Grand Council, Treaty 3 Elders and youth, the Union of New Brunswick Indians, the Assembly of First Nations, and the Northeast

Superior Regional Chiefs Forum.

As well, the NWMO continued its engagement of Métis organizations in Ontario. Through its agreements with the Métis Nation of Ontario (MNO), the NWMO was able to brief all six of the potentially impacted Regions of the MNO. In August, it convened a project workshop at the MNO's Annual General Assembly in Thunder Bay, Ontario. Many of these organizations also accepted the NWMO's invitation to tour an interim nuclear waste storage facility to see how used nuclear fuel is being safely managed and to learn more about the NWMO's work.

The NWMO also continued to strengthen its relationship with First Nation and independent Métis communities in Ontario. These included First Nations such as Wabigoon Lake Ojibway, Pays Plat, Ginoogaming, Constance Lake, Pic Mober, and the First Nations of the North Shore of Lake Huron. Independent Métis communities engaged include the Historic Saugeen Métis in Bruce County, the Jackfish Métis Association in the vicinity of Schreiber, and the Red Sky Métis Independent Nation in the Robinson-Superior Treaty area.

In Saskatchewan, the NWMO provided project briefings and engaged in other activities with the leaders, Elders, and citizens of Peter Ballantyne Cree Nation, Buffalo River Dene Nation, Métis Nation-Saskatchewan's Eastern Region 1, Prince Albert Grand Council (PAGC) and PAGC Women's Commission, the Northern Saskatchewan Trappers Association, and the Federation of Saskatchewan Indian Nations.

Other engagement activities for Saskatchewan First Nation and Métis peoples included: dry storage tours at Darlington and Pickering Waste Management Facilities, and Learn More briefings at the NWMO's Toronto office; participation in learning groups for the airborne geophysical surveys and observation of general geological features conducted in the Creighton area; and participation in workshops and community capacity building.

The NWMO also sponsored a number of sporting and cultural events, including the North American Indigenous Games, the 2014 Native Softball Championships, and the Wahpeton Dene Nation Pow Wow.

Sponsoring the 2014 North American Indigenous Games

In July, the NWMO was a sponsor of the 2014 North American Indigenous Games. The games seek to inspire youth to realize their dreams by promoting sport and healthy lifestyles, and more broadly, unity, culture, volunteerism, and teamwork among First Nation, Métis, and Non-Indigenous communities.

This year's games were held in Regina, Saskatchewan, and brought together thousands of athletes and fans from all provinces and territories, and from across the United States.

For more details about the NWMO's engagement activities in First Nation and Métis communities, please see the chapter *Collaboratively Implementing the Site Selection Process*.

Municipal Organizations

The NWMO's relationships with municipal organizations are key to understanding municipal perspective and practice to help guide engagement. With this goal in mind, the NWMO seeks advice through ongoing meetings with communities hosting nuclear facilities, as well as with municipal associations in nuclear fuel cycle provinces. Their guidance has helped ensure the NWMO's engagement activities support communities working together as the site selection process moves forward.

As in previous years, the Canadian Association of Nuclear Host Communities (CANHC) provided insight and advice about how the NWMO might broaden its awareness-building activities and municipal outreach in the nuclear provinces and in the country as a whole. NWMO staff attended the CANHC annual general meeting.

As well, NWMO staff participated in conferences hosted by 14 municipal organizations:

- » The Saskatchewan Urban Municipalities Association;
- » The Economic Developers Council of Ontario;
- » The Rural Ontario Municipal Association/Ontario Good Roads Association Combined Conference;
- » The Thunder Bay District Municipal League;
- » The Saskatchewan Association of Rural Municipalities;
- » The Canadian Association of Nuclear Host Communities;
- » The Northwestern Ontario Municipal Association;
- » The Ontario Small Urban Municipalities;
- » The Federation of Northern Ontario Municipalities;
- » The Federation of Canadian Municipalities (FCM);
- » The Association of Municipalities of Ontario;
- » The Northwestern Ontario Regional Conference;
- » The Union of Municipalities of New Brunswick; and
- » The Ontario West Municipal Conference.

The Municipal Forum, established by the NWMO in 2009 with the assistance of the FCM, met twice in 2014. It continued to provide insight on best practices for engaging with local governments and associations. It also acted as a link to municipal associations and their members, while offering valuable advice on how engagement might be broadened to surrounding municipalities potentially affected by the project. As in previous years, it helped the NWMO better understand the needs and processes of municipalities participating in the site selection process.



Strengthening Relationships With Federal and Provincial Governments

The NWMO engages with federal and provincial government representatives in order to build understanding about the APM Project, and identify topics of shared interest for further learning and planning. This includes areas such as transportation, the duty to consult Aboriginal peoples, and potential access to Crown land.

Given that implementation of the project includes multiple departments, the NWMO works through a lead ministry within each jurisdiction, making it the primary point of contact with other ministries and departments.

In addition to working with government officials, the NWMO briefs elected representatives at both the federal and provincial levels.

Corporate Social Responsibility Program

The NWMO's Corporate Social Responsibility Program (CSRP) continued to support initiatives that help young Canadians enhance their appreciation of science and develop scientific skills.

As the site selection process began to narrow down in 2014, the program was also broadened to support local initiatives in Phase 2 communities, along with First Nation and Métis communities, and municipalities in the surrounding area.

In 2014, the program provided funding for four youth science initiatives: Shad; the Science North School Outreach Program; Scientists in School; and the Science Ambassador Program.

NWMO support for **Shad** began in 2009. Held on different Canadian university campuses each summer, the program focuses on science, engineering, technology, leadership, and entrepreneurship. The NWMO supports the program by providing bursaries to students and delivering interactive presentations by NWMO technical staff. More than 300 Shad students attended NWMO presentations in 2014.

NWMO support for the **Science North School Outreach Program** began in 2012. This classroom-based program helps schools augment their existing science curriculum through hands-on interactive programs. NWMO funding delivers the program to schools in northern Ontario communities participating in the site selection process.

NWMO support for **Scientists in School** began in 2013. The program helps kindergarten to Grade 8 students develop a lifelong interest in science, technology, math, environmental stewardship, and engineering. In the school year 2013–2014, funds from the CSRP enabled Scientists in School to deliver 50 workshops in 41 schools across four school districts in Ontario's Bruce and Huron Counties.

NWMO support for the **Science Ambassador Program** began in 2013. Based in Saskatchewan, the 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, and the focus is on students in Grades 5 to 9.



NWMO volunteers attend the 2014 Toronto Science Fair.

Other Youth Engagement

In addition to funding youth science initiatives, the NWMO also undertakes a range of activities to engage the next generation of Canadians.

Over the course of the year, NWMO staff made presentations to more than 300 elementary and high-school students in communities participating in the site selection process. These presentations were made in classrooms, as well as at local open houses.

In June, Grades 7 and 8 students from Ignace visited the NWMO's Learn More Centre in Toronto. NWMO staff talked to them about the organization and careers.

Several CLCs (described in the chapter *Collaboratively Implementing the Site Selection Process*) included youth representatives in order to bring forward a youth perspective and identify opportunities for local youth engagement.

At the university level, NWMO staff made six seminar presentations to students enrolled

in a range of disciplines. The organization also provided support for enhanced student participation in the Women in Nuclear annual conference.

As in previous years, NWMO staff volunteered at science fairs. In April, for example, technical staff lent a hand at three science fairs: the Toronto Science Fair, and two Bluewater Regional Science and Technology Fairs – one for senior-level students, the other for junior-level students. The NWMO also participated at the Canada-Wide Science Fair in Windsor, Ontario.

Further details, including an overview of the NWMO's youth engagement activities to date and its priorities moving forward, are available online at www.nwmo.ca/youthengagement. For details on youth involvement in the NWMO's Council of Elders, please see the chapter *Adapting Plans*.

Building Understanding and Awareness of the NWMO's Work

The NWMO's communications program supports public involvement in APM by building awareness about Canada's plan for the safe, long-term management of the country's used nuclear fuel.

To make information as accessible as possible, the NWMO uses both traditional and electronic media, ranging from public open houses and exhibits, ads, brochures and newsletters, to videos, presentations, information kiosks, and most recently, a web-based version of the NWMO's travelling physical exhibits.

Printed Materials

The publications the NWMO produced in 2014 focused on sharing information about APM and the next steps in the site selection process. Publications included brochures describing the fieldwork that takes place early in Phase 2 preliminary assessments, and questions and answers about the transportation of used nuclear fuel.

The NWMO continued to update the collection of backgrounders it makes available to the public. All NWMO backgrounders can be accessed online at www.nwmo.ca/backgrounders. They are also made available locally through community information kiosks, local NWMO offices, and public events such as open houses.

"Ask the NWMO," an advertising feature launched in 2012, continued to be published in newspapers and websites serving communities engaged in the site selection process. Each column features commonly asked questions about a particular facet of APM, with answers provided by a NWMO specialist. The whole series is also available online on the NWMO's website. A compilation of the features that ran over the course of the year was also published and made available for handout in communities.

The NWMO also published its second triennial report (released in March), its implementation plan for 2014 to 2018, a draft implementation plan for 2015 to 2019, and three issues of its newsletter, *NWMO News*.

"Ask the NWMO," an advertising feature launched in 2012, continued to be published in newspapers and websites serving communities engaged in the site selection process. ▲

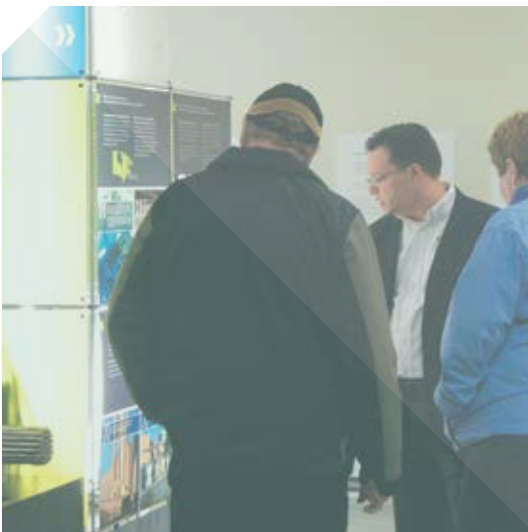


Exhibits

- ▶ The NWMO's mobile transportation exhibit, launched in April 2013, continued to visit communities engaged in the site selection process. It was also on display at the annual conferences of the Transportation Association of Canada, the Ontario Small Urban Municipalities, and the Federation of Northern Ontario Municipalities.
- ▶ The NWMO's physical exhibit, which provides information on such topics as radiation, the multiple-barrier system, and the role of community well-being in the site selection process, was displayed at 18 local open houses over the course of the year. These publicly advertised events provide opportunities for local residents to learn more, talk with NWMO specialists, and ask questions.

The NWMO's Mobile Transportation Exhibit

The NWMO's mobile transportation 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 it 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.





Digital Communications

As in previous years, the NWMO website (www.nwmo.ca) was regularly updated with project-related documents and information pertaining to the site selection process.

An important upgrade to the site was the launch in December of a new virtual exhibit to help people learn more about APM and the site selection process. Available online at www.nwmoexhibit.ca/fla/english, the virtual exhibit uses audiovisual tools to recreate the experience of visiting the NWMO's travelling exhibit. Like the travelling exhibit, its virtual counterpart has seven core modules, covering such topics as radiation, the multiple-barrier system, the concept of a deep geological repository, and the safe and secure transportation of used nuclear fuel.

Other Communications Initiatives

In 2014, the NWMO hosted two “Learn More” days for media from areas engaged in the site selection process. These sessions included a tour of an interim nuclear waste storage facility, and a briefing about the APM Project and site selection process. The organization responded to many media inquiries from outlets serving communities involved in the site selection process, in addition to making its specialists available to local, national, and international broadcast and print media.

As part of helping communities learn more about the project, the NWMO's communications team also continued to provide support as needed to CLCs as they updated websites and produced newsletters to communicate with residents. The committees' respective websites can be accessed at www.clcinfo.ca.



Collaboratively Implementing the Site Selection Process

Strategic Objective: The NWMO will implement collaboratively with Canadians the process for siting a deep geological repository for the safe, long-term management of used nuclear fuel in an informed, willing host community.

Since 2010, the NWMO has been engaged in a multi-year, community-driven process to identify a site where Canada's used nuclear fuel can be safely contained and isolated in a deep geological repository.

For a site to be selected, it must not only meet or exceed strict safety and geoscientific requirements, but it must also have an informed and willing host.

The site selection process requires that the

initiative to enter the process and proceed from one step to the next must come from communities interested in learning more about the project. The process is collaborative. Interested communities are encouraged to engage with First Nation and Métis communities, as well as with municipalities in the surrounding area. The project will only proceed with interested communities, First Nation and Métis communities, and surrounding municipalities, working together to implement it.

By the end of 2014, all communities engaged in learning more about Canada’s plan were in Step 3 (preliminary assessments) of a nine-step site selection process.

Why Preliminary Assessments?

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 in the site selection process). They 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.

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 and involve it in the implementation of the project.

Steps in the Siting Process

Getting Ready	The NWMO publishes the finalized siting process, having briefed provincial governments, the Government of Canada, national and provincial Aboriginal organizations, and regulatory agencies on the NWMO's activities. The NWMO will continue briefings throughout the siting process to ensure new information is made available and requirements which might emerge are addressed.
Step 1	The NWMO initiates the siting process with a broad program to provide information, answer questions and build awareness among Canadians about the project and siting process. Awareness-building activities will continue throughout the full duration of the siting process.
Step 2	Communities identify their interest in learning more, and the NWMO provides detailed briefing. An initial screening is conducted. At the request of the community, the NWMO will evaluate the potential suitability of the community against a list of initial screening criteria.
Step 3	For interested communities, a preliminary assessment of potential suitability is conducted. At the request of the community, the NWMO will conduct a feasibility study collaboratively with the community to determine whether a site has the potential to meet the detailed requirements for the project. Regional engagement will be initiated, and an initial review of transportation considerations will be conducted. Interested communities will be encouraged to inform surrounding communities, including potentially affected Aboriginal communities and governments, as early as possible to facilitate their involvement. Preliminary assessments are conducted in two phases: Phase 1: Desktop study and engagement; Phase 2: Field investigations and expanded engagement.
Step 4	For interested communities, potentially affected surrounding communities are engaged if they have not been already, and detailed site evaluations are completed. In this step, the NWMO will select one or more suitable sites from communities expressing formal interest for regional study and/or detailed multi-year site evaluations. The NWMO will work collaboratively with these communities to engage potentially affected surrounding communities, Aboriginal governments and the provincial government in a study of health, safety, environment, social, economic and cultural effects of the project at a broader regional level (Regional Study), including effects that may be associated with transportation. Involvement will continue throughout the siting process as decisions are made about how the project will be implemented. A Centre of Expertise will be launched in or near the community.
Step 5	Communities with confirmed suitable sites decide whether they are willing to accept the project and propose the terms and conditions on which they would have the project proceed.
Step 6	The NWMO and the community with the preferred site enter into a formal agreement to host the project. The NWMO selects the preferred site, and the NWMO and community ratify a formal agreement.
Step 7	Regulatory authorities review the safety of the project through an independent, formal and public process, and if all requirements are satisfied, give their approvals to proceed. The implementation of the deep geological repository will be regulated under the <i>Nuclear Safety and Control Act</i> and its associated regulations to protect the health, safety and security of Canadians and the environment, and to respect Canada's international commitments on the peaceful use of nuclear energy. Regulatory requirements will be observed throughout all previous steps in the siting process. The documentation produced through previous steps, as well as other documentation that will be required for a licence application, will be formally reviewed by regulatory authorities at this step through an Environmental Assessment, and if this assessment is successful, then licensing hearings related to site preparation (and possible construction) of facilities associated with the project. Various aspects of transportation of used nuclear fuel will also need to be approved by regulatory authorities.
Step 8	Construction and operation of an underground demonstration facility proceeds. The NWMO will develop the Centre of Expertise, launched in Step 4, to include and support the construction and operation of an underground demonstration facility designed to confirm the characteristics of the site before applying to regulatory authorities for an operating licence. Designed in collaboration with the community, it will become a hub for knowledge-sharing across Canada and internationally.
Step 9	Construction and operation of the facility. The NWMO begins construction of the deep geological repository and associated surface facilities. Operation will begin after an operating licence is obtained from regulatory authorities. The NWMO will continue to work in partnership with the host community in order to ensure the commitments to the community are addressed throughout the entire lifetime of the project.

Highlights of the Site Selection Process in 2014

January–March

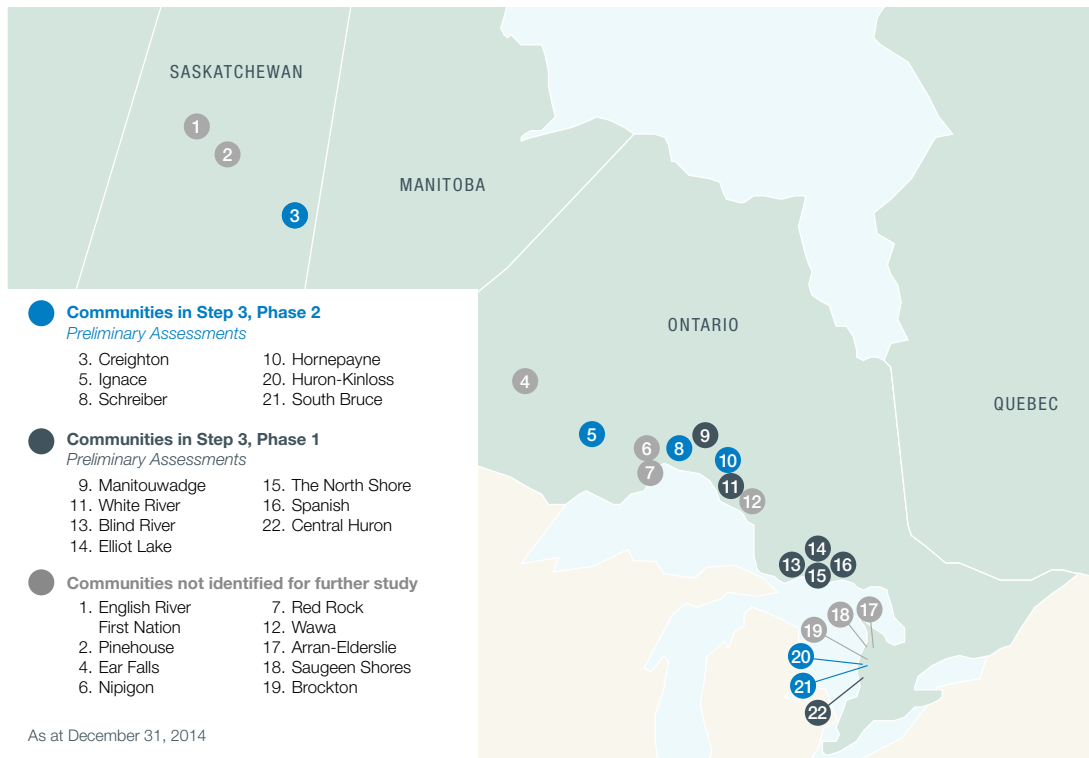
- » The year begins with 17 communities participating in the site selection process: one in Step 2 (initial screenings); 12 in Step 3, Phase 1 preliminary assessments; and four initiating Step 3, Phase 2 preliminary assessments.
- » NWMO staff meet with mayors and councils of the four Phase 2 communities to brief them about Phase 2 activities and together confirm the next steps. These meetings are followed by open houses for community members and others interested in learning more about the project and upcoming assessments, and help in planning technical studies such as Airborne Geophysical Surveys. Engagement activities continue throughout the year.
- » The NWMO and Phase 2 communities initiate a broadened engagement program designed to begin to bring together interested communities, First Nation and Métis communities in the area, and surrounding municipalities to explore potential to work together to implement the project.
- » The NWMO and Phase 1 communities embark on learning and assessment activities that continue throughout the year.
- » Community liaison committees (CLCs) begin to hold meetings that continue over the course of the year.
- » Phase 1 preliminary assessments are concluded in Arran-Elderslie (ON) and Saugeen Shores (ON) after early findings show the two communities have limited potential to contain a site suitable for the project.

April–June

- » High-resolution airborne surveys are completed in the vicinities of three Phase 2 communities: Creighton (SK), Ignace (ON), and Schreiber (ON).
- » Working together with people in the area, plans are developed for airborne surveys to be conducted in the Hornepayne area in 2015.
- » After requesting and reviewing an interim report of findings from Phase 1 preliminary assessments, the Township of Nipigon (ON) passes a resolution to discontinue its involvement in the Learn More program and the site selection process.

July–September

- » The Municipality of Central Huron (ON) passes a resolution to move into Step 3 of the site selection process and requests a preliminary assessment.
- » Observation of general geological features (described thereafter) is planned collaboratively with people in the area and completed in two Phase 2 communities: Creighton (SK) and Schreiber (ON).



- October–December**
- » Observation of general geological features (described thereafter) is planned collaboratively with people in the area and completed in two Phase 2 communities: Hornepayne (ON) and Ignace (ON).
 - » Phase 1 preliminary assessments are completed in Brockton (ON), Huron-Kinloss (ON), and South Bruce (ON). Huron-Kinloss and South Bruce are assessed as having strong potential to meet site selection requirements and identified as a focus for more detailed Phase 2 assessments.
 - » The year ends with 13 interested communities participating in the site selection process: seven in Phase 1 preliminary assessments, and six in Phase 2 preliminary assessments. At the same time, many First Nation and Métis communities, and surrounding municipalities have begun to add their perspective to reflection on the project and its potential to fit in the area.

Phase 1 Work

In 2014, 12 communities were engaged in Phase 1 preliminary assessments. These assessments involved desktop studies designed to explore potential to meet safety requirements and foster community well-being.

Phase 1 assessments fell under two broad categories: technical studies and community well-being studies.

Phase 1 technical studies were a preliminary desktop exploration of potential suitability of the local geology to contain and isolate used nuclear fuel. They have ensuring safety, for people and the environment, as their overriding goal.

Phase 1 community well-being studies were designed to develop a deeper understanding of

the community, its aspirations and its vision in order to help explore ways in which the project might affect its well-being (social, cultural and economic). Working in collaboration with interested communities, NWMO staff and contractors assembled information and sought discussion to understand both the community's circumstances, and its long-term objectives and challenges.

Community learning about the project continued, with engagement and reflection about its potential to fit with the community's long-term vision. Outreach to First Nation and Métis communities, and surrounding municipalities also began.

Recognizing Community Leadership

Working collaboratively with interested communities, the NWMO completed three Phase 1 preliminary assessments in 2014. In that same year, it also concluded assessments in three other communities.

Through their multi-year participation in the site selection process, all six communities have contributed to advancing Canada's plan for safely managing used nuclear fuel over the long term. In acknowledging these significant contributions to the process, the NWMO will be providing \$400,000 to each of the six

communities upon their establishment of a Community Well-Being Reserve Fund.

Administered by the communities, these funds will support continuing efforts to build community sustainability and well-being. Examples of activities the funds could support include projects, programs, or services that benefit community youth or seniors, community sustainability, or economic development initiatives. Other communities engaged in the process will be similarly recognized upon completion of their Phase 1 studies.

Phase 2 Work

A milestone was reached in 2014 with the initiation of Phase 2 preliminary assessments in four communities. Three (Hornepayne, Ignace, and Schreiber) are in Ontario, and one (Creighton) is in Saskatchewan. Assessments of these communities built on results of studies completed in Phase 1. There were more detailed technical and safety assessments, as well as more intensive assessments of community well-being, interest, and willingness. Together, these assessments were designed to provide the NWMO and communities with an expanded understanding of potential suitability of an area to host the project, interest in the project, and the ability for the project to be implemented in a way that fosters the area's well-being. At the same time, engagement with First Nation and Métis communities in the area, and surrounding municipalities broadened.

At the beginning of 2014, the NWMO met with the four Phase 2 communities (Hornepayne, Ignace, and Schreiber in Ontario, and Creighton in Saskatchewan) to confirm the plan for the next round of assessments and the broadened engagement that begins at this stage in the site selection process.

By the end of the year, three more communities completed Phase 1, and two were identified for further study in the second phase of preliminary assessments. This work will commence in 2015.

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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.

Phase 2 geoscience work involves a series of preliminary field investigations, including high-resolution geophysical surveys, geological mapping, and the drilling and testing of deep boreholes.

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.



2014 Initial Field Studies: Airborne Geophysical Surveys and Observation of General Geological Features

In 2014, as part of Phase 2 preliminary geoscientific assessments, the NWMO initiated a series of initial geoscientific field studies, including the acquisition and interpretation of high-resolution airborne geophysical surveys and initial geological mapping (also referred to as “observing general geological features”), to observe and ground-truth general geological features. The objective of these initial field studies was to improve understanding of the geology of the potentially suitable areas identified in Phase 1 geoscientific desktop assessments, and assess whether it is possible to identify candidate areas for further field studies. These initial field activities were planned and implemented in collaboration with interested communities, and First Nation and Métis communities. The data collected greatly improved understanding of the geology of the areas studied.

In 2014, fieldwork began in three Ontario communities (Hornepayne, Ignace and Schreiber) and one Saskatchewan community (Creighton). This initial work was part of the more detailed geoscientific evaluations that occur in Phase 2 preliminary assessments.

Airborne Geophysical Surveys

In April 2014, high-resolution airborne surveys were completed in the vicinities of Creighton, Ignace and Schreiber using small fixed-wing planes. The surveys included both magnetic and gravity surveys to improve understanding of the geological characteristics of the areas studied. The surveys provided new data about rock types, homogeneity, potential presence of faults and fractures, and the depth and extent of potentially suitable host rock formations.

Observing General Geological Features

In 2014, observation of general geological features was conducted in Creighton (SK), Hornepayne (ON), Ignace (ON) and Schreiber (ON). The purpose of these initial visual observations was to better understand the lay of the land, and to confirm the presence and nature of key geological features such as fractures, rock types, extent of bedrock exposure and surface constraints. Observation of general geological features was conducted using existing roads and trails to access areas with exposed bedrock. Boats and aircraft were also used.

An important component of the planning and execution of the initial geological mapping activities was to work with individuals and groups with local knowledge of the land. These included trappers, and local First Nation and Métis peoples. Engagement with local knowledge holders greatly enhanced the planning of mapping activities. Meetings were held with community members and local trappers to

discuss and exchange information about mapping plans and techniques, land access, and logistics, and most importantly, to collaboratively plan activities so they could be carried out in a manner respectful of the land and trapping activities.

As part of the NWMO's promise to work in partnership with First Nation and Métis communities, there is a commitment to interweaving local Traditional Knowledge in all phases of the NWMO's work. Traditional Knowledge involves all aspects of Aboriginal peoples' unique understanding, relationship and connection of the land to their way of life. Prior to the commencement of mapping activities, traditional ceremonies were performed by Elders on the lands where some of the mapping activities were planned to take place. The ceremonies reminded both participating members of the local Aboriginal and non-Aboriginal communities, contractors, and NWMO staff that as humans, we are dependent on the land for sustaining life. One important aspect was the importance of water and its preservation as a clean resource.

Dialogue was ongoing throughout mapping activities. Representatives from the local communities, and First Nation and Métis communities in the area accompanied geologists during their initial observations. Local guides with strong local knowledge and connections to the land were also hired.

Findings from these initial studies, combined with data from earlier desktop studies, will inform the NWMO's future fieldwork, which will be planned and implemented in collaboration with interested communities, and First Nation and Métis communities.





Local representatives join NWMO teams in observing general geological features in the vicinity of communities involved in Phase 2 preliminary assessments.

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

Beyond ensuring safety, the NWMO's commitment to communities and surrounding areas is to implement the project in a way that would foster community and area well-being. Phase 2 includes more intensive community learning and engagement designed to explore whether conditions can be fostered to advance study in the broader area with the interested community, First Nation and Métis communities, and surrounding municipalities, working together to implement the project.

In Phase 2, work also continues to address community-specific priorities, concerns and challenges revealed during Phase 1 dialogues. Among other things, Phase 2 assessments are designed to better 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.

Phase 2 assessments also further explore community and area interest in learning about the project and having it proceed in the area, while continuing to build awareness and understanding. As engagement broadens, spiritual considerations, ways of life, and other components and perspectives on well-being will also need to be considered.



Members of the Ignace Community Nuclear Liaison Committee visit one of the planes used to conduct airborne geophysical surveys.

Community Liaison Committees

Over the course of the year, community liaison committees (CLCs) helped their communities learn about and reflect on the project, and provided input to preliminary assessments. At the same time, the CLCs played a vital role in helping the NWMO engage more effectively with people in their communities, and address issues and concerns of particular interest to them.

CLCs played an active role in facilitating learning in their communities. Their activities included:

- » Planning open houses;
- » Hosting expert speakers on a range of topics;
- » Asking questions on behalf of community members;
- » Facilitating responses to community questions;
- » Publishing newsletters and maintaining websites;
- » Convening regular public meetings;
- » Updating the NWMO about community activities; and
- » Arranging for visits of the NWMO's mobile transportation exhibit to their communities.

CLCs in Phase 1 communities played a key role in developing community profiles, providing information and feedback to relationship managers and NWMO consultants as activities are planned and materials developed. They helped identify leaders in their communities, and in many instances, arranged for consultants to meet with them in the course of developing community profiles. CLCs also helped identify and plan briefings to community groups, and enabled discussions with community members during open houses and community events.

CLCs in Phase 2 communities helped direct the broadened engagement that takes place in this phase of preliminary assessments. CLCs helped communities take the lead in beginning to build relationships, and facilitating learning among their communities, First Nation and Métis communities in the area, and surrounding municipalities. This work is vital because the project will only be implemented in an area where communities can work together to implement it.

Phase 2 CLCs also helped plan and implement outreach and engagement to plan and conduct the two types of fieldwork that were initiated in 2014: geophysical airborne surveys and observation of general geological features. In the case of airborne surveys, they helped identify potentially affected landowners and trappers in flyover areas, and others who may have an interest in the surveys. In the case of observing general geological features, they provided information about such factors as seasonal activities, culturally or ecologically sensitive areas, and people living on or using the land. They also helped start a conversation that continued in community briefings, targeted discussions, open houses, and other community events.

Community Liaison Committees

When a community moves into Step 3 of the site selection process, its Council may request funding from the NWMO to cover the administrative expenses of a community liaison committee (CLC), along with the salary for a half-time (Phase 1) or full-time (Phase 2) coordinator. The Council both selects the CLC's members and sets its mandate. A range of other costs are also covered by the NWMO as outlined online at www.nwmo.ca/sitingprocess_feasibilitystudies_resources.

CLC meetings are open to the public. Announcements, agendas, and minutes of their meetings are posted on their respective websites, which can be accessed at www.clcinfo.ca.

In addition, the NWMO provides technical assistance for CLCs to set up their own websites and publish newsletters.



Tom Isaacs answers questions at a meeting of a community liaison committee. Mr. Isaacs is a current member of the US National Academy of Science Nuclear and Radiation Studies Board, and was the lead advisor to President Obama's Blue Ribbon Commission on America's Nuclear Future.

Community Learning

As part of helping communities learn more about APM, the NWMO encourages them to talk directly to experts in different aspects of the nuclear fuel cycle. CLCs played an active role in facilitating learning from subject matter experts, both from the NWMO and outside organizations. CLCs arranged for subject matter experts to discuss different aspects of the nuclear fuel cycle. Tom Isaacs, for example, was an invited speaker at meetings of four CLCs. Mr. Isaacs is a current member of the US National Academy of Science Nuclear and Radiation Studies Board, and was the lead advisor to President Obama's Blue Ribbon Commission on America's Nuclear Future. He spoke about the status of international long-term nuclear waste management programs.

Dr. Jeremy Whitlock, an employee of Canadian Nuclear Laboratories (formerly Atomic Energy of Canada Limited) and former president of the Canadian Nuclear Society, was another invited speaker. He gave a series of presentations about nuclear power and radiation.

CLCs also arranged for NWMO experts to brief them on such topics as the transportation of used nuclear fuel, radiation and safety, the project, geosciences, and engagement with First Nation and Métis communities.

Learn More briefings at used nuclear fuel interim storage sites and the NWMO's headquarters provided additional opportunities for community representatives to meet and question experts. These briefings are described in the chapter *Building Sustainable Relationships*.

“This was a great opportunity to interact with many diverse community groups and school grade levels. I enjoy answering questions from the public about nuclear science and technology, and consider it an honour – and even a duty – to help people to better understand this uniquely Canadian achievement, which is also an achievement in environmental sustainability.”

—Dr. Jeremy Whitlock, Manager of Non-Proliferation and Safeguards at Canadian Nuclear Laboratories' Chalk River Laboratories



NWMO staff visit the Pays Plat First Nation in Ontario.

Engaging With First Nation and Métis Communities

In 2014, the NWMO's engagement of First Nation and Métis communities in the areas surrounding potential host communities was both broadened and deepened. The NWMO directly engaged First Nation and Métis communities through a wide variety of activities, including information sessions, workshops, attendance at Aboriginal trade shows, and meetings with Elders and Chiefs, as well as Métis leaders and citizens.

All the NWMO's work with First Nation and Métis communities is based on the understanding that this is a learning process and participation is not an indication of support for the project.

The NWMO continued to elicit narratives from First Nation and Métis communities in potential siting areas. This process began in 2013, when the NWMO invited Aboriginal communities to provide their own narratives around such topics

as their priorities for land use and the vision they have for their communities, both now and in the future. In 2014, the NWMO sought to build upon this work to explore how the project may proceed in a manner consistent with the communities' own priorities and visions.

First Nation and Métis communities were also invited to attend open houses hosted by the NWMO, and meet with its staff and local community leaders. Wherever possible and appropriate, members of the Council of Elders accompanied NWMO staff in meetings and gatherings with individual First Nation and Métis communities.

First Nation and Métis community members participated in walking the land to observe general geological features. This occurred in the vicinities of the Saskatchewan community of Creighton and the Ontario communities of Hornepayne, Ignace and Schreiber.

What Communities Wanted to Know

Over the course of engagement in 2014, community questions and discussion focused on five broad areas: health and safety; the project; the site selection process; the transportation of used nuclear fuel; and understanding implications for individual communities.

The discussion that follows summarizes the key areas of discussion with communities in 2014. The complete report can be read online at www.nwmo.ca/what_we_heard. Public feedback about the NWMO's most recent implementation plan is discussed in the chapter *Adapting Plans*.

Health and Safety

Health and safety continued to be the topic that generated the most discussion. People wanted to be confident that the NWMO's transportation, construction, and operational procedures would ensure the safety of people, water sources, the land, and the plants and animals in the area. As part of understanding potential risks, they wanted to know more about radiation, and the technologies and regulatory framework in place to minimize exposure.

As in previous years, people wanted assurance that the project could be implemented without endangering water resources, especially the Great Lakes and local sources of drinking water. They asked specific questions about the multi-barrier system that would be used in a deep geological repository. The safety of workers and people living in the vicinity of the facilities was another source of questions.

There was considerable interest in the record of nuclear waste management facilities, with particular reference to that of the Waste Isolation Pilot Plant in Carlsbad, New Mexico, and the Asse salt mine in Germany, and relevance, if any, to the APM Project. The fact that numerous other countries are developing their own repositories for high-level radioactive waste was of interest to many. There were also questions raised about radiation releases at such nuclear power plants as Fukushima and Chernobyl, and what might be learned for Canada's deep geological repository.

The APM Project

Questions about the project were wide-ranging. Of these, many concerned how used nuclear fuel bundles are engineered, how they are managed on an interim basis, what the NWMO is and how APM was selected as Canada's plan for the long-term management of used nuclear fuel, how the deep geological repository will function, who will pay for the project, and whether the funds are sufficient and guaranteed.

What Communities Wanted to Know

The Site Selection Process

The site selection process itself is necessarily of great interest to the communities participating in it, and increasingly, First Nation and Métis communities, and municipalities in surrounding areas. All three groups had questions about how the process was developed and how communities entered it.

Residents of interested communities were very clear that the decision to host the project cannot be made solely by elected officials, and that it will instead require an expression of willingness by the residents themselves. Councils' decision-making should be limited to whether communities should continue to learn more about the project.

There was also consensus that the process should proceed slowly and collaboratively so that residents can understand what is involved and that communities can opt out of the process at any time.

Conversations have also begun to focus on the details of regional studies, especially about the timing of regional involvement and the manner in which this will be managed. Many people expressed the view that it is important to begin regional discussions sooner rather than later. The importance of respectful engagement with First Nation and Métis communities in the area of interested communities, as well as with neighbouring municipalities, has been a focus of discussion, as has the importance of relationship building, and the planning of briefings and learning events. People had questions about how the NWMO and communities will work together to implement partnerships in the area, and what the NWMO would do if a neighbour is uninterested in the project.

Transportation of Used Nuclear Fuel

Questions about transportation focused on health and safety. People wanted to know more about the technologies and regulations that are in place to minimize exposure to radiation. They also wanted to know about the possibility and consequences of an accident en route.

There was considerable interest in emergency response measures and protocols, with local first responders tending to ask the most detailed questions about this aspect of the NWMO's transportation planning. The security of shipments was another subject of interest to many people.

People also had questions about logistics – potential routes, mode or modes of transportation, the number of shipments that would be made, financing, upgrades to existing roads or the construction of new roads, and the like.

The mobile transportation exhibit (described in the chapter *Building Sustainable Relationships*) helped answer many of the public's questions about how used nuclear fuel can be safely and securely transported. In addition to allowing visitors to see a used fuel transportation package for themselves, the exhibit provided details about the rigorous testing the package must pass before being certified by the Canadian Nuclear Safety Commission (CNSC). Visitors also had the opportunity to learn more about emergency response planning, security features, the role of regulators, and the strong international track record in safely transporting used nuclear fuel.

Implications for Communities

Questions about the project's potential impact on individual communities were increasingly focused on what preliminary assessments might reveal about the geological appropriateness of potential siting areas.

Community input has played a crucial role in directing the sequence and initiation of fieldwork in Phase 2 communities. This input has guided the NWMO in identifying significant local features, environmentally and culturally sensitive areas, and the land users (trappers, hunters and cottagers) who must be engaged as studies progress. A notable example was Hornepayne, where airborne geophysical surveys were postponed in light of feedback from the community and the Northeast Superior Regional Chiefs Forum.

People continued to ask about the project's potential impact on their communities. Along with questions about economic benefits, there were questions about managing such challenges as fluctuations in population and potential shifts in property values.

Social Media

As the site selection process moves forward, many people have turned to social media to share their thoughts. This has occurred in many of the communities involved in the site selection process.

Many of the comments made online concerned safety. Other threads included transportation safety and related logistics, critical discussions regarding NWMO funding to communities in the siting process, and arguments in favour of fundamentally changing Canada's current nuclear fuel cycle. Many active social media users and websites critical of Canada's nuclear industry continue to be predominantly in favour of decommissioning existing nuclear power plants and advocate for the large-scale transition to renewables. Those expressing concerns about the NWMO's work are often also opposed to nuclear power generation and other large energy development projects.

Addressing Transportation Issues

Transportation is a key element in scientific and technical preliminary assessments, and in the NWMO's ongoing engagement activities.

For the APM technical program, Phase 1 transportation assessments used published information to address, in a preliminary way, the question of whether a safe and secure transportation route can be identified or developed from the current interim storage locations to potential host sites.

Using an expanded set of safety and security criteria, Phase 2 transportation assessments were initiated. These studies will include logistics and route assessment studies for illustrative road and rail routes.

As part of its ongoing engagement activities, the NWMO continued to provide the public with information about the safe and secure transportation of used nuclear fuel, and the regulatory framework that governs its movement. NWMO staff also:

- » Met with local and provincial first responder groups, and met with their members at municipal conferences;
- » Participated in national and international transportation conferences and symposia; and
- » Engaged communities involved in the siting process on transportation issues.



NWMO staff attend the Ignace Fire Safety Night in Ontario.



The NWMO's mobile transportation exhibit supported these activities through visits to interested communities, First Nation and Métis communities, and municipal and transportation conferences. (For more information about the exhibit, please see the chapter *Building Sustainable Relationships*.)

In addition, through ongoing research, the NWMO continues to build its understanding of public perspectives about transportation, identify key questions and concerns on this topic, and identify values and objectives the public would like to see guide decision-making for transportation planning.

Focus groups conducted by Environics Research were a notable example. In these groups, a cross-section of citizens helped identify and explore the early questions that will need to be asked and answered as the NWMO begins discussions about the transportation of used nuclear fuel.

The top issues people raised concerned which mode of transportation the NWMO would use to transport used nuclear fuel to the permanent repository, and what effects this could potentially have on the surrounding area during transportation and in the event of an accident. Participants wanted to know about the potential for accidents and what would be the consequences; the safety and robustness of used fuel transportation packages; and how any risk to the public would be avoided or minimized.

Participants were interested in the information provided in the NWMO video about this topic, and thought that it addressed many possible scenarios and answered many of their questions about the potential for issues in transportation of nuclear waste. The detail that stood out most to participants was the extent of the testing on the containers and the international scale of testing. Participants were also interested in and reassured by the robust regulatory framework in place for the transportation of used nuclear fuel, and the strong international experience and track record with the safe transportation of used nuclear fuel.



Community members visit the NWMO's mobile transportation exhibit in Ignace, Ontario.

Looking Ahead

Confirming a safe site will take several years of progressively more detailed technical, scientific, social, cultural, and economic studies, as well as engagement with interested communities and their neighbours. The project will only proceed with the involvement of the interested community, First Nation and Métis communities, and surrounding municipalities, working together to implement it.

With many communities engaged in exploring their interest and suitability for hosting the project, the site selection process must provide a basis for progressively identifying a smaller number of communities for more detailed assessments. Ultimately, 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 are expected to take several more years to complete, with numerous opportunities for stock-taking by communities and the NWMO. Based on the findings of progressively more detailed studies, communities with strong potential to meet the technical and community well-being requirements of the project will be identified to be the focus for more detailed studies.

Assessments and dialogues conducted in Phase 2 preliminary assessments will help guide further narrowing down by identifying the one or possibly two sites with strong potential to meet requirements and for hosting the project. Detailed site evaluations on the site or sites 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 CNSC (please see the chapter on *Ensuring Governance and Accountability*).

Communities may choose to end their involvement at any point during the site evaluation process until a final agreement is signed, subject to all regulatory requirements being met and approvals received.



Community Learn More Centre opens in Schreiber, Ontario.



NWMO staff answers questions at the Annual Ripley-Huron Fall Fair in Ontario.



NWMO staff answers questions at the February open house in Lucknow, Ontario.



The NWMO hosts a booth at the 31st Annual Trade and Leisure Show in Creighton, Saskatchewan.



Community Learn More Centre opens in Hornepayne, Ontario.



NWMO staff take part in the 45th Annual Blind River Winter Carnival in Ontario.



Students attend the May open house in Walkerton, Ontario.



The NWMO fields a team at the Ignace Annual Fire Truck Pull in Ontario.



NWMO staff, contractors and local guides observe general geological features in Creighton, Saskatchewan.



NWMO staff take part in the Canada Day celebrations in Creighton, Saskatchewan.



Optimizing Repository Designs and Further Increasing Confidence in Safety

Strategic Objective: The NWMO will refine and further develop the generic designs and safety cases for a repository for used nuclear fuel in both crystalline and sedimentary rock formations, and conduct technical research and development to ensure continuous improvement, consistent with best practices.

The technical end point of Adaptive Phased Management (APM) is a deep geological repository where Canada's used nuclear fuel will be safely contained and isolated on an indefinite basis. Through optimizing and improving designs, supporting safety analyses, and advancing related engineering and scientific methods, the APM technical program works to ensure the repository will meet high technical standards.

The primary objective of the APM technical program is to complete the preliminary engineering designs, cost estimates, and applied research activities necessary to support the development of a safety case and licence submission for a used fuel geological repository.

To help achieve this goal, the APM technical program conducts joint research projects with Canadian universities, international organizations, and its counterparts in other countries, including Sweden, Switzerland, Finland, France, South Korea, and the United Kingdom.

Its work is also reviewed annually by independent researchers. Beginning in 2008, these

reviews were conducted by an Independent Technical Review Group, which was established by the NWMO Board of Directors and which completed its mandate in 2013. In 2014, peer review on geological work associated with the project continued to be provided by the existing APM-Geoscientific Review Group. As the technical program advances and becomes increasingly specialized, the NWMO will co-ordinate independent reviews of its work by assembling groups of experts with relevant subject matter expertise.

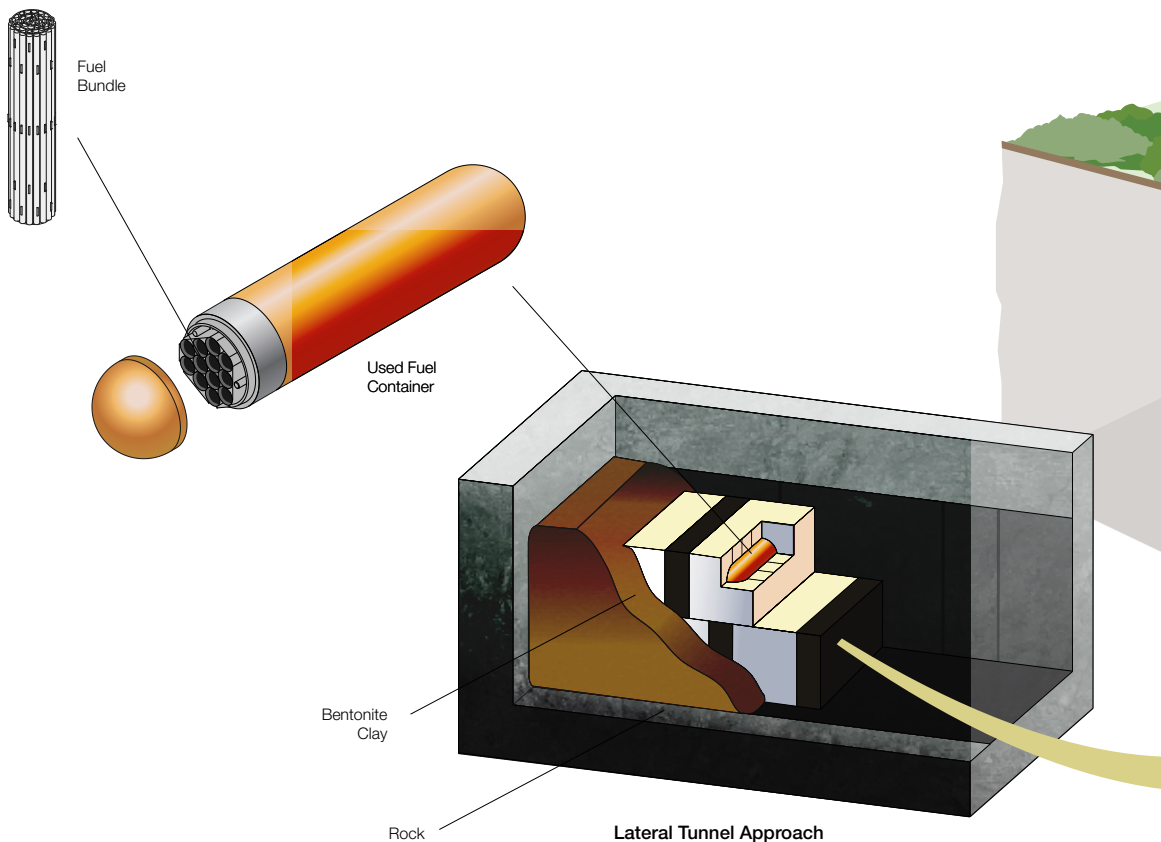
The program's work falls under four broad categories: repository and engineered barrier design, transportation, geoscience, and safety. The highlights of each area's achievements over the past year are described hereafter, followed by an overview of the different ways (reports, papers, conferences, collaborative research with universities, and joint projects with international organizations) the NWMO maintains the technical capability necessary for the safe implementation of APM.

Repository Engineered Barrier Design

The main objectives of the repository engineering design program are to:

1. Develop the engineering data, models, methods, and tools necessary to advance and optimize the conceptual designs for a repository project and associated systems;
2. Provide required engineering data inputs for the safety assessment of the repository project;
3. Support planned site characterization and subsurface investigation activities; and
4. Provide engineering designs necessary to support APM repository cost estimates.

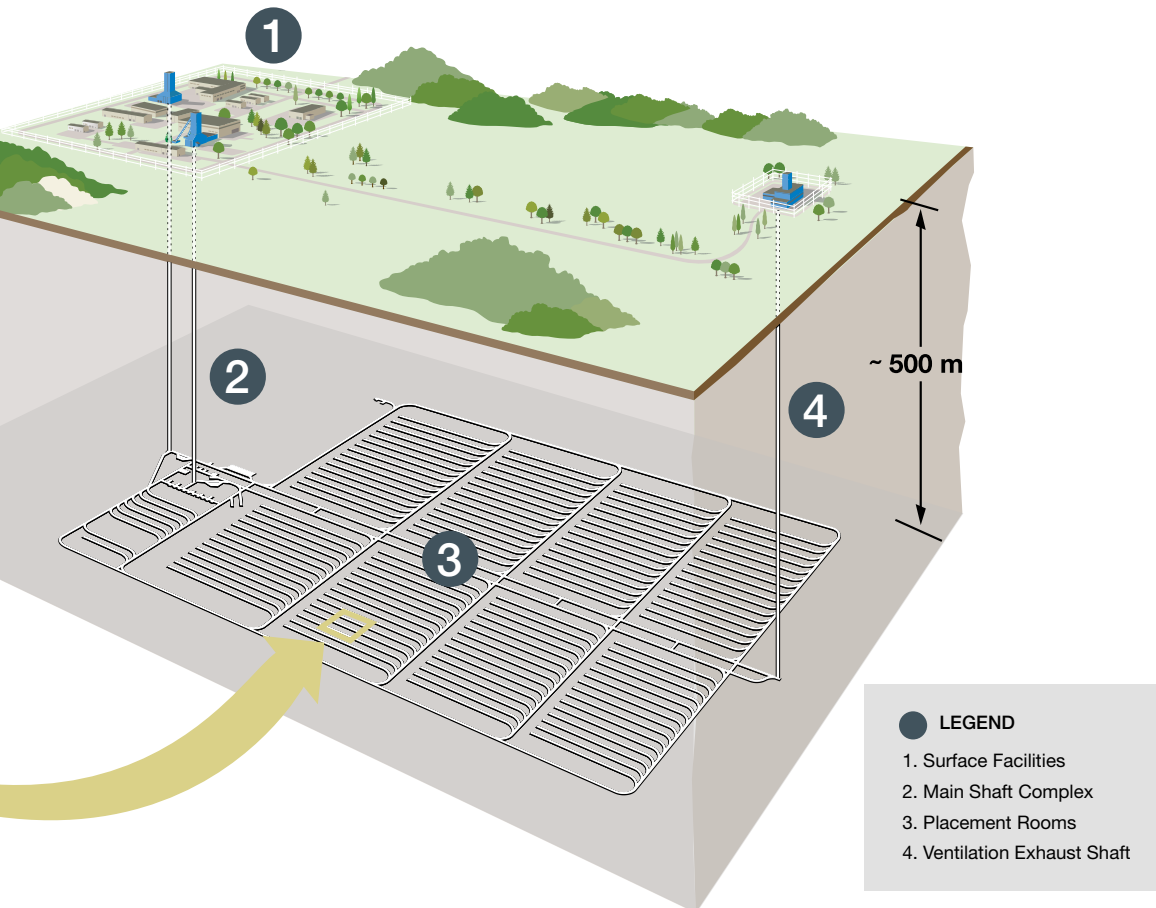
Engineered barrier system for a deep geological repository for used CANDU fuel



Repository Engineering

In the past, the NWMO has used several different container and emplacement designs to represent the possible configurations of a deep geological repository. These illustrations were based on international experience using light water reactor fuel. In 2014, we completed the design of an engineered barrier system specifically created for used CANDU fuel and began implementing a proof test plan to prove the system's safety performance. This optimized design uses modern design concepts and tools, and applies modern manufacturing methods. The resulting engineered barrier system is robust, simple and able to safely protect the environment and people over the long time frames required.

In late 2013, and 2014, the NWMO implemented a Configuration Management system to host engineering design data, and to provide a system for modifying or updating designs in a controlled manner. The system will ensure engineering and design information, as well as the rationale behind the design, is available to all designers over the decades-long timeline of the APM Project.



Engineered Barrier System

The Canadian engineered barrier system consists of the used fuel container, buffer box, sealing materials and emplacement system. It is the primary protection of the used nuclear fuel that is contained and isolated in a deep geological repository.

In 2014, the NWMO completed a multi-year design of an engineered barrier system that has been optimized for CANDU fuel. The NWMO then developed a proof test plan to prove the system's safety performance. The plan, when executed, will serve two purposes: (1) to provide evidence in a licence application that the design meets the requirements of the NWMO's safety case; and (2) to prove that the NWMO can successfully and repeatedly manufacture and operate all components of the engineered barrier system.

The proof test plan includes work to demonstrate the functionality and operability of the used fuel container, including its ability to withstand repository loads and resist corrosion throughout the life of the repository. From an operability perspective, the plan includes development of a manufacturing program for welding and copper coating of the used fuel container.

Key to the Canadian engineered barrier system is the buffer box. It consists of a carbon steel shell filled with highly compacted bentonite blocks. The performance of the buffer box is based on achieving an overall dry density suitable to prevent microbial and chemical attack of the container from the adjacent rock and groundwater. Through the proof test plan, the NWMO will demonstrate that it can achieve the required dry density within the buffer box, and that it can manufacture and assemble the buffer box safely and repeatedly within specification.

The final part of the proof test plan includes demonstrating the emplacement technology associated with the buffer box and sealing system. These demonstration trials will show that the buffer box can be emplaced without damage and that the sealing systems can be emplaced around the buffer box to ensure that the required dry density is met.

Implementation Results

In 2014, the NWMO built its first container designed specifically for used CANDU nuclear fuel. This included demonstration of the copper coating, welding and machining of the complete container. It also built its first buffer box, including the steel shell and small brick, highly compacted bentonite fill. As well, the NWMO began to test large blocks suitable for eventual inclusion in the buffer box.

At the same time, the NWMO designed and built specialty handling equipment capable of assisting in the testing of the used fuel container and buffer box system. It also designed some of the initial emplacement equipment that will be built in 2015.

To conduct engineering trials, the NWMO acquired a test facility in Oakville, Ontario. This test facility is a precursor to the Centre of Expertise that will be located in a community once a repository site has been selected. The engineering test facility will contain equipment necessary to undertake the proof test plan, as well as demonstration equipment to illustrate to the public the NWMO's capability in repository design and development.



Transportation Studies

Transportation is an important part of the APM technical program. To support this activity, the NWMO has undertaken a number of studies to improve its understanding of the transportation risks in order to mitigate or eliminate them.

In 2013, the NWMO released a transportation dose analysis report that showed the radiological dose received by a member of the public along the transport route is significantly below (by several orders of magnitude) that allowed by regulation. The report was based on internationally available data for the relationship between the time, distance and frequency of exposure for members of the public. In 2014, working with Carleton University, the NWMO undertook a time-distance-frequency analysis that was specifically related to Canadian traffic. As part of this analysis, researchers at Carleton University used a specially equipped vehicle that travelled between the reactor site and potential repository sites in order to validate the relationships between distance and exposure for a member of the public.

In 2014, working with Carleton University, the NWMO undertook a time-distance-frequency analysis that was specifically related to Canadian traffic.

In 2014, the NWMO also undertook a worker dose study. This study looked at potential radiological dose to both NWMO and non-NWMO workers. NWMO workers included drivers and security escorts, while non-NWMO workers included mobile repair mechanics, commercial vehicle inspectors, and weigh scale operators.

As part of its tools development program, the NWMO developed computer modelling of impact analysis and fire simulation. The goal is to take real-life accidents and model their impact on the NWMO used fuel transportation package designs.

The NWMO also began a review of the used nuclear fuel transportation package design to determine if any enhancements could be incorporated in the design. These enhancements would be based on current materials and manufacturing technologies. The review looked at the design of seals, the impact limiter, and tie-downs.

As part of the site selection process, the NWMO initiated a logistics route analysis for each Phase 2 community. The study will look at routes from interim storage sites at the reactors to the Phase 2 communities.

Geoscience

The purpose of the NWMO's geoscience program is to advance the understanding of geosphere evolution that is relevant to the suitability of deep-seated geologic crystalline and sedimentary settings to safely host a deep geological repository.

The characterization of geologic setting stability and evolution on time frames necessary to support and underpin a repository safety case requires a multidisciplinary approach. A key goal of the APM Geosciences program in 2014 was to continue working with specialists and universities in Canada and abroad to maintain this unique applied research capability. This work has, in part, prioritized a broad range of activities related to the reliable characterization of bedrock formation properties that most influence the scientific basis to understand long-term natural rock barrier function and subsurface fluid movement that affect confidence in repository safety.

Specific examples in 2014 included designing and benchmarking methods to:

- » Estimate the diffusive properties of low-porosity rock formations that can govern radionuclide migration rates;
- » Characterize porewater chemical and isotopic compositions that provide evidence of fluid origin and residence time;
- » Identify characteristics that retard radionuclide migration by estimating the sorptive properties of the rock matrix under expected repository conditions;
- » Use fracture infill minerals to date last fluid movements; and
- » Characterize microbial communities that could influence radionuclide release and mobility.

The long-term stability of the repository and barrier function of the host and enclosing bedrock formations is important to a repository safety case. In this regard, further work has involved confirmation of the coupled Thermal-Mechanical-Hydraulic properties of repository host and enclosing rock mass necessary to describe the consequence of repository and longer-term geologic perturbations on natural barrier function and repository safety. This work has included activities directed toward the prediction, properties and sealing of the Excavation Damage Zone, a potential more permeable release pathway within the rock mass immediately adjacent the excavated rock face.

Further activities involved the initiation, in 2014, of a collaborative site analogue study at the Mont Terri Underground Research Laboratory in Switzerland designed to examine solute migration on geologic time scales. The study, among other activities, involves an inter-laboratory comparison of pore fluids chemistries in carefully preserved low-permeability rock core samples obtained from a 250-metre borehole intersecting an entire sedimentary clay formation. The distribution of pore fluid ions and gases

serve as another basis to scientifically test and establish rates of solute transport at time frames commensurate with repository safety.

Finally, numerical predictive methods are particularly useful given the time frames during which repository safety must be assessed. These predictive tools, when used in conjunction with field observation, serve several important functions, including:

- » Better assuring internal consistency and confidence in the geosphere models derived for repository sites;
- » Providing reasoned estimates of the time rate of change and magnitude of perturbations likely to influence and govern repository safety; and
- » Offering a means to illustrate site analogues not otherwise achievable given the long time frames and coupled phenomena involved.

In 2014, the geoscience program worked with Canadian universities to develop numerical analysis of regional- and local-scale groundwater system evolution; future ice sheet and permafrost on the North American land mass; and reactive mass transport models.

Repository Safety

The objective of the repository safety program is to evaluate the long-term safety of any candidate repository site and design in order to assess and improve the safety of the proposed facility. In the near term, before any candidate site has been proposed, the safety objective is addressed through case studies and continuous improvements to our understanding of important features and processes influencing repository performance.

Current work programs include the extension of work on the two postclosure safety assessments the NWMO has conducted to date.

Postclosure Safety Assessments

Postclosure safety assessments are meant to show, with an appropriate degree of confidence, that the repository will remain safe over a period of 1 million years. This is how long it takes for the radioactivity in used nuclear fuel to approach that of an equivalent amount of natural uranium. Because of the long time periods involved, the NWMO's safety assessments test whether engineered and natural barriers can safely contain and isolate the used nuclear fuel without human intervention.

In 2014, the repository safety program conducted a preliminary preclosure ALARA (as low as reasonably achievable) and hazard identification. This work was based on conceptual designs for above- and below-ground operations at a repository, and assessed two different types of used nuclear fuel containers. The ALARA assessment considered the fuel handling steps and evaluated the potential normal operations dose to workers at the facility. The hazard identification also considered the used fuel handling steps from arrival at the facility to emplacement underground, and looked at possible accidents and their likelihood. The results of these preliminary studies show that the facility design is appropriate from an operational safety perspective and have provided further information on where the design can be improved.

Additional studies have recently been completed on:

- » The criticality safety of the used fuel;
- » Models and data for assessment of dose to biota; and
- » Modelling of gas generation and transport underground.

As well, experimental work continued on the properties of engineered seal materials and used fuel stability.



Partnerships With Universities

Research partnerships with universities continued to play an important role in ensuring the NWMO's technical work is scientifically rigorous. In 2014, researchers at the following universities worked on APM-related projects: McGill University; McMaster University; Queen's University; Ryerson University; the University of Alberta; the University of British Columbia; the University of Ottawa; the University of Saskatchewan; the University of Toronto; the University of Waterloo; Western University; and outside Canada, the University of Bern (Switzerland).

Support for Post-Secondary Education

The NWMO continued its participation in University Network of Excellence in Nuclear Engineering (UNENE). An alliance of universities, nuclear power utilities, and research and regulatory agencies, UNENE is a not-for-profit corporation for the support and development of nuclear education, research, and development capacities in Canadian universities.

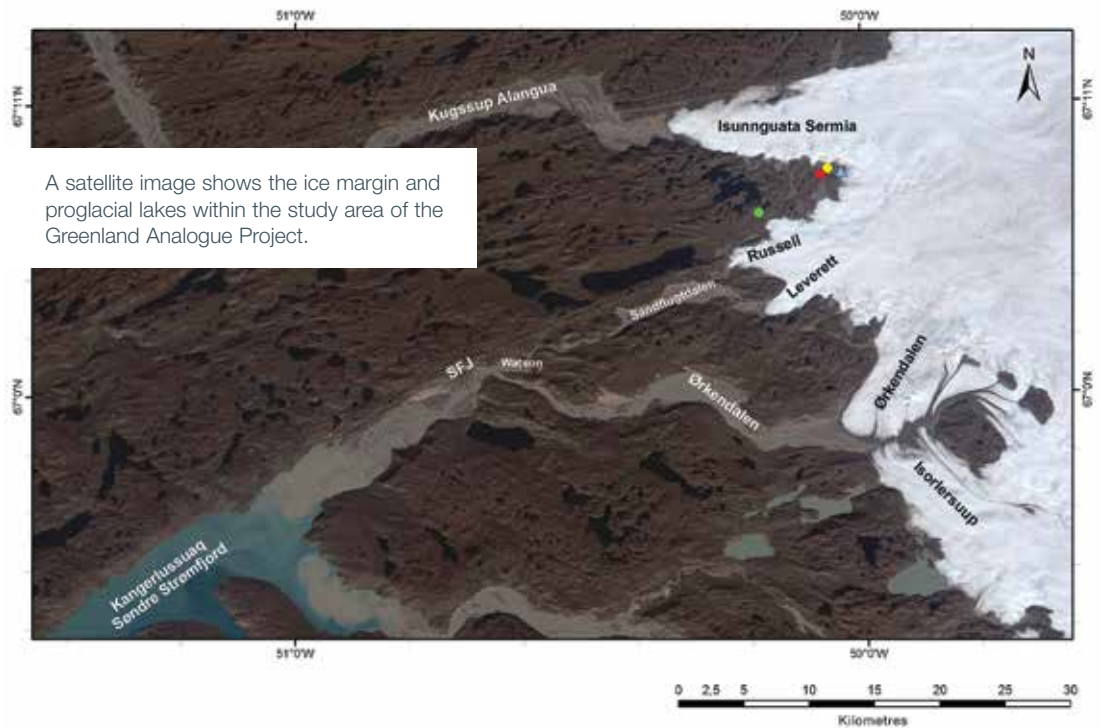
NWMO technical staff also provided support to university students by acting as mentors, by participating on PhD thesis committees, and by sharing their expertise through review of research proposals and theses, and hands-on assistance with the design and setup of specific experiments or methods.

Laurianne Bouchard, a M.Sc. student at the University of Ottawa, discusses her work on shales and carbonates from Ontario. Ms. Bouchard's research is funded through a NWMO grant to her thesis supervisor, Dr. Ian Clark.

International Partnerships and Networking

Partnering with other radioactive waste management organizations allows the NWMO to foster international co-operation on the development and demonstration of technology, learn from other countries' experience, and keep abreast of developments in repository design and safety case development for various host rock formations. The NWMO has co-operation agreements with its counterparts in Sweden, Finland, France, Switzerland, the United Kingdom, and as of May 2014, South Korea.

As in previous years, the Swedish Nuclear Fuel and Waste Management Company (SKB) and Posiva were the NWMO's partners in the Greenland Analogue Project, an ongoing research project looking at how an ice sheet affects groundwater flow and water chemistry around a repository in crystalline bedrock during glacial events.





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, 2014.

The agreement commits the two organizations to exchange scientific and engineering information. There will also be an exchange of information about 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 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 used CANDU fuel.

The NWMO and the Korea Radioactive Waste Agency sign an agreement to share scientific and engineering information.

Underground Research Laboratories

Underground research laboratories (URLs) provide a unique environment to work collaboratively with international partners on issues associated with safely containing and isolating used fuel canisters in a stable rock formation. They also provide geoscientists with valuable hands-on training.

The NWMO conducts joint research at four different 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.

From Left to Right:

- 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).
- Underground demonstration tunnel at ONKALO. Courtesy of K. Kantonen (Posiva).
- Schematic of the Äspö Hard Rock Laboratory and locations within the URL of various ongoing experiments. Courtesy of SKB, Illustrator: Jan Rojmar.



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. 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 demonstrations in collaboration with international partners, some of which are nuclear waste management agencies. The NWMO is involved in 12 projects, 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

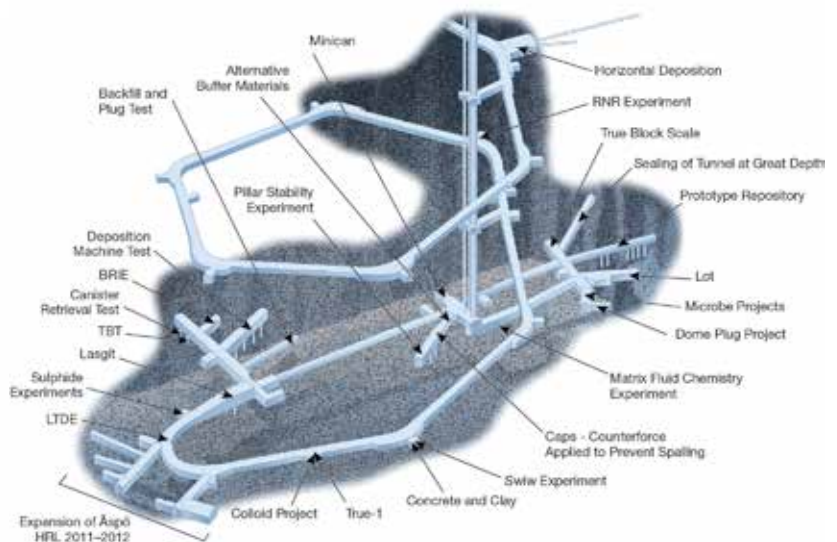
The Grimsel Test Site (GTS) is located in the Swiss Alps and supports research projects focused on the geological disposal of radioactive waste in crystalline rock. The goal of the work there is the development and testing of specialized equipment, methodologies, and models under 'real' conditions. The 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 repository tunnel 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 joint research there with SKB. 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, engineered barrier performance, damage to the rock mass associated with excavation, fracture parameterization, and specialized site characterization techniques.

ONKALO Underground Research Laboratory

The ONKALO URL 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.



As in previous years, the NWMO supported the Nuclear Energy Agency's (NEA) Thermodynamic Database Project, which is developing a quality-assured database for key elements in radioactive waste management systems. The NWMO is also a member of the NEA's Integration Group for the Safety Case, and in particular, was active in the NEA's:

- » Expert Group on Operational Safety;
- » Features, Events and Processes Database Project;
- » Radioactive Waste Repository Metadata Management Project;
- » Topical Session on Extreme Events and Their Consideration in the Safety Case;
- » Working Group on Measurement and Physical Understanding of Groundwater Flow Through Argillaceous Media (Clay Club); and
- » International Collaboration on Preservation of Records, Knowledge and Memory Across Generations.

NWMO technical staff also collaborated with researchers from the United States Geological Survey and swisstopo, Switzerland's geoinformation centre.

The NWMO is also a member of BIOPROTA, an international forum on biosphere modelling for radioactive waste facilities.

Other Collaborative Work

The NWMO's knowledge base was enhanced through active participation in workshops and conferences sponsored by such organizations as the Canadian Nuclear Society, the NEA, and the International Atomic Energy Agency.

NWMO technical staff also presented papers at the following conferences over the course of 2014:

- » The International Conference on the Performance of Engineered Barriers: Backfill, Plugs and Seals;
- » The Euratom IGD-Technology Platform Geodisposal Conference;
- » The International Waste Management Symposia; and
- » The Pacific Basin Nuclear Conference.



Ken Nash, President and CEO of the NWMO, delivers a keynote about how Canada is setting an international example in meeting the challenge of safely managing used nuclear fuel over the long term.

NWMO Staff Share Their Expertise at the 2014 Pacific Basin Nuclear Conference

The Pacific Basin Nuclear Conference serves as an international forum for sharing the latest advances in nuclear science and safety. About 600 experts from around the world attended the 2014 conference, which was held in Vancouver in August and coincided with the 35th anniversary of the Canadian Nuclear Society. The conference was hosted by that organization in co-operation with the Canadian Nuclear Association and Natural Resources Canada.

Five experts from the NWMO made presentations, including NWMO President and CEO Ken Nash.

In June, the NWMO hosted its 12th annual Geoscience Seminar. The seminar plays an important role in the APM 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. The more than 75 participants included researchers from 10 Canadian universities, the University of Bern, the Geological Survey of Canada, the Paul Scherrer Institute, and the NWMO's sister organization in Sweden – SKB.





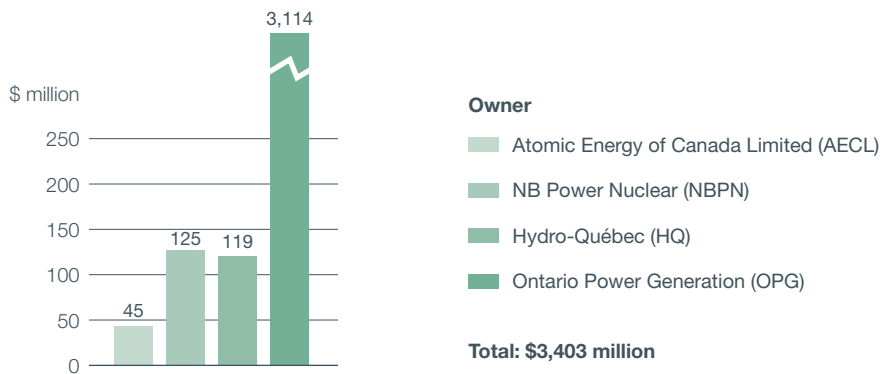
Providing Financial Surety

Strategic Objective: The NWMO will ensure funds are available to pay for the safe, long-term management of Canada’s used nuclear fuel.

The *Nuclear Fuel Waste Act (NFWA)* specifically addresses the future financial obligations for managing used fuel over the long term. The legislation requires the establishment of trust funds by each waste owner. The funds were established in 2002, and annual contributions have been made by each waste owner since.

The total value of these funds, including investment income, was approximately \$3.4 billion as of the end of 2014. This money is in addition to other segregated funds and financial guarantees the companies have set aside for nuclear waste management and decommissioning.

Trust Fund Balance December 2014



Experience in other countries has demonstrated the importance of safeguarding these funds so that they will be preserved for their intended purpose. The *NFWA* built in explicit provisions to ensure the trust funds are maintained securely and used only for their intended purpose. The NWMO may have access to these funds only for the purpose of implementing the management approach selected by the Government once a construction or operating licence has been issued under the *Nuclear Safety and Control Act (NSCA)*.

These legislated obligations are the responsibilities of the individual companies named, and not the responsibility of the NWMO. The trust funds are noted here because of their significance in the overall provision for long-term nuclear waste management.

As required by the *NFWA*, the NWMO makes public the audited financial statements of the trust funds when they are provided by the financial institutions annually. They are posted at www.nwmo.ca/trustfunds.

In addition, the NWMO is required to provide a range of financial information in each of its annual reports following the Government's decision, as defined in subsection 16(2) of the *NFWA*.

Reporting of the Canadian Nuclear Safety Commission (CNSC) Financial Guarantees as Required by *NFWA* Section 16(2)(a)

As required under Section 16(2) of the *NFWA*, the annual report requires reporting the form and amount of any financial guarantees that have been provided during the fiscal year by all NWMO members – Ontario Power Generation (OPG), Hydro-Québec (HQ) and NB Power Nuclear (NBPN) – and Atomic Energy of Canada Limited (AECL). Financial guarantees are required by the CNSC under the *NSCA* to cover the cost (in present value terms) associated with decommissioning, interim storage and long-term management of radioactive waste (including used nuclear fuel) produced to date. These financial guarantees for year 2015 total \$18.4 billion and are reviewed independently by the CNSC as part of the waste owner licence requirements. A large portion of these guarantees, approximately \$16.1 billion (as of year-end 2014), exist in segregated funds dedicated to nuclear waste management and decommissioning, with the remainder in the form of Provincial Guarantees.

Details of the status of these guarantees are presented in the Attachment 1.

Total Cost Estimate as Required by NFWA Section 16(2)(b)

The *NFWA* requires the NWMO to address the cost and funding of the long-term management of used nuclear fuel. The last full update of the cost estimates for the Adaptive Phased Management (APM) program was completed in 2011. This estimate provides the basis for financial planning and trust fund deposits for future years.

In producing an estimate for the long-term planning around the APM program, a number of system design and costing assumptions were adopted to guide the projections. Among these were:

- a. Engineering and conceptual design assumptions for the deep geological repository and transportation.
- b. Assumed repository capacity of 3.6 million fuel bundles.
- c. An in-service date of 2035 for the deep geological repository.
- d. Closure of repository in 2160.

Each component of APM costs was systematically addressed to develop a full lifecycle cost estimate. Allowances and contingencies are also included in the APM cost estimate to account for cost risks.

The 2011 cost estimate for the APM program for managing 3.6 million used nuclear fuel bundles is \$17.9 billion (2010 \$) or present value of \$7 billion (2010 \$). This cost estimate will form

the baseline from which cost estimates for a used fuel inventory greater than 3.6 million can be derived.

When updated to January 1, 2015, present value, the estimate cost of APM is \$8.8 billion (for liabilities from 2015 onwards). Of the \$8.8 billion, approximately \$7.5 billion is the estimated cost of developing and building a repository, transporting the used fuel, and operating the repository for the 2.5 million fuel bundles produced as of the end of June 2014. The \$7.5 billion present value cost estimate of a deep geological repository for the 2.5 million used fuel bundles includes \$2 billion to develop the repository to a point of obtaining a construction licence and \$5.5 billion to complete construction, transport the fuel to the repository, and operate, close and monitor the repository.

The costs of interim storage at the reactor sites and recovery of the used fuel from storage are not included as part of the \$8.8 billion cost estimate since they are the responsibility of the waste owners.

The next full update of baseline cost estimates is expected to be completed no later than the year 2017. In addition to a regular baseline cost estimates update on a five-year cycle, the NWMO is committed to providing annual assessments on all factors that impact these cost estimates. Any material change in the cost estimates will be dealt with and disclosed in the NWMO Annual Report.

Cost to Be Funded Through the *NFWA* Trusts

The *NFWA* requires that post-construction licence costs (currently estimated at \$5.5 billion) must be funded through contributions to the *NFWA* trust funds established by OPG, HQ, NBPN and AECL. As of December 2014, the total value of these funds, including investment income, was approximately \$3.4 billion.

Budget Forecast for 2015 as Required by the *NFWA* Section 16(2)(c)

In addition to making financial provision for work required post-construction licence, the NWMO will incur costs of approximately \$2 billion (as stated in present value as of January 1, 2015) to site the long-term management option, develop its detailed design, evaluate its environmental impacts, and obtain a site preparation and construction licence from the CNSC. For 2015, the NWMO Board of Directors approved a budget envelope of \$64 million. Annual costs beyond 2015 are subject to further review. Sharing of these costs will be in accordance with the percentages defined in the funding formula.

Funding Formula as Required by *NFWA* Section 16(2)(d)

In accordance with the requirements under the *NFWA*, the NWMO proposed a funding formula to address the future financial costs of implementing the APM approach in its 2007 Annual Report. This followed the Government's selection, in June of 2007, of the APM approach to the long-term management of used fuel. The funding formula, based partly on projections of used fuel to be generated by each waste owner, allocates liabilities to each of the corporations for their portion of the estimated total cost. It identifies trust fund contributions by each nuclear waste owner for their portion of the estimated total cost. This initial funding formula was approved by the Minister of Natural Resources in April 2009. Since then, the NWMO has proposed the same funding formula each year. For the 2015 fiscal year, the NWMO is proposing to use the same funding formula again.

Cost Sharing

For the purpose of sharing NWMO costs, cost sharing has initially been done based on the number of fuel bundles produced as of June 30, 2006, adjusted to account for the assumed timing of transfer of used fuel to the repository. For OPG, this transfer is assumed to start in 2035. For HQ, NBPN and AECL, this transfer is assumed to start in 2050.

In June 2014, the NWMO Board approved the number of used fuel bundles for each member and AECL to reflect the bundles in storage as of June 30, 2013. As a result of the updated number of fuel bundles in storage, the cost-sharing percentage for each member and AECL is as follows: OPG: 91.94%, HQ: 3.64%, NBPN: 3.49%, and AECL: 0.93%.

These percentages apply to the sharing of both pre- and post-construction costs. Costs specific to a nuclear fuel waste owner, such as special fuel and special transportation costs that are owner-specific, are attributed to the owner.

Possible Future Reactors

In response to the request of the Minister of Natural Resources, discussions were held with a number of stakeholders regarding the development of a funding formula that could apply to possible new waste owners and used fuel from new reactors. The results of the discussions are summarized below:

1. The principles used in the approved funding formula are reasonable and should apply to new owners and new reactors.
2. Fixed and variable costs and investments made to date need to be considered in any new funding formula for new owners and new reactors.
3. The characteristics of new fuel types must be considered.
4. The existing funding formula should be developed when specific circumstances are clear for new reactors and new owners.
5. The changes in funding formula for new owners of new reactors may be different than the changes for an existing owner with new reactors.

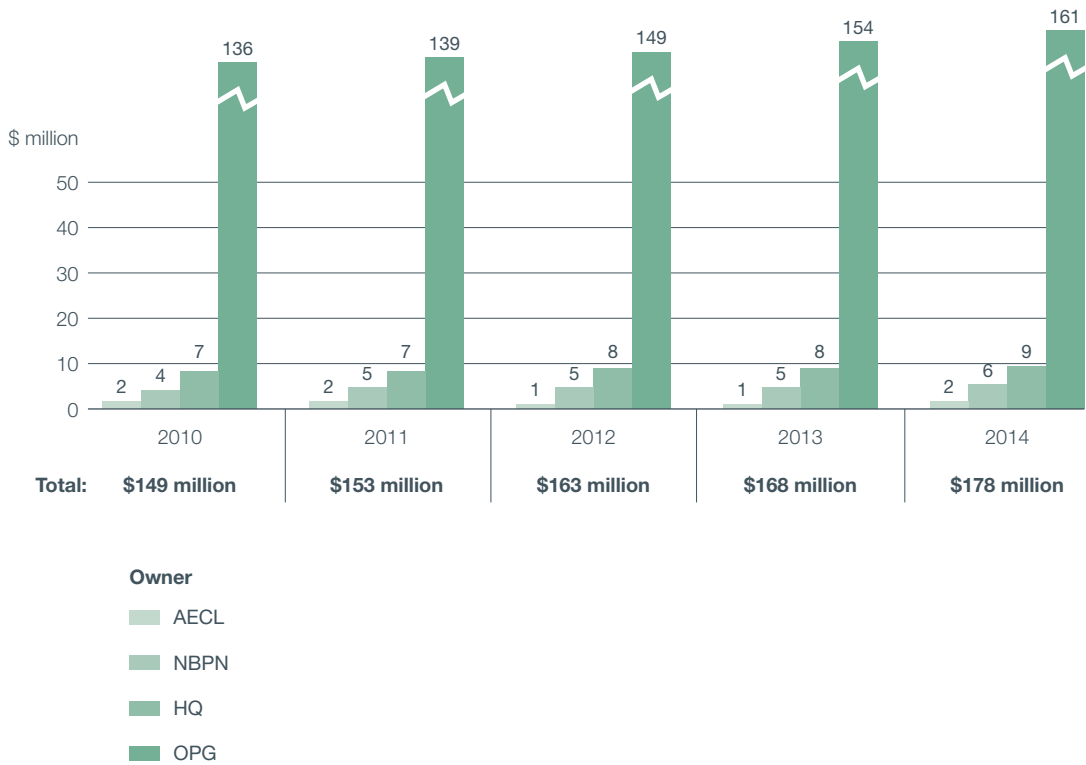
The NWMO proposed to apply the above principles to specific circumstances related to new owners and new reactors when they arise.

Trust Fund Deposits 2010 to 2014 as Required by *NFWA* Section 16(2)(e)

Beginning in 2002, used nuclear fuel owners have been making annual contributions to the *NFWA* Trust Funds. The contributions for each waste owner are shown in the following diagram.

Contributions to *NFWA* Trust Funds

Total Deposits to Trust Funds



Trust Fund Deposits for 2015 as Required by NFWA Section 16(2)(e)

The NFWA trust fund deposits for 2015 stated herein have been developed based on the funding formula for 2015. Under this funding formula, the funding for the post-construction licence costs is divided into two parts:

1. Funding for historical used fuel bundles (Committed Liability)
2. Funding for used fuel to be produced each year (Future Liability)

Committed Liability represents all costs that will be incurred regardless of whether any further used fuel bundles are generated in the future. This liability includes all fixed costs for the facility and variable costs attributed to the historical used fuel bundles. Contributions for the Committed Liability are to be amortized to the year 2035 in equal present value payments. The rationale for this amortization period is that 2035 is consistent with the earliest planned date when the deep geological repository would be available. This funding method has the advantage of distributing the funding obligations evenly to each year taking into account the time value of money.

Future Liability represents the incremental cost of transferring to the repository, facility expansion, and additional operating and monitoring costs of used fuel bundles to be produced each year. Each future used fuel bundle would incur the same cost in present value terms taking into account the time value of money.

The 2015 Trust Fund Deposits are shown in the table below.

Total Trust Fund Deposits: Year 2015

Owner	Trust Fund Balance (\$ million)	Deposits to Trust Funds (Committed and Future Bundles) (\$ million)*
	December 2014	2015
OPG	3,114	187.9
HQ	119	6.5
NBPN	125	8.8
AECL	45	1.1
Total	3,403	204.3

* Annual trust fund deposits are required to be made within 30 days of the submission of the Annual Report. A deposit date of April 30 is assumed for illustrative purposes.

ATTACHMENT 1

Financial Guarantee Status – Used Fuel Owners

Ontario Power Generation Inc.

Effective July 31, 2003, OPG provided the CNSC with a Decommissioning Financial Guarantee that included a guarantee associated with the long-term management of used fuel arising from the operation of OPG-owned nuclear stations and waste management facilities, including those leased by Bruce Power. The Decommissioning Financial Guarantee also covers liabilities associated with long-term management of low- and intermediate-level waste, as well as plant decommissioning.

Development and maintenance of the Financial Guarantee considers the following points:

- » The Financial Guarantee covers the liability based on projected waste arising to year-end in any given year. As a result, the value of the used fuel Financial Guarantee changes annually to recognize the incremental cost associated with additional used fuel generated during that year.
- » The initial Financial Guarantee submission covered the five-year period to year-end 2007. It has been updated twice since then, in 2007 and 2012 respectively. The latest approved 2012 Financial Guarantee submission covered from January 2013 to year-end 2017.
- » The Financial Guarantee is satisfied in part by the actual accumulation of funds within both a Used Fuel Fund and a Decommissioning Fund under the *Ontario Nuclear Funds Agreement (ONFA)* between OPG and the Province of Ontario. This value is supplemented by a Provincial Guarantee which is executed between the Province of Ontario and the CNSC.
- » The *NFWA* Trust Fund forms part of the Used Fuel Fund under the *ONFA*.

The Provincial Guarantee Agreement provides an unconditional and irrevocable guarantee to supplement monies set aside by OPG in segregated funds, including the *NFWA* Trust Fund, to satisfy the total Financial Guarantee required by the CNSC.

OPG submitted documents to the CNSC in 2012 to support its application to update the Financial Guarantee for the period from January 1, 2013, to year-end 2017. The CNSC hearing for this application was held in October 2012. The CNSC accepted the Financial Guarantee proposal on December 20, 2012.

The Annual Report to the CNSC for year 2015 shows a Financial Guarantee requirement of \$15,111 million. This will be satisfied by a 2014 year-end Used Fuel Fund balance of \$8,115 million, a Decommissioning Fund balance of \$7,338 million and a Provincial Guarantee of \$1,551 million for a total available guarantee of \$17,004 million.

The value of the OPG *NFWA* Trust Fund as of year-end 2014 is \$3,114 million. This value forms part of the segregated fund balance shown above.

Hydro-Québec

HQ has provided the CNSC with a Decommissioning Financial Guarantee of \$685 million stated in present value as of June 30, 2016, that includes a guarantee associated with used fuel arising from the operation of Gentilly-2 and the cost of station decommissioning, including the long-term management of low- and intermediate-level radioactive waste.

- » The total guarantee is made up of \$340 million for decommissioning and long-term management of low- and intermediate-level radioactive waste and \$345 million for used fuel.
- » The guarantee is in the form of an expressed commitment of the Province of Quebec to HQ that provides a guarantee of payment.
- » The HQ *NFWA* Trust Fund contained \$119 million as of December 31, 2014, and the fair value is estimated at \$140 million.

NB Power Nuclear

NBPN has provided the CNSC with a Decommissioning Financial Guarantee that includes costs associated with the long-term management of used fuel projected to be produced from the Point Lepreau Generating Station and the cost of station decommissioning, including the long-term management of low- and intermediate-level radioactive waste.

- » The current used fuel Financial Guarantee is based on the present value of future costs to manage used fuel produced to the end of 2014. The fund will be increased annually based on future used fuel production estimates.
- » The Financial Guarantee requirement is satisfied by three separate funds: a Used Fuel Fund, a Station Decommissioning Fund, and the *NFWA* Trust Fund.
- » The total market value of the funds at December 31, 2014, was approximately \$674 million and was comprised of the following:
 - Used Fuel Fund – \$257 million
 - Station Decommissioning Fund – \$292 million
 - *NFWA* Trust Fund – \$125 million

Atomic Energy of Canada Limited

AECL is not a member of the NWMO. Its Financial Guarantee is in the form of an expressed commitment by the Government of Canada to the CNSC, combined with supporting estimates of the financial liability and the basis for same. The AECL *NFWA* Trust Fund contained approximately \$45.3 million as of December 31, 2014.



Adapting Plans

Strategic Objective: The NWMO will adapt plans for the management of used nuclear fuel in response to new knowledge, international best practices, advances in technical learning, insight from Aboriginal Traditional Knowledge, evolving societal expectations and values, and changes in public policies.

Developing a deep geological repository for used nuclear fuel is a long-term project that will span several decades. Because of the timelines involved, Adaptive Phased Management (APM) includes numerous opportunities to refine and adjust the plan in light of change, whether in societal expectations or in new technologies. To achieve this goal, the NWMO is committed to continuous learning and to incorporating new knowledge at each step in the process. Each step, in other words, provides an opportunity to take stock and make any adjustments before proceeding.

Based on feedback the NWMO received from communities and the public, it added two new strategic objectives to its implementation plan for 2015 to 2019: developing transportation plans and continuously improving technical knowledge.

The addition of transportation as a specific objective responds to feedback received over the course of 2013. The new objective brings together in a single program stream the NWMO's ongoing work to establish safe, secure and socially acceptable plans for transporting used nuclear fuel. The change also reflects the importance of transportation as an element of the APM program.

The second new objective, continuously improving technical knowledge, reflects the importance of collaboration with universities and international organizations to the NWMO's technical program, and its continuing commitment to staying abreast of, and contributing to, advances in the field of used nuclear fuel management.



Keeping Abreast of Evolving Societal Expectations

To ensure its planning is responsive to evolving societal values, the NWMO welcomes input from people interested in and potentially affected by the project, including communities involved in the site selection process, First Nation and Métis communities, potentially affected and interested individuals and organizations, and the general public.

Every year, the NWMO solicits broad public input on its corporate strategic objectives and associated planned activities by publishing a draft of its upcoming five-year strategic plan.

Public Input on the NWMO's Draft Five-Year Implementation Plan

The NWMO again solicited public input on its corporate strategic objectives and associated planned activities by publishing a draft of its rolling five-year strategic plan (*Implementing Adaptive Phased Management 2015 to 2019*).

To encourage public review and comment, the Plan is distributed by mail to 2,500 individuals and organizations that had previously expressed interest, and it is posted on the NWMO's website with an invitation to comment by making a submission, sending a letter, or filling out a comment form.

Comments received about the NWMO's strategic objectives in 2014 were largely positive, and most people found the objectives and associated activities appropriate. Many suggested revisions were minor and were accommodated in the final plan. A *What We Heard* document was also published detailing the changes and refinements in the final Plan, and is available on the NWMO website at www.nwmo.ca/what_we_heard.

Along with comments used to revise the draft implementation plan, the NWMO received comments about the ongoing challenges and issues that will need to be addressed in the next five years as part of implementing Canada's plan. Recommendations included:

- » Ensuring understanding of the paramount importance of safety and gaining social acceptance of the project;
- » Ensuring all residents of communities interested in the project are engaged in learning and reflection on the project;
- » Building confidence in the safety of transporting used nuclear fuel; and
- » Sustaining the involvement of communities over the long timelines involved in implementing APM.

Incorporating Aboriginal Traditional Knowledge

Aboriginal Traditional Knowledge

Aboriginal, or Indigenous, Traditional Knowledge is the unique understanding, relationship, and connection to the land that defines the way of life of Aboriginal peoples.

It emphasizes the interrelationship among all components of the environment. It is a complex and sophisticated system of knowledge drawing on millennia of wisdom and experience. It constantly grows and expands with the experience of new generations. It is expected that this knowledge system will continue to provide a source of wisdom through the various stages of project development and implementation.

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.

As part of its promise to work in partnership with First Nation and Métis communities, the NWMO is committed to interweaving local Traditional Knowledge in all phases of its work. In particular, the organization expects that integrating 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 must inform more detailed studies.



The NWMO is currently working together with Aboriginal communities in potential siting areas to respectfully apply Traditional Knowledge to both the technical safety and community well-being dimensions of the site selection process. It will continue to work together with these communities as the process moves forward.

Observing general geological features is part of the initial fieldwork that takes place in Phase 2 preliminary assessments. Prior to the commencement of these observations, traditional ceremonies were performed by local Elders on the land where some of the mapping activities were to take place. The ceremonies reminded both participating members of the local Aboriginal and non-Aboriginal communities, contractors, and NWMO staff that as humans, we are dependent

on the land for sustaining life. One aspect in particular was stressed, and that was the importance of water and its preservation as a clean resource for all life.

The NWMO recognizes that any collection or documentation of Indigenous Knowledge will be of interest to each community beyond the scope of the APM Project. It will therefore make arrangements to manage the information and proceed in a manner acceptable to the community.

The NWMO will look to Aboriginal peoples to share their knowledge with the NWMO to the extent that they wish to. The NWMO will ensure that Aboriginal intellectual property is protected, as agreed with the Aboriginal peoples who choose to share that knowledge.





The Council of Elders meets in Ottawa.

Council of Elders

The Council of Elders functions as an advisory body to NWMO management, providing counsel on the application of Traditional Knowledge in the implementation of APM. The Council also provides advice on matters that could enhance the development and maintenance of good relations with First Nation and Métis communities.

Through its guidance, the Council works to protect and preserve all creation: air, land, fire, water, plants, medicines, animals, and human-kind – guided by the seven universal teachings of love, trust, sharing, honesty, humility, respect, and wisdom.

The Council met three times in 2014.

In 2014, because the Council felt that youth should play an important role in their proceedings, the NWMO Council of Elders Terms of Reference was modified to include youth participation. A youth subcommittee was created to interview and nominate youths to the Council. Seven youths were appointed in 2014, and the Elders encouraged them not only to learn, but also to voice their opinions and perspectives.

As well, Council members provided input on the NWMO Draft Traditional Knowledge Policy, as

well as involving First Nation and Métis communities in the NWMO's work. They invited community partners to an orientation session in July, during which an overview of the project, the NWMO, and the site selection process was presented.

Members of the Council actively participated in engagement activities over the course of the year. These included First Nation and Métis meetings, NWMO open houses, trade shows, and cultural events. There, they were able to engage with people in communities, and explain the role the Council plays in the NWMO's work and the guidance it has provided. Their presence at these events has been well-received, and has helped strengthen relationships among the Council, First Nation and Métis communities, and other communities in the area.

In September, the Grand Council Treaty #3 invited the Council of Elders to a meeting in Winnipeg, Manitoba. The theme was, "The Rights of Mother Earth and All Her Children". The meeting provided opportunities for information sharing, group discussion and personal interaction. Council of Elders members also joined in the ceremonies that accompanied the meeting.

Refining the Well-Being Framework

Safety is the most important consideration in the site selection process. But for a community to be selected, the project must also have the potential to foster its well-being, as well as that of the First Nation and Métis communities, and municipalities in the surrounding area. As engagement broadens, so does the discussion of what “well-being” means. The siting process is designed to foster conversation about each area’s long-term vision and how they, themselves, define well-being.

In order to support this ongoing dialogue, the NWMO brought well-being practitioners together in 2014 to review the current well-being framework, and suggest additions, changes and/or refinements that will help broaden the conversation about well-being. The workshop was facilitated by Joanne Barnaby and Elder Fred Kelly. Together, they set the tone and direction for the conversation, including asking participants to step outside their professional roles and to reflect on their ideal vision for their descendants well into the future. An important function of this conversation was to raise consciousness of cultural values and the needs of future generations before considering how to plan for community well-being. Discussions to refine the well-being framework will continue and are expected to be advanced in 2015.

Tracking International Best Practice

NWMO staff continued to participate in the Organisation for Economic Co-operation and Development (OECD) Nuclear Energy Agency (NEA) Radioactive Waste Management Committee. The NWMO was also represented in two working groups of the committee: the Integration Group for the Safety Case of Radioactive Waste Repositories, and the Forum on Stakeholder Confidence. The forum works to facilitate sharing experience across countries in addressing the societal dimension of radioactive waste management, and explores means of ensuring an effective dialogue with the public with a view to strengthening confidence in the decision-making processes.

The NWMO's Ethical and Social Framework

The NWMO's Ethical and Social Framework sets out principles to be used by the organization in guiding planning, engagement and decision-making in relation to implementation of the site selection process.

These are:

- » **Respect for life in all its forms**, including minimization of harm to human beings and other sentient creatures;
- » **Respect for future generations** of human beings, other species, and the biosphere as a whole;
- » **Respect for peoples and cultures**;
- » **Justice** (across groups, regions and generations);
- » **Fairness** (to everyone affected, and particularly to minorities and marginalized groups); and
- » **Sensitivity to the differences of values and interpretation** that different individuals and groups bring to the dialogue.

These ethical and social principles were adopted by the NWMO in 2005, based on the report of the Ethics Round Table that met at the request of the NWMO. In addition to the above principles, the 2005 report identified a series of ethical questions relevant to the NWMO's procedures and recommendations.

2007 to 2010

Between 2007 and 2010, the NWMO concentrated on developing processes and plans collaboratively with Canadians to create a participatory site selection process.

2010 to present

Since 2010, the NWMO has actively moved ahead with the nine-step site selection process, with a focus on engagement and relationship building with the communities that wish to explore hosting the APM Project and those potentially affected by siting of the project.

The following are examples of NWMO efforts to work within its Ethical and Social Framework.

- » The NWMO has taken a deliberative and careful approach to its planning, engagement, and decision-making, as evidenced by adherence to the implementation of its nine-step site selection process. The NWMO has also responded to communities' needs and conditions, being sensitive to the principles of fairness, justice, and sensitivity to differences in values and interpretation that different individuals and groups bring to the dialogue.
- » The NWMO has worked to ensure its activities are open, inclusive, and fair to all parties, including those opposed to its mandate. Everyone interested in the NWMO's work can provide input through a wide variety of channels. These include the organization's website, direct communication with staff, and open houses and other community events attended by staff.
- » Input and feedback from supporters and opponents alike are made available publicly and responded to. The NWMO continues outreach to those opposed to its work.
- » Each year, the NWMO seeks public input through its draft implementation plan for the next five years, providing all Canadians with opportunities to comment. It also reports annually to the federal Minister of Natural Resources on its activities, and the Minister tables the annual report in the House of Commons. This is in keeping with a commitment to making public policy in a free, pluralistic, and democratic society.
- » The NWMO's Aboriginal Relations program reflects the organization's commitment to engaging with First Nation and Métis organizations and communities.
- » The NWMO has developed and is implementing an Aboriginal Policy, and is nearing completion of an Aboriginal Traditional Knowledge Policy. As well, an Aboriginal Resource Program has been developed and is being implemented to recognize that Aboriginal communities have distinct priorities, including translation of information.
- » The NWMO has formed an APM-Geoscientific Review Group to provide third-party review of its feasibility and other technical studies.
- » New research is shared when it becomes available.
- » The community liaison committees (CLCs) community websites, and the NWMO's website and communications provide a transparent window showing where communities are in the process. This information is available on an equal basis, regardless of whether people support or oppose the project.
- » The NWMO actively engages youth and seeks their perspective on managing Canada's used nuclear fuel. This engagement is documented annually online at www.nwmo.ca/youthengagement.
- » The NWMO uses a formal process whereby communities need to explicitly agree to enter into a formal agreement with the NWMO to learn more about becoming a site community, and to proceed through a series of detailed discovery and assessment steps.
- » Communities are supported in activities aimed at developing their own capacity to undertake the learning and assessment process, including: establishing CLCs; undertaking open houses; creating and maintaining a website; having opportunities for visits to interim storage areas and the NWMO headquarters; and having access to independent experts.
- » In Phase 2 preliminary assessments, communities undergo technical evaluations of potentially suitable sites in great detail, with a focus on geoscientific suitability, environment and safety, potential transportation routes, and engineering considerations. Equally important, Phase 2 preliminary assessments allow communities to reflect in detail on whether implementing the project in the area would foster long-term well-being. As part of this reflection, communities must deeply engage not only their own residents, but also First Nation and Métis communities in the area, and surrounding communities.

Keeping Abreast of Technical Issues and Advances

The NWMO maintains a robust research program to keep abreast of technical issues and advances. This includes joint research projects with its sister organizations in other countries, as well as with universities in Canada and abroad. (The NWMO's research partnerships are detailed in the chapter *Optimizing Repository Designs and Further Increasing Confidence in Safety*.) The NWMO also monitors developments in used fuel reprocessing and Canadian energy policy that might have a bearing on the implementation of APM.

Ongoing Monitoring of Advances in Reprocessing Used Nuclear Fuel

There is no current plan in Canada to adopt advanced reactors or fuel cycles for recycling used nuclear fuel. However, no matter what the reactor or fuel cycle, a deep geological repository is required. Canada's plan for such a repository could accommodate the new waste forms resulting from these reactors or fuel cycles should Canada's nuclear power companies decide to adopt them at some later date. To help anticipate any changes in fuel cycles used in Canada and the types of waste that may need to be managed as a result, the NWMO has kept a watching brief on new developments since 2008. This watching brief is updated every year and can be read online at www.nwmo.ca/adaption.

Recycling Used Nuclear Fuel Does Not Eliminate the Need for a Deep Geological Repository

Some countries are conducting research on advanced reactors that could also recycle used nuclear fuel, and a small number of countries partly recycle used nuclear fuel in existing reactors. Unlike the once-through fuel cycle currently used in Canada and most other nuclear power countries, these advanced fuel cycles generate high-level waste (HLW), a by-product with characteristics similar to used fuel. Studies conducted around the world have concluded that HLW should also be contained and isolated in a deep geological repository.

Almost all countries with commercial nuclear power production are planning to isolate the by-product of their nuclear fuel cycle in a deep geological repository, whether this is used fuel or HLW. These countries include: the United States, Russia, Sweden, Finland, Switzerland, China, the United Kingdom, Japan, Germany, France, Spain, Belgium, Netherlands, and Hungary.

As part of its ongoing monitoring, the NWMO closely follows the latest research and development programs in advanced fuel cycles, including reprocessing, partitioning and transmutation. It also closely follows international conferences in the field. In 2014, these included:

- » The World Nuclear Fuel Cycle Conference;
- » The International Congress on Advances in Nuclear Power Plants, ICAPP 2014;
- » The 22nd International Conference on Nuclear Engineering, ICONE-22;
- » The 13th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation (IEMPT-13), co-sponsored by the International Atomic Energy Agency, the European Union, and the OECD NEA; and
- » The American Nuclear Society Topical Meeting on Reactor Physics, PHYSOR 2014.

As of 2014, the nuclear power companies have not proposed any plans to change the fuel cycle in Canada in the foreseeable future.

Energy Policy

As it had in previous years, the NWMO continued to monitor the status of potential new or refurbished reactors for the implications of these industry developments on the quantities and characteristics of the used nuclear fuel that the organization may be asked to manage in the future. The NWMO updated its inventory of Canada's used nuclear fuel in 2014. It is posted online at www.nwmo.ca/technicalresearch.

Planning for the Long Term

As part of the work it does on the international stage, the NWMO continued to participate in the NEA's International Collaboration on Preservation of Records, Knowledge and Memory Across Generations. Initiated in 2011, the project supports the lengthy and complex decision-making processes that are inherent in the long operational and post-operational lifetimes of radioactive waste repositories. Its particular focus is on sharing international information, comparing approaches, testing potential solutions, and sharing decisions. The NWMO's involvement in the project will continue in its next phase, which began in April 2014 and has a duration of three years.



Ensuring Governance and Accountability

Strategic Objective: The NWMO will maintain an accountable governance structure that provides confidence to the Canadian public in the conduct of the NWMO's work.

The integrity of the NWMO's work is advanced by multiple layers of oversight and peer review. Internally, the NWMO is governed by its Board of Directors. The *Nuclear Fuel Waste Act (NFWA)* also requires the Board to appoint an Advisory Council that has a mandate to review and

publicly comment on the work of the NWMO.

In addition, a range of external reviews and reports, and a robust quality management system are in place to ensure the integrity of the Adaptive Phased Management (APM) program.

Annual Reporting to the Minister of Natural Resources

The NWMO reports to the Minister of Natural Resources Canada on an annual basis, as required by the *NFWA*. This annual report is made public and tabled in Parliament, and the Minister issues a statement on it each year. Every three years, an expanded version of the annual report – the triennial report – is required under the *NFWA* and must also include the comments of the Advisory Council.

The *NFWA* requires the NWMO to submit a triennial report to the Minister of Natural Resources. 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 outlines the organization's work plan for the upcoming five years (2014 to 2019).

In his statement responding to the report, the Minister expressed satisfaction with the progress in the site selection process. He also expressed his appreciation for “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.

Technical Review

Since 2008, there have been annual external reviews of the NWMO's ongoing and future applied research and development activities in the areas of geoscience, safety assessment, and engineering technology development. Conducted by internationally recognized specialists, these reviews evaluate whether the NWMO's work in each area is consistent with the current international state of knowledge and whether there is an adequate scientific, technical, and resource basis to implement APM.

The work of the APM technical program continues to be independently reviewed to evaluate whether appropriate scientific and engineering approaches are in place to support the implementation of APM. Beginning in 2008, these reviews were conducted by an Independent Technical Review Group, which was established by the NWMO Board of Directors and which completed its mandate in 2013. In 2014, peer review on geological work associated

with the project continued to be provided by the existing APM-Geoscientific Review Group (APM-GRG). As the technical program advances and becomes increasingly specialized, the NWMO will co-ordinate independent reviews of its work by assembling groups of experts with relevant subject matter expertise.

Recommendations provided by peer reviews serve as a basis with which a NWMO response and action plan are created and tracked to demonstrate program position and progress. Reviews completed to date and the NWMO's response are publicly available on the NWMO website.

In 2014, the APM-GRG and an external group of experts for the engineered barrier design conducted their first annual reviews. Written reports outlining their findings were then prepared and presented to the NWMO's Board of Directors and Advisory Council.

Early Involvement of the Canadian Nuclear Safety Commission

The APM repository will be subject to the Canadian Nuclear Safety Commission's (CNSC) comprehensive licensing system, which covers the entire life cycle of the repository. Once a suitable site with an informed and willing host is identified for the APM repository, the NWMO would submit an application for a Licence to Prepare the Site (and possibly Licence to Construct) to the CNSC. Before a licensing decision can be made, an environmental assessment (EA) under the *Canadian Environmental Assessment Act, 2012*, must be completed and a decision taken on the EA that the project is not likely to cause significant adverse environmental effects, taking into account mitigating measures that were identified during the EA.

At this early stage of the APM initiative, the NWMO has not submitted a licence application to the CNSC. Although no licence application has yet been made, as Canada's independent nuclear regulator, the CNSC adopts the best practice of getting involved early in proposed new nuclear projects to ensure that the future licence applicant and affected communities have a comprehensive understanding of the CNSC's role in regulating Canada's nuclear sector.

In recognition of the CNSC's early involvement, the NWMO signed an arrangement with the CNSC. In March 2014, the arrangement was renewed. As part of the arrangement, the CNSC is providing regulatory guidance to the NWMO, conducting pre-licensing reviews of conceptual designs and illustrative safety assessments, and participating in community or other meetings to provide information on the regulator's role.

Learning About Canada's Nuclear Regulator

In this early stage of the site selection process, the CNSC is conducting outreach meetings when requested by participating communities and Aboriginal groups. These meetings take place between communities and CNSC staff; the NWMO is not present or briefed on these meetings.

At the request of local community liaison committees (CLC), CNSC staff also travelled to communities to explain the CNSC's independent regulatory role. CNSC staff also made themselves available to answer questions about their regulatory role from CLC members and local residents. CNSC staff also continues to hold open houses in communities when requested.

Planning for Transportation of Used Nuclear Fuel

The CNSC, along with federal and provincial transportation agencies, participated in an ongoing NWMO planning group to address the issues and concerns arising from the transportation of used fuel. This participation is an important part of confirming that the regulatory requirements and expectations associated with the transport of used fuel are consistently understood. Going forward, the NWMO will need to demonstrate to regulatory authorities the safety and security of a transportation system before shipments of used nuclear fuel can begin.

International Reporting

Internationally, the NWMO reports on its progress at meetings of the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention)*. Reports to the *Joint Convention* are made under the auspices of the CNSC, and are part of the convention's requirement that Canada and other signatory nations demonstrate that they are meeting international commitments to manage radioactive waste and used nuclear fuel safely. In 2014, the NWMO participated in the development of the Canadian National Report for the 2015 review meeting of the *Joint Convention*.

Quality Management

The NWMO has developed, implemented, and maintained a management system that is compliant with Canadian and international standards. In particular, the system was developed to meet CSA N286 management system requirements. This system implements the organization's fundamental values regarding accountability, engagement and excellence by ensuring that:

- » Staff understand their roles and responsibilities;
- » The views of interested communities and groups are internalized; and
- » The best knowledge, thinking and innovative technologies are used in the NWMO's operations.

In 2014, the NWMO continued with its internal audit program. It also successfully completed certification maintenance audits, and retained certification to ISO 9001:2008 for quality, ISO 14001:2004 for environment, and CSA Z1000:2006 for occupational health and safety.

Going forward, the NWMO management system will continue to adapt to meet the evolving needs of the organization as it narrows the search for a site for a used fuel repository. The management system will be updated to meet the requirements of the new ISO 9001 standard for quality expected to be issued in 2015, as well as the new ISO 14001 standard expected in 2016.

Going Forward

At each step along the way, the NWMO's work will meet or exceed all applicable standards and requirements for protecting the health, safety, and security of both people and the environment. The NWMO holds itself accountable to the public by posting key documents on its website, most notably annual reports, triennial reports, minutes from meetings of the Board of Directors and Advisory Council, reports of technical review groups and the NWMO's response to them, research papers, and results of the NWMO's engagement activities.



nwmo

NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES

Building and Sustaining an Effective Organization

Strategic Objective: The NWMO will build and sustain an effective organization with the social, environmental, technical and financial capabilities for the safe, long-term management of Canada's used nuclear fuel.

At the end of 2014, there were 140 people working full-time for the NWMO, both at its Toronto headquarters and in communities.

The NWMO's staffing priorities and policies reflect the fact that the management of used nuclear fuel is a long-term responsibility requiring expertise in a wide variety of areas. These include repository design and construction, transportation, geoscience, environmental assessment, Aboriginal Traditional Knowledge, social research, ethics, law, finance, communications, and public engagement. All are critical to responding to the needs and concerns of interested and potentially affected communities, developing collaborative partnerships with those communities, and ensuring that evaluations of potential sites meet the highest technical standards, as does the eventual site itself.

In 2014, the organization made important staff additions to build its capabilities in First Nation and Métis engagement, reflecting the need for interested communities, First Nation and Métis communities in the area, and other surrounding municipalities to work in partnership to implement the project. The NWMO also created a new position to help advance this goal: Associate Vice-President of Aboriginal Relations.

Conferences, joint projects with universities,

and international partnerships, all helped NWMO staff develop their skills and incorporate the latest technologies in their work. (For details, please see the chapter *Optimizing Repository Designs and Further Increasing Confidence in Safety*.)

The NWMO remained committed to creating and retaining a diverse workforce, and to providing equal opportunity in recruitment, hires, promotions, and compensation. A notable example was the NWMO's partnership with the Ontario Job Opportunity Information Network (JOIN), an organization that promotes and develops employment opportunities for people with disabilities. In 2014, the NWMO began posting external job vacancies on JOIN's job board.

As well, the NWMO continued to provide health and safety training in such areas as health awareness, defensive driving, first aid, fire safety, and the prevention of workplace violence.

The goal of equipping a new generation to assume responsibility for APM was also advanced through a number of youth-based science initiatives, as described in the chapters *Building Sustainable Relationships* and *Optimizing Repository Designs and Further Increasing Confidence in Safety*.



Other Activities: Ontario Power Generation's Deep Geologic Repository Project for Low and Intermediate Level Waste

Since 2009, the NWMO has been under contract to Ontario Power Generation (OPG) to help develop a deep geologic repository for the long-term management of low- and intermediate-level radioactive waste at the Bruce nuclear site in the Municipality of Kincardine.

In 2011, OPG further contracted with the NWMO to manage the detailed design of the future repository. It is presently planned that the NWMO will provide construction services following the receipt of a licence for the repository.

The NWMO's work on behalf of OPG is separate from its mandate to implement Adaptive Phased Management (APM). The OPG repository would only be used to contain and isolate low- and intermediate-level radioactive waste from the Bruce, Pickering, and Darlington generating stations. The APM repository, by contrast, would be used to contain and isolate used nuclear fuel from all Canadian nuclear stations. In both cases, before a licensing decision can be made, an environmental assessment (EA) under the *Canadian Environmental Assessment Act, 2012 (CEAA)*, must be completed and a decision taken on the EA that the project is not likely to cause significant adverse environmental effects, taking into account mitigating measures that were identified during the EA. The involvement of the NWMO in the OPG Project reflects the unique expertise

Low-level radioactive waste consists of industrial items that have become contaminated with low levels of radioactivity during routine cleanup and maintenance activities at nuclear generating stations.

Intermediate-level radioactive waste consists primarily of used nuclear reactor components, ion-exchange resins, and filters used to purify reactor water systems.

within the NWMO with respect to repository development. The OPG repository would be owned and ultimately operated by OPG.

The OPG deep geologic repository would be approximately 680 metres below ground in low-permeability limestone, beneath a 200-metre-thick layer of low-permeability shale. These sedimentary bedrock formations provide multiple natural barriers which will safely contain and isolate the radioactive waste for 100,000 years and beyond.

Site Investigations

Collection of additional baseline monitoring data at the site of OPG's planned repository was continued in 2014. The site has a number of shallow and deep boreholes that are routinely monitored.

Monitoring activities included regular sampling of sediments, surface water and shallow water quality, surface water flows and shallow ground-water quality. In the deep boreholes, although there is no flowing ground-water present at repository depth, measurements of hydraulic formation pressures were continued. These measurements help verify that conditions in the deep bedrock are stable.

In October, attendees at the Eastern Section meeting of the American Association of Petroleum Geologists made a field trip to the project site. The tour included a review of the deep borehole pressure monitoring, viewing of core samples, information on geoscientific verification, and a discussion during which ideas and insights were shared.

Ongoing sampling of surface water supports the collection of baseline monitoring data in support of OPG's proposed repository.



Regulatory Approvals

The Joint Review Panel established in 2012 is responsible for (1) examining the potential environmental impacts of the proposed project and preparing a Panel report in accordance with the requirements of the *CEAA*; and (2) considering OPG's licence application submitted under the *Nuclear Safety and Control Act* to prepare a site and to construct the deep geologic repository facility.

In February 2012, the Panel initiated a period for public review and comment on OPG's submissions. This was followed by public hearings in the fall of 2013. The Panel then requested additional information on six aspects of the project:

1. The methodology used to determine the significance of adverse environmental effects;
2. Updates to the geoscientific verification plan;
3. Expansion plans for the project;
4. Relative risk analysis of alternative means of carrying out the project;
5. Implications of revisions to the reference waste inventory; and
6. Applicability of recent incidents at the Waste Isolation Pilot Plant in the United States to the safety case for the OPG Project.

The NWMO worked with OPG in providing the information requested, with OPG's responses provided by June 2014.

In June, the Panel announced additional public hearings to give the participants, OPG, and the Canadian Nuclear Safety Commission an opportunity to provide their views on the subjects of the Panel's information requests issued since November 2013. These hearings were held in September 2014.

In November, the Panel announced the close of the Public Record and indicated that its report would be issued to the Minister of the Environment on or before May 6, 2015. Subject to the Minister's decision on the EA, the Panel may then be authorized to take a decision on the application for a Licence to Prepare a Site and Construct the Deep Geologic Repository.

For more information about the project and regulatory approvals process, please visit www.opgdgr.com.

Attendees from the American Association of Petroleum Geologists examine rock samples at the Bruce nuclear site.



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The Organization





The Members

The NWMO was established in 2002 by Canada's nuclear electricity generators, following passage by the federal government of the *Nuclear Fuel Waste Act*.

Ontario Power Generation, New Brunswick Power Corporation and Hydro-Québec are the founding Members, and along with Atomic Energy of Canada Limited, are required to fund the NWMO's operations.

Board of Directors

The Board of Directors is responsible for oversight of the organization and taking a leadership role in the development of the corporation's strategic direction.

As of December 31, 2014, the Board was composed of nine directors. Mr. Pierre Charlebois served as Chairman, and Mr. Ken Nash, as President and CEO. Of the remaining seven directors, Ms. Josée Pilon was appointed by Hydro-Québec (HQ); Mr. Darren Murphy, by the New Brunswick Power Corporation; and Mr. C. Ian Ross, Mr. Ron Jamieson, Dr. Deborah Poff, Mr. Wayne Robbins, and Ms. Beth Summers, by Ontario Power Generation (OPG).

The Board of Directors convened four formal meetings in 2014. In addition, the four Committees of the Board met a total of 15 times during the year.

In 2014, the Board continued to oversee the NWMO's site selection process, including:

- » Decisions to narrow down the number of communities;
- » Planning for multi-year preliminary assessments; and
- » Engagement activities to support those assessments.



Early in the year, the Board provided comment on the NWMO's triennial report for the years 2011 to 2013, and approved the audited financial statements, which were subsequently presented to the NWMO Members at the Annual General Meeting held on June 12. The Directors also reviewed the NWMO's Performance Objectives and Measures for 2015. In fall 2014, the 2015–2019 NWMO Business Plan was presented to the Board for discussion. The 2015 budget was approved. The Board held several discussions related to strategic decisions and the future direction of the NWMO.

Other activities by the Board of Directors included reviews of:

- » The terms of reference and membership of the Advisory Council, the Adaptive Phased Management (APM)-Geoscientific Review Group, and an independent review group of experts for the engineered barrier design;
- » The plan to update the APM lifecycle cost estimate;
- » A proof testing plan for the Mark 2 concept as the reference design for the engineered barrier system;
- » The status of studies and engagement activities conducted as part of the site selection process, and decisions to narrow down communities in that process;
- » Planning for multi-year Phase 2 preliminary assessments and supporting engagement activities;
- » Plans for safely transporting used nuclear fuel;
- » Planning assumptions leading to regulatory approval to proceed with construction of a deep geological repository for used nuclear fuel;
- » The performance of the NWMO pension fund; and
- » Support to OPG on its Deep Geologic Repository Project in Kincardine, Ontario.

Committees of the Board of Directors

Audit, Finance and Risk Committee

The committee met four times in 2014. The committee oversees external audits of the NWMO's financial statements. The committee also advises the Board annually on the selection of auditors for the following year and the terms of the Audit Service Plan. Meetings are held with the auditors each year to discuss their findings.

The committee also regularly reviewed in-year financial statements and reported its findings to the Board. The committee reviewed the NWMO's audited pension and financial statements, and recommended approval. The committee's other activities included reviews of:

- » The NWMO's business plan;
- » Any changes to key risks for the APM program, and for the Licensing Phase, and Design and Construction Phase of OPG's Deep Geologic Repository Project for Low and Intermediate Level Waste;
- » The NWMO's internal governance and audit systems;
- » The pension fund;
- » Lifecycle liability management work programs;
- » Reports covering financial results, a cash flow forecast, and compliance;
- » Expenses reported by the Chairman, President and Executive Committee;
- » The NWMO's procurement process;
- » The Committee's charter; and
- » The *Nuclear Fuel Waste Act* trust fund contributions.

In June, an annual joint meeting of the Audit, Finance and Risk Committee, and the Human Resources and Compensation Committee was held to review the NWMO's pension plan funding and sustainability.

As of December 31, 2014, there were four directors on the committee:

- » Ian Ross, Chair;
- » Robin Heard (until December 2014);
- » Ron Jamieson; and
- » Josée Pilon.

Siting Committee

The NWMO Siting Committee provides a vehicle through which the Board may maintain close oversight of this important element of the NWMO's mandate and manage the risks associated with the execution of the site selection process. The committee met four times in 2014. Its activities included reviews of:

- » The status of the APM site selection process and the communities presently engaged in the process;
- » Phase 1 preliminary assessments guiding a narrowing-down process;
- » The start of Phase 2 preliminary assessments and early plans for fieldwork;
- » Written reports on the NWMO's engagement program;
- » Updates on the work of the Council of Elders; and
- » The Committee's charter.

As of December 31, 2014, there were five directors on the committee:

- » Ron Jamieson, Chair;
- » Pierre Charlebois;
- » Darren Murphy;
- » Deborah Poff; and
- » Wayne Robbins.

Human Resources and Compensation Committee

The committee met four times in 2014. It is responsible for overseeing the NWMO's human resources functions, including compensation practices, human resources policy, organization design, labour relations, and the pension plan.

As of December 31, 2014, the committee had five directors:

- » Ian Ross, Chair;
- » Pierre Charlebois;
- » Robin Heard (until December 2014);
- » Josée Pilon; and
- » Deborah Poff.

Low- and Intermediate-Level Waste Deep Geologic Repository Oversight Committee

The committee met twice in 2014. It has responsibility for monitoring the NWMO's role in managing the regulatory approvals, engineering, procurement, and construction of OPG's Deep Geologic Repository Project in Kincardine, Ontario. This includes review of the NWMO's performance under its Deep Geologic Repository Services Agreement, and Engineering, Procurement, and Construction Management Agreement with OPG, as well as risk management related to the project.

Other activities in 2014 included reviews of:

- » Updated Regulatory Approvals, and Design and Construction work plans;
- » Planning assumptions;
- » Hearings held by the Joint Review Panel;
- » The 2015–2019 Business Plan finalized and approved by OPG; and
- » Issues related to the reference inventory and waste characterization planning.

As of December 31, 2014, the committee had four members:

- » Wayne Robbins, Chair;
- » Ian Ross;
- » Morris Medd (non-director committee member); and
- » Wolf Seidler (non-director committee member).

Members of the Board of Directors



Pierre Charlebois



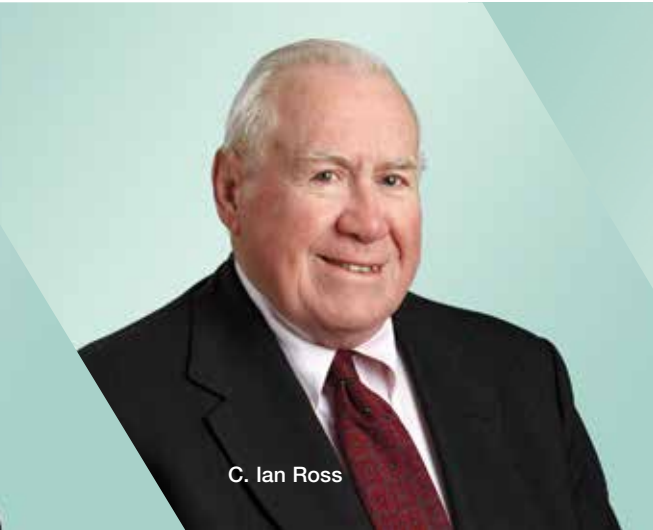
Ronald L. Jamieson



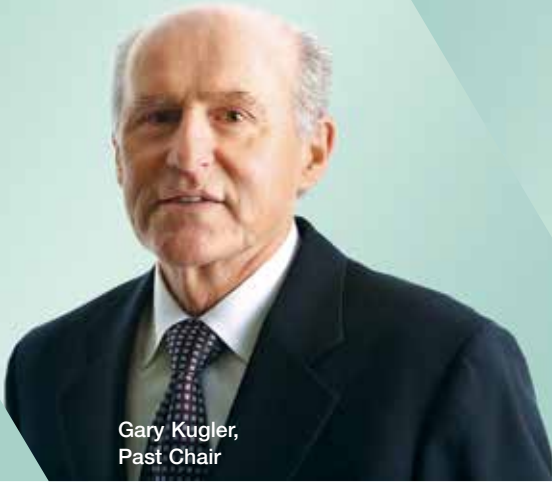
Darren Murphy



Wayne Robbins



C. Ian Ross



Gary Kugler,
Past Chair



Ken Nash



Josée Pilon



Deborah C. Poff



Beth Summers



Robin Heard,
Past Board Member

**Pierre Charlebois – Chair
(September 2014 –)**

Mr. Pierre Charlebois is the retired Executive Vice-President and Chief Operating Officer at OPG, and was responsible for the operation of OPG's nuclear, hydro, and fossil businesses. From December 2003 to November 2006, Mr. Charlebois served as Chief Nuclear Officer, responsible for overseeing OPG's nuclear generation business and its performance. Mr. Charlebois graduated from the University of Ottawa in 1975 with a bachelor's degree in Applied Science. He is a member of the Professional Engineers of Ontario.

**Gary Kugler – Chair
(June 2006 – June 2014)**

Dr. Gary Kugler is the retired Senior Vice-President of Nuclear Products and Services at Atomic Energy of Canada Limited (AECL), where he was responsible for AECL's commercial operations. During his 34 years with AECL, he held various technical, project management, business development, and executive positions. Prior to joining AECL, he served as a pilot in the Canadian Air Force. Dr. Kugler is a graduate of the Institute of Corporate Directors' Directors Education Program and has also served on the Board of OPG, as well as the Board of Perma-Fix Environmental Services. He holds an Honours B.Sc. in Physics and a PhD in Nuclear Physics from McMaster University.

**Ken Nash – President and CEO
of the NWMO**

Mr. Ken Nash is a founding director of the NWMO and a past chair of the organization's Board of Directors. He has held a number of senior management positions at Ontario Hydro and OPG in the areas of finance, engineering, and environmental management, and most recently, was Senior Vice-President of the Nuclear Waste Management Division. He is also past chair of EDRAM, an association of waste management organizations from 10 countries, including Canada.

Ronald (Ron) L. Jamieson

Mr. Ron Jamieson is a member of the Board of Directors of the Ontario Power Authority. Prior to his retirement in late 2005, he served as Senior Vice-President of Aboriginal Banking at BMO Financial Group. Mr. Jamieson has held several senior executive positions in the financial services industry. Throughout his career, he has also been active in economic development initiatives for Aboriginal communities across Canada. Mr. Jamieson also served as Chairman, President and CEO of Ontario Energy Corporation, whose mandate was to invest or participate in energy projects throughout Canada. He is also Chairman of the Canadian Council for Aboriginal Business and was recently named President of First Canadian Property Investments Ltd. In 2014, Mr. Jamieson was awarded the Order of Ontario and the Order of Canada, as well as receiving an honorary doctoral degree from Nipissing University.

Darren Murphy

In June 2012, Mr. Darren Murphy was appointed as Vice-President of Corporate Services and Chief Financial Officer at NB Power. His areas of responsibility include Finance, Human Resources, Information Systems, Voice Services, Environment, Safety, Regulatory Affairs, Corporate Compliance, and Corporate Project Management. Mr. Murphy joined NB Power's executive team in 2007, and in addition to his current role, he has held a number of executive positions, including Vice-President of Distribution and Customer Service, and Vice-President of Transmission. He had worked for over 17 years in Distribution field operations before joining the executive team. Mr. Murphy is a member of the Board of Directors for the New Brunswick Investment Management Corporation, and the New Brunswick Energy Marketing Corporation.

Josée Pilon

Ms. Josée Pilon is an MBA graduate of Laval University. She was a member of the steering committee on the evaluation project for the rehabilitation of Gentilly-2. As a special projects manager, she is responsible for evaluating business opportunities for new sources of energy from the private sector, including wind power, biomass and hydro-electric. She is also involved on the financial impact evaluation of new hydroelectric projects on municipalities. Prior to her current position, she held numerous business development positions in international projects.

Deborah C. Poff

Dr. Deborah Poff has recently completed her term as President of Brandon University, where she is currently on administrative leave. Previously, Dr. Poff was a Professor of Philosophy and Political Science at the University of Northern British Columbia (UNBC). From 1994 to 2004, she was Vice-President and Provost at UNBC. In 2004, she was awarded a Fellowship in Public Policy with the Sheldon Chumir Foundation in Ethical Leadership. She is the co-founder and editor of the *Journal of Business Ethics*, and editor-in-chief of the *Journal of Academic Ethics*. She is the editor of *Business Ethics in Canada*, and the section editor on business and economic ethics of *Encyclopedia of Applied Ethics*, published by Elsevier in 2012. She recently co-edited *Citation Classics from the Journal of Business Ethics: Celebrating the First Thirty Years of Publication* with Springer.

Wayne Robbins – Vice-Chair

Mr. Wayne Robbins is the retired Chief Nuclear Officer at OPG. He was responsible for all OPG's nuclear operations, engineering, nuclear waste management, strategic planning, and plant performance. Mr. Robbins served as Senior Vice-President of the Darlington Nuclear Generating Station from 2006 to 2009. He was recognized with OPG's 'Power Within Leader of the Year' award in 2008 and received the Ontario Energy Association leadership award in 2009. He has held several other senior positions at OPG and is also past Chairman of the Canadian Nuclear Association Board. Mr. Robbins holds a B.Sc. in Civil Engineering from Queen's University and is a member of the Professional Engineers of Ontario. He has also completed the Ivey Executive Program, and Rotman's Directors Education Program.

C. Ian Ross

Mr. Ian Ross served at the Richard Ivey School of Business at Western University from 1997 to 2003. Most recently, he was Senior Director, Administration in the Dean's Office, and was also Executive in Residence for the School's Institute for Entrepreneurship, Innovation and Growth. He has served as Governor, President and CEO of Ortech Corporation; Chairman, President and CEO of Provincial Papers Inc.; and President and CEO of Paperboard Industries Corp. Mr. Ross currently serves as a director for a number of corporations and is Chair of GrowthWorks Canadian Fund Ltd. He served as a Director of OPG from December 2003 to April 2014. He is also a member of the Law Society of Upper Canada.

Beth Summers (December 2014 –)

Ms. Beth Summers is a Senior Vice-President and the Chief Financial Officer at OPG. She is responsible for providing financial leadership and support to OPG's operational units and support services groups. She has overall accountability for financial strategy, controllership, accounting, reporting, business planning, investment planning, taxation, treasury, and pension and nuclear fund management. Prior to joining OPG, Ms. Summers was the Chief Financial Officer of Just Energy Group Inc. She was previously at Hydro One Inc., where she held positions of increasing financial responsibility, including the Chief Financial Officer. Ms. Summers began her career at Ernst & Young in the audit practice area. She is a Chartered Professional Accountant (CPA, CA) and obtained a bachelor's degree in Business Administration from Wilfrid Laurier University.

Robin Heard

Past Board Member
(September 19, 2014 – December 10, 2014)



Officers and Executive Committee

Officers

Chairman of the Board

Pierre Charlebois

President and CEO

Kenneth E. Nash

Vice-Presidents

Michael Hung

Patrick Moran

Kathryn Shaver

Jennifer Spragge

Derek Wilson

Treasurer and Chief Financial Officer

General Counsel and Corporate Secretary

Vice-President, APM Engagement and Site Selection

Vice-President, Human Resources

Vice-President, Design and Construction

Executive Committee

Kenneth E. Nash

Paul Gierszewski

Christopher Hatton

Michael Hung

Patrick Moran

Sean Russell

Kathryn Shaver

Jennifer Spragge

Bob Watts

Derek Wilson

President and CEO

Director, Safety and Licensing

Director, Repository Design Development

Treasurer and Chief Financial Officer

General Counsel and Corporate Secretary

Director, Environmental Assessment

Vice-President, APM Engagement and Site Selection

Vice-President, Human Resources

Associate Vice-President, Aboriginal Relations

Vice-President, Design and Construction



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EQUIPAMENTO DE

Advisory Council





As required by the *Nuclear Fuel Waste Act (NFWA)*, the NWMO Board of Directors established an Advisory Council in 2002. In 2014, the Advisory Council comprised 10 members. The Honourable David Crombie continued to serve as Chair. The full Advisory Council membership is profiled at the end of this chapter.

The Advisory Council is made up of individuals knowledgeable in nuclear waste management issues, and experienced in working with citizens and communities on a range of public policy issues. Current members' expertise includes geotechnical engineering, chemical engineering, nuclear engineering, engagement and public affairs, business ethics, ecology, land use planning and management, environmental law, medicine, political science, municipal affairs, First Nation and Métis relations, and Aboriginal Traditional Knowledge.

Statutory Reporting Requirements

The Advisory Council is required by the *NFWA* to comment every three years on the previous three years of NWMO activity. These independent statements, which include observations on the results of NWMO public consultations and analysis of any significant socio-economic impacts of the organization's activities, are published in the NWMO's triennial reports.

The Council is also required to comment on the organization's five-year strategic plans and budget forecasts. Advisory Council comments are also published in the NWMO's triennial reports.

Council Operations

In addition to fulfilling its legislated reporting requirements, the Advisory Council outlines its activities on a yearly basis for inclusion in the NWMO's annual report. The Council meets with the NWMO senior management, closely following the development of the organization's plans and activities, and providing ongoing counsel and advice. The Council also deliberates in camera.

At the Advisory Council's request, formal minutes of its meetings are recorded and posted on the NWMO website at www.nwmo.ca/advisorycouncilminutes. The NWMO's dispositioning of that advice may be reviewed at www.nwmo.ca/actrackingmatrices.

The Advisory Council Chair has direct access to NWMO Board meetings to ensure a comprehensive exchange of information and to provide a conduit for the Chair to keep the Council fully informed on Board matters, and vice versa.

In 2014, the Advisory Council discussed its ongoing operations with the NWMO Board with a view to ensuring the organization benefits fully from the Council's contributions. Council members advanced a range of opportunities for expanding their contributions to the NWMO. As part of this discussion, it was agreed that Council agendas would be structured to ensure time is allocated to addressing strategic plans and priority topics for Adaptive Phased Management (APM) implementation. In addition, Board and Council will meet so that the Council may share with the Board its assessment of key issues and advice for managing priority areas.

Advisory Council Membership

Current appointments to the Advisory Council are for three years each, and are based on several criteria: the type of work the NWMO will be engaged in over the next four years, the expertise that work will require, and the specific provisions of the *NFWA*.

Highlights of the Council's Activities in 2014

The Advisory Council met four times in person in 2014 and once by conference call. At each meeting, NWMO staff briefed the Council on the progress of current projects, as well as on the status of plans under development. Members reviewed the NWMO's second triennial report, covering the years 2011 to 2013, and in March 2014, they submitted their comments for inclusion in that report. They closely reviewed the NWMO's Transparency Policy. In addition, topics of particular interest to Council members were deliberated, and requests for additional information were met by NWMO staff. The Council continued to review the key areas of business risk relevant to near-term activities in APM implementation.

The Adaptive Phased Management Site Selection Process

Members were briefed on the progress of the site selection process through the year. Updates were provided at each meeting on the status of the communities involved in Phase 1 preliminary assessments. As Phase 1 assessments neared completion, the Council reviewed the draft findings of each detailed assessment, along with recommendations on communities that should continue in the siting process by advancing to Phase 2 assessments.

At the end of 2014, the Council had an extensive discussion of completed assessment findings and final recommendations. In addition to technical findings, members discussed the strength of interest in learning more about the project, both in initiating communities, and among First Nation and Métis communities, and surrounding municipalities.

In reviewing next steps with management, the Council discussed how the process would embrace expanded engagement and broader regional dialogue and planning in siting areas, and how those potentially affected by the transportation of used nuclear fuel would be engaged.

The Council was asked to review the NWMO's proposed new program for recognizing the important contributions of First Nation and Métis communities and organizations at the end of the Phase 1 assessments. Council members expressed support for such a recognition program, and offered advice on the structure of the program and considerations for introducing the program.

At the beginning of the year, Council members discussed the NWMO's launch of Phase 2 preliminary assessments, and preparatory work for early field activities and expanded engagement. They discussed plans for the work in the communities participating in Phase 2 preliminary assessments, including airborne geophysical surveys, walking of the land to observe general geological features, and plans for engaging First Nation and Métis communities.

As the year progressed, the Council reviewed and commented on the NWMO's business planning effort to scope out the multi-year Phase 2 studies and engagement. The Council noted that fieldwork conducted in Phase 2 preliminary assessments might be impacted by the timing of permits and approvals. Members expressed interest in the NWMO's plans for engagement activities on a regional level. They reviewed year-end reports on Phase 2 fieldwork, including the initiatives taken by the NWMO for collaborative planning and delivery of field activities with local communities, Elders, and First Nation and Métis community members. Members supported the NWMO's plan to procure services locally in siting areas wherever possible.

Members stressed the importance of the NWMO's retaining its emphasis on principles and values. Consistent with the premise of APM, they urged the organization to continue to listen to all perspectives, and be open to learning from evolving views and new knowledge.

Transportation

At the Council's request, NWMO staff provided detailed presentations on transportation planning and associated engagement activities. Members discussed transportation logistics and timing for engaging communities and provincial governments potentially affected by transportation routes. Recognizing transportation to be an important strategic objective in implementing APM, the Council suggested assigning higher profile to transportation in planning documents and risk assessments.

Transparency

At the request of the Council, management tabled the NWMO Transparency Policy for discussion and review. Members offered suggestions for providing greater clarity in the policy document.

Environmental Integrity and Safety

Environmental integrity remained an important topic of discussion for the Council. Members also discussed safety standards observed by other nuclear waste management organizations, along with the role of the regulator in maintaining a culture of safety over long time frames.

Technical Aspects of Adaptive Phased Management

Council members were kept up to date on the work of the APM technical program. This included work on the engineered barrier design and container proof testing program, and the formation of an independent group of experts to review the engineered barrier design; the status of the two postclosure safety assessments the NWMO has submitted to the Canadian Nuclear Safety Commission; the successful completion of a weld crush test; and the work plans supporting reference designs for crystalline and sedimentary rock geospheres.

The Council also requested additional information about used fuel container technologies. Toward that end, they sought clarification on the NWMO's proof testing programs for used fuel containers. They also wanted to know more about the questions the Swedish Radiation Safety Authority raised in its review of copper coatings.

The Council requested a dedicated briefing from the NWMO's Chief Financial Officer on the funding of the APM program and provisions for financial surety.

Engagement and the Evolving External Landscape

The Council continued to be briefed on the NWMO's engagement activities and changes in the external landscape that might affect those activities. Members requested and received background information on recent developments within Canada and internationally.

The Council continued to follow developments in Ontario Power Generation's (OPG) proposed Deep Geologic Repository Project for Low and Intermediate Level Waste. In particular, members discussed information requests that OPG received from the Joint Review Panel reviewing the proposal to site and construct a facility in Kincardine, Ontario.

Communications

Members provided feedback on the NWMO's communications with communities and the public at large. This included discussing the NWMO's rollout plans for the Phase 1 preliminary assessments completed in 2014.

Members of the Advisory Council



David Crombie – Chair

The Honourable David Crombie is the President of David Crombie and Associates, the Chair of Toronto Lands Corporation, and past Chair of Ontario Place. He is the immediate past President and CEO of the Canadian Urban Institute. He is also a past mayor of the City of Toronto and a Privy Councillor. Mr. Crombie was the first Chancellor of Ryerson University and is the recipient of honorary doctorates of law from the University of Toronto and the University of Waterloo. Mr. Crombie is an Officer of the Order of Canada and the Order of Ontario.



David R. Cameron

Dr. David Cameron, a Fellow of the Royal Society of Canada, is a Professor of Political Science at the University of Toronto. His professional career has been divided between public service – in Ottawa and at Queen's Park, Ontario – and academic life. A longtime student of Canadian federalism and Quebec nationalism, he has turned his attention to constitution-making and government design in conflict and post-conflict situations in Sri Lanka, Iraq, Somalia, the Western Sahara, and Jerusalem. He is currently the Dean of the Faculty of Arts and Science at the University of Toronto.



Marlyn Cook

Dr. Marlyn Cook is presently working in her home community of Grand Rapids First Nation in northern Manitoba. She was the Chief of Staff and Director of the Traditional Healing Program with Weeneebayko General Hospital in Moose Factory, Ontario. Dr. Cook is Cree and a member of the Grand Rapids First Nation in northern Manitoba. She has practised medicine in the Mohawk community of Akwesasne, in Sioux Lookout Zone and in a number of northern Aboriginal communities in Manitoba. She is active in her community serving as an advisor and Board member to a number of organizations. Dr. Cook is known for her work blending Western and Traditional medicine, and has been involved with sharing this knowledge with medical students and doctors throughout Canada. Her belief is that healing needs to be focused on all aspects of the person – spiritual, mental, physical, and emotional.



Wesley Cragg

Dr. Wesley Cragg is a graduate of the Universities of Alberta (BA Hon. and MA) and Oxford (B.Phil. and D.Phil.) which he attended as a Rhodes Scholar. He was appointed the first George R. Gardiner Professor of Business Ethics at York University's Schulich School of Business (1992 to 2006) where he launched Schulich's MBA Program in Business Ethics. He is the Founding Chair and President of Transparency International Canada (1993 to 2006), a former President of the John Howard Society of Canada and the Canadian Philosophy Association, and a longtime member of the Boards of the John Howard Society of Sudbury, Ontario and Canada. Dr. Cragg is currently a York University Senior Scholar, a Schulich School of Business Professor of Business Ethics and the Director of CBERN (Canadian Business Ethics Research Network), national, Social Sciences and Humanities funded network. Dr. Cragg is the author and editor of several books on a variety of themes in business and applied ethics and the philosophy of law, and widely published in Canadian and international journals.



Frederick Gilbert

Dr. Frederick Gilbert is the past President and Vice-Chancellor of Lakehead University in Thunder Bay, Ontario. Dr. Gilbert has had an extensive teaching, research and administrative career in the United States and Canada at Lakehead University, Colorado State University, the University of Northern British Columbia, Washington State University, the University of Guelph and the University of Maine, and also has held several environmental and wildlife management public service appointments and positions. He was Big Game Project Leader for the State of Maine, and while at the University of Guelph, he was a principal partner in an environmental consulting firm. He has retired to Nova Scotia where he has a certified organic farming operation and is a member of the South Shore Wine Growers Association.



Eva Ligeti

Ms. Eva Ligeti teaches Environmental Law and Policy in the graduate program in Environmental Science at the University of Toronto. As the Executive Director of the Clean Air Partnership, she worked to make Toronto more environmentally sustainable and a world leader in clean air. A lawyer, she served as Ontario's first Environmental Commissioner from 1994 to 1999. Ms. Ligeti has served on numerous boards and committees, including the Council of the Federation of Canadian Municipalities' Green Municipal Fund, as a member of the Province of Ontario's Expert Panel on Climate Change Adaptation, and as a co-chair of the Greening Greater Toronto Task Force.



Derek Lister

Dr. Derek Lister is Professor Emeritus in the Chemical Engineering Department at the University of New Brunswick in Fredericton, where he also holds the Research Chair in Nuclear Engineering. His main research interests are in chemistry and corrosion associated with nuclear and other power systems, areas in which he has published widely. He holds positions on a number of national and international committees advising government and industry.



Dougal McCreath

Dr. Dougal McCreath is Professor Emeritus in the Bharti School of Engineering at Laurentian University in Sudbury, Ontario. A Fellow of both the Engineering Institute of Canada and of the Canadian Academy of Engineering, he has wide teaching, research and international consulting interests, ranging from the design of deep underground excavations to the recovery and sustainability of damaged ecosystems. He has served on two Canadian Environmental Assessment Agency review panels dealing with nuclear related issues.



Donald Obonsawin

Mr. Donald Obonsawin is the founder and President of DIRECTIONS, a management consulting company that provides policy, management and strategic planning services. From 2003 to 2007, he was President and CEO of Jonview Canada Inc. Previous to that, he enjoyed a 25-year career in both the provincial and federal public services, including 15 years as Deputy Minister of seven Ontario government ministries. He also held senior positions with the federal departments of Indian Affairs and Northern Development Canada, and Health and Welfare Canada. Mr. Obonsawin is a member of the Abenaki First Nation of Odanak.



Michel R. Rhéaume

Mr. Michel Rhéaume is the CEO of RHEM Technologies Inc. in Grand-Mère, Quebec, a company specializing in nuclear safety and health physics. Mr. Rhéaume is a physics graduate from Université du Québec à Trois-Rivières. He began his career at Hydro-Québec in 1975, and before his retirement, he had been a manager in Health Physics, Emergency Preparedness, Environment, Nuclear Safety and Licensing, and Nuclear Waste Management. From 2007 to 2011, he was director of the nuclear engineering division of GENIVAR, an engineering consulting firm, overseeing important projects. In 1999, he received from the Canadian Nuclear Association the outstanding award in recognition for his contribution to public acceptance of nuclear technology through his skills and knowledge in Health Physics. In 2004, he received the Founders Award of the Canadian Radiation Protection Association at the International Radiation Protection Association Meeting in Madrid, Spain. Mr. Rhéaume also taught nuclear physics and health physics for 20 years at Université du Québec à Trois-Rivières.



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Auditor's Report and Financial Statements

Management's Responsibility for Financial Reporting

The accompanying financial statements of the Nuclear Waste Management Organization (NWMO) and all the information in this annual report are the responsibility of management and have been approved by the Board of Directors.

The financial statements have been prepared by management in accordance with Canadian generally accepted accounting principles. When alternative accounting methods exist, management has chosen those it deems most appropriate in the circumstances. Financial statements are not precise since they include certain amounts based on estimates and judgments, particularly when transactions affecting the current accounting period cannot be finalized until future periods.

Management has determined such amounts on a reasonable basis in order to ensure that the financial statements are presented fairly, in all material respects, and in light of information available up to February 19, 2015.

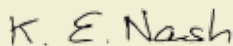
Management has a system of internal controls designed to provide reasonable assurance that the financial statements are accurate and complete in all material respects. The internal control system includes an established business conduct policy that applies to all employees. Management believes that the systems provide reasonable assurance that transactions are properly authorized and recorded, financial information is relevant, reliable and accurate, and the Organization's assets are appropriately accounted for and adequately safeguarded.

The Board of Directors is responsible for ensuring management fulfills its responsibilities for financial reporting, and is ultimately responsible for reviewing and approving the financial statements. The Board carries out this responsibility through its Audit, Finance and Risk Committee (the Committee).

The Committee is appointed by the Board and meets periodically with management, as well as the external auditor, to discuss internal controls over the financial reporting process, auditing matters and financial reporting issues; to satisfy itself that each party is properly discharging its responsibilities; and to review the financial statements and the external auditor's report. The Committee reports its findings to the Board for consideration when approving the financial statements for issuance to the members. The Committee also considers, for review by the Board and approval by the members, the engagement or reappointment of the external auditor.

The financial statements have been audited by Deloitte LLP, the independent external auditor, in accordance with Canadian generally accepted auditing standards on behalf of the members.

February 19, 2015



Ken Nash
President and CEO



Michael Hung
Chief Financial Officer

Independent Auditor's Report

To the Members of Nuclear Waste Management Organization

We have audited the accompanying financial statements of Nuclear Waste Management Organization, which comprise the statement of financial position as at December 31, 2014, and the statements of operations, changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained in our audit is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of Nuclear Waste Management Organization as at December 31, 2014, and the results of its operations and its cash flows for the year then ended, in accordance with Canadian accounting standards for not-for-profit organizations.

Deloitte LLP

**Chartered Professional Accountants, Chartered Accountants
Licensed Public Accountants
February 19, 2015
Toronto, Ontario**

**Statement of financial position
as at December 31, 2014**

	2014	2013 Restated (Note 2)
	\$	\$
Assets		
Current assets		
Cash (Note 4)	4,954,918	6,300,670
Accounts receivable	2,216	2,216
Member contributions receivable (Note 7a)	14,324,691	2,339,534
Prepaid expenses and deposits	817,603	674,048
	20,099,428	9,316,468
Capital assets (Note 5)	3,193,221	2,828,844
Other assets (Note 6)	5,000	5,000
Deferred pension asset (Note 9)	31,730,570	23,689,000
	55,028,219	35,839,312
Liabilities		
Current liabilities		
Accounts payable and accrued liabilities (Note 14)	19,888,837	8,850,052
Deferred lease inducements (Note 10)	125,205	130,597
Deferred member contributions (Note 7b)	184,386	434,819
	20,198,428	9,415,468
Deferred capital contribution (Note 8)	3,193,221	2,828,844
Deferred member contributions (Note 7c)	10,044,822	7,195,646
Other post-employment and pension benefits liability (Note 9)	20,010,594	15,007,200
	33,248,637	25,031,690
Net assets	1,581,154	1,392,154
	55,028,219	35,839,312

Approved by the Board of Directors, February 19, 2015.

K. E. Nash

Ken Nash
President and CEO
Toronto, Canada

C. Ian Ross

C. Ian Ross
Chair – Audit, Finance and Risk Committee
Toronto, Canada

The accompanying notes to the financial statements are an integral part of this financial statement.

Statement of operations
year ended December 31, 2014

	2014	2013 Restated (Note 2)
	\$	\$
Revenue		
Member cash contributions received (Note 6)	59,794,562	65,452,616
Non-member cash contributions received	754,979	552,116
	60,549,541	66,004,732
Change in deferred capital contributions (Note 8)	(364,377)	320,534
Change in long-term deferred member contributions (Note 7c)	(2,849,176)	(2,226,876)
Change in member contributions receivable (Note 7a)	11,985,157	(1,482,259)
Change in deferred member contributions (Note 7b)	250,433	167,122
Total contribution revenue (Note 13)	69,571,578	62,783,253
Interest income (Note 13)	52,579	57,042
Total revenue	69,624,157	62,840,295
Expenses		
Adaptive Phased Management		
Staffing and administration (Note 6)	23,067,846	19,837,617
Siting process	18,964,752	10,402,992
Design and development safety case	11,777,443	9,314,742
Building relationships	3,251,152	2,650,228
Governance structure	512,091	579,527
Adapting to change	332,815	203,320
	57,906,099	42,988,426
Deep Geologic Repository		
Regulatory review stage	6,266,087	10,205,583
Design stage	1,054,676	2,392,939
Staffing and administration	2,196,258	5,046,786
	9,517,021	17,645,308
Lifecycle Liability Management		
Contract services	47,634	34,544
Staffing and administration	1,201,440	1,260,309
	1,249,074	1,294,853
Amortization	951,963	911,708
Total expenses (Note 13)	69,624,157	62,840,295
Excess of revenue over expenses for the year	-	-

The accompanying notes to the financial statements are an integral part of this financial statement.

Statement of changes in net assets as at December 31, 2014

	2014	2013 Restated (Note 2)
	\$	\$
Excess of revenue over expenses for the year	-	-
Net assets, beginning of year		
As previously reported	-	-
Adjustment for retrospective application of Section 3463:		
Deferred pension asset (Note 2)	6,308,360	973,823
Other post-employment and pension benefits liability (Note 2)	(4,916,206)	(6,337,793)
Net assets (deficiency) beginning of year, as restated	1,392,154	(5,363,970)
Remeasurements during the year:		
Deferred pension asset	3,382,000	5,334,537
Other post-employment and pension benefits liability	(3,193,000)	1,421,587
Net assets, end of year	1,581,154	1,392,154

Statement of cash flows year ended December 31, 2014

	2014	2013
	\$	\$
Operating activities		
Cash received from contributions	60,549,541	66,004,732
Interest received	52,579	57,042
	60,602,120	66,061,774
Cash paid for salaries and benefits, materials and services	(60,755,881)	(64,050,522)
	(153,761)	2,011,252
Investing activities		
Purchase of capital assets	(1,191,991)	(682,581)
Investment in subsidiary	-	(5,000)
	(1,191,991)	(687,581)
Net (decrease) increase in cash	(1,345,752)	1,323,671
Cash, beginning of year	6,300,670	4,976,999
Cash, end of year (Note 4)	4,954,918	6,300,670

The accompanying notes to the financial statements are an integral part of this financial statement.

Notes to the financial statements

December 31, 2014

1. Description of organization

The Nuclear Waste Management Organization (“NWMO”) is a not-for-profit corporation without share capital, established under the *Canada Corporations Act*, 1970 (“the Act”), as required by the *Nuclear Fuel Waste Act (Canada)*, 2002 (“*NFWA*”) which came into force November 15, 2002.

The *NFWA* requires electricity-generating companies which produce used nuclear fuel to establish a waste management organization. In accordance with the *NFWA*, the NWMO established an Advisory Council, conducted a study and provided recommendations on the long-term management of used nuclear fuel to the Government of Canada. The results of the study and the recommendations were submitted in November 2005. As part of the long-term mandate, the NWMO is now responsible for implementing the Adaptive Phased Management (“APM”), an approach selected by the Government of Canada to address the management of used nuclear fuel.

The NWMO formally began operations on October 1, 2002. Its founding members are Hydro-Québec, NB Power Nuclear, and Ontario Power Generation Inc. (“Members”) – which are Canadian companies that currently produce used nuclear fuel as a by-product of electricity generation.

Pursuant to a Membership Agreement, cost sharing of APM costs has initially been done based on the number of fuel bundles produced as of June 30, 2006, adjusted to account for the assumed timing of transfer of used fuel to the repository. At the Board of Directors’ meeting on June 11, 2014, the date used for the calculation of the number of fuel bundles was changed to June 30, 2013, effective for cost sharing of APM costs beginning January 1, 2015.

In addition to the above mandate, effective January 1, 2009, the NWMO entered into two new agreements with Ontario Power Generation Inc. (“OPG”) to expand its operations to provide project management services for Phase 1 of OPG’s Low and Intermediate Level Waste Deep Geologic Repository (“DGR”), and certain provision costing and accounting services relating to nuclear Lifecycle Liability Management (“LLM”).

Effective February 1, 2011, the NWMO entered into an Engineering, Procurement and Construction Management Agreement for the DGR Phase 2 (design) and Phase 3 (construction) services with OPG. The design services cover detailed engineering, geoscience characterization, environmental and safety assessment, community engagement and regulatory affairs. Phase 3, the construction services, is pending government approval, as well as both parties – OPG and the NWMO – mutually agreeing to proceed with this service.

2. Restatement of the prior years' figures

Canada's Accounting Standards Board ("AcSB") approved and released Section 3463 Reporting Employee Future Benefits by Not-for-Profit Organizations. The Standard applies to fiscal years beginning on or after January 1, 2014. Except as otherwise provided for in Section 3463, the NWMO is required to apply Employee Future Benefits, Section 3462 in Part II of the Chartered Professional Accountants Canada ("CPA Canada") Handbook. This Standard is also effective for years beginning on or after January 1, 2014. The NWMO adopted both Standards effective January 1, 2014. The transition date for the new Standards is January 1, 2013.

The adoption of the new Standards resulted in the adjustment of any unamortized amounts (past service costs/credits and actuarial gains/losses) directly to net assets, and any future remeasurements and other items (as defined in paragraphs .085-.090 of Section 3462) will be recognized directly in net assets in the Statement of financial position, rather than in the Statement of operations.

In addition, the NWMO revised the actuarial assumptions for benefit obligations and costs adopted in estimating its accrued benefit obligations (see Note 9).

(a) The impact of this restatement on the Statement of financial position as at January 1, 2013, is as follows:

	Balance as previously reported as at December 31, 2012	Adjustments	Reference	Balance as adjusted as at January 1, 2013
	\$	\$		\$
Deferred pension asset	13,362,177	973,823	(i)	14,336,000
Other post-employment and pension benefits liability	8,299,407	6,337,793	(ii)	14,637,200
Net deficiency	-	5,363,970	(iii)	5,363,970

(b) The impact of this restatement on the Statement of operations for the year ended December 31, 2013, is as follows:

	Amount as previously reported - 2013	Adjustments	Reference	Amount as adjusted - 2013
	\$	\$		\$
Revenue:				
Change in long-term deferred member contributions	209,124	(2,436,000)	(iv)	(2,226,876)
Expenses:				
Adaptive Phased Management Staffing and administration	21,733,506	(1,895,889)	(v)	19,837,617
Deep Geologic Repository Staffing and administration	5,466,293	(419,507)	(v)	5,046,786
Lifecycle Liability Management Staffing and administration	1,380,913	(120,604)	(v)	1,260,309

2. Restatement of the prior years' figures (continued)

(c) The impact of this restatement on the Statement of financial position as at December 31, 2013, is as follows:

	Balance as previously reported as at December 31, 2013	Adjustments	Reference	Balance as adjusted as at December 31, 2013
	\$	\$		\$
Deferred pension asset	15,266,640	8,422,360	(vi)	23,689,000
Other post-employment and pension benefits liability	10,412,994	4,594,206	(vi)	15,007,200
Deferred member contributions	4,759,646	2,436,000	(iv)	7,195,646
Net assets	-	1,392,154	(iii)	1,392,154

Explanation of adjustments:

- (i) This adjustment is related to the remeasurement of the defined benefit obligation and other post-employment and pension benefits liability as per CPA Canada Handbook Part II, Section 3462, paragraphs .085-.090. The NWMO previously used actuarial valuations prepared for accounting purposes. It now uses an actuarial valuation prepared for funding purposes (but not one prepared using a solvency, wind up, or similar valuation basis), as allowed by Section 3462. The impact of this change is \$17,515,000, which is offset by the adjustment of unamortized losses of \$16,541,177, a net adjustment of \$973,823.
- (ii) The adjustment is related to the unamortized losses as per the new Standard as noted above.
- (iii) The remeasurement adjustments are charged to net assets as per CPA Canada Handbook Part III, Section 3463, paragraph .02.
- (iv) The operating cost for 2013 is reduced by \$2,436,000 under the new Standard in CPA Canada Handbook Part II, Section 3462, resulting in a lower revenue requirement on a deferral basis which is adjusted to the long-term deferred member contributions.
- (v) The reduction of cost is allocated to programs based on the staff time charged.
- (vi) This adjustment is to reflect the December 31, 2013, amounts under CPA Canada Handbook Part II, Section 3462.

3. Significant accounting policies

Basis of presentation

The financial statements of the NWMO are the representations of management prepared in accordance with Canadian accounting standards for not-for-profit organizations set out in Part III of the CPA Canada Handbook using the deferral method of reporting restricted contributions. The significant accounting policies adopted by the NWMO are as follows:

Reporting controlled and related entities

The investment in the controlled enterprise is reported using the equity method (Note 6).

Capital assets

Capital assets are recorded at cost. Amortization is provided for on a straight-line basis over their estimated useful lives as follows:

Furniture and office equipment	7 years
Transport and work equipment	7 years
Computer equipment and software	3 years
Vehicles	5 years
Leasehold improvements	Initial lease term plus one renewal period

Income tax

The NWMO is a not-for-profit organization, and pursuant to section 149(1)(1) of the *Income Tax Act*, is not subject to income tax.

Revenue recognition

Contributions received from members are treated as restricted contributions, and as such, they are not recognized as revenue until associated costs have been incurred. Any excess or short-fall of member contributions is recorded as deferred revenue or member contribution receivable, respectively.

Contributions used for the purchase of capital assets owned by the NWMO are deferred and amortized into revenue at the rate corresponding with the amortization rate of the related capital assets.

Pension and other post-employment benefits

The NWMO's post-employment benefit programs include a contributory defined benefit registered pension plan, a defined benefit supplementary pension plan, and other post-employment benefits, including group life insurance, health care and long-term disability benefits. The NWMO has adopted the following policies with respect to accounting for these post-employment benefits as per CPA Canada Handbook Part III, Section 3463, effective January 1, 2014 (see Note 2):

3. Significant accounting policies (continued)

- (i) The NWMO accrues its obligations under pension, supplementary pension plan, and other post-employment benefit (“OPEB”) plans. The defined benefit obligation for pension is determined using the projected benefit method pro-rated on service and are measured based on the actuarial valuation prepared for funding purposes (but not one prepared using a solvency, wind up, or similar valuation basis). Under this method, the benefit costs are amortized over the average remaining service period of active employees. The average remaining service period for active employees is 15 years (Note 9). For other unfunded plans such as supplementary pension plan and OPEB, a similar accrual method is used and the benefit obligations are measured based on the actuarial valuation for accounting purposes. Remeasurements and other items for the period are recorded through net assets.
- (ii) The obligations are affected by salary levels, inflation, and cost escalation of specific items (e.g. dental and health claims). Pension and OPEB costs and obligations are determined annually by independent actuaries using management’s best estimate assumptions. The discount rate used by the NWMO in determining projected benefit obligations and the costs for the NWMO’s pension plan is based on the funding valuation on a going concern basis, while other employee benefit plans’ discount rates are based on representative AA corporate bond yields in effect at year end.
- (iii) Pension fund assets are valued using market-related values for the purposes of determining actuarial gains or losses and the actual return on plan assets. The plan’s assets consist of investment grade securities. Market and credit risk on these securities are managed by the plan by placing plan assets in trust and through the plan investment policy.

Research and development

Research and development costs are charged to operations in the year incurred.

Foreign currency translation

Monetary assets and liabilities denominated in foreign currencies are translated into Canadian currency at the year-end exchange rate. Any resulting gain or loss is reflected in staffing and administration expenses. Transactions in foreign currencies throughout the year have been converted at the exchange rate prevailing at the date of the transaction.

Financial instruments

Financial instruments include cash, accounts receivable, and accounts payable and accrued liabilities.

Financial assets and financial liabilities are initially recognized at fair value when the NWMO becomes a party to the contractual provisions of the financial instrument. Subsequently, all financial instruments are measured at amortized cost. Financial assets measured at amortized cost are assessed at each reporting date for indications of impairment. If such impairment exists, the asset is written down and the resulting impairment loss is recognized in the Statement of operations.

Related party transactions

Related party transactions are recorded at the exchange amount.

Use of estimates

The preparation of financial statements in conformity with Canadian generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosures of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Due to the inherent uncertainty in making estimates, actual results could differ from those estimates. Accounts requiring significant estimates include pension and other post-employment benefits, certain accrued liabilities and amortization which is based on the estimated useful life of the capital assets.

4. Cash

There is no restricted cash as of December 31, 2014. Included in cash in 2013 was \$3,960,800, which was restricted, as this amount secured a Letter of Credit issued for the Supplementary Pension Plan (Note 9). There is no such requirement due to the use of a Letter of Credit issued by OPG in 2014.

5. Capital assets

	2014			2013
	Cost	Accumulated amortization	Net book value	Net book value
	\$	\$	\$	\$
Furniture and office equipment	2,097,881	1,492,416	605,465	785,823
Computer equipment and software	2,971,092	1,675,955	1,295,137	571,154
Leasehold improvements	2,234,099	1,398,099	836,000	1,138,139
Transport and work equipment	215,435	15,388	200,047	-
Custom vehicle	374,231	117,659	256,572	333,728
	7,892,738	4,699,517	3,193,221	2,828,844

6. Related party transactions, balances and other information

Transactions and balances not otherwise disclosed separately in the financial statements are as follows:

	2014			2013
	APM	LLM/DGR	Total	Total
	\$	\$	\$	\$
Transactions during the year				
Member contributions received				
Ontario Power Generation Inc.	44,052,000	11,909,950	55,961,950	62,061,801
New Brunswick Power	2,029,153	-	2,029,153	1,938,000
Hydro-Québec	1,803,459	-	1,803,459	1,452,815
	47,884,612	11,909,950	59,794,562	65,452,616
Transactions with				
Ontario Power Generation Inc.				
Payments				
DGR communication services	-	-	-	100,000

6. Related party transactions, balances and other information (continued)

The NWMO set up a wholly owned subsidiary in Saskatchewan to purchase mineral exploration rights in support of the APM siting process. This subsidiary was incorporated on March 27, 2013, with share capital under the *Canada Business Corporations Act*. The subsidiary company purchased certain mineral exploration claims for \$5,000 funded by \$1 in share capital and a \$4,999 interest-free loan from the NWMO. A summary of the total assets, liabilities and shareholder's equity as at December 31, 2014, and revenues, expenses, net income and cash flows from operating, financing and investing activities for the year ended December 31, 2014, are presented below:

	2014	2013
	\$	\$
Assets	-	-
Total assets	-	-
Liabilities	4,999	4,999
Shareholder's deficiency		
Share capital	1	1
Deficit	(5,000)	(5,000)
Total shareholder's deficiency	(4,999)	(4,999)
Total liabilities and shareholder's equity	-	-
Revenues	-	-
Operating expenses	-	5,000
Net operating loss	-	(5,000)
Cash from holding company		
Subscription of shares	-	1
Interest-free loan	-	4,999
Cash from holding company	-	5,000
Cash used in operations	-	(5,000)
Cash as at December 31	-	-

7. Member contributions receivable and deferred member contributions

The NWMO receives contributions from its members and is solely funded through their contributions. The contributions received from the members are restricted in nature, and thus revenue is recognized when qualifying expenses are incurred. Amounts received in advance of qualifying expenses are recorded as deferred member contributions. Commitments for contributions which have not been received by the NWMO are recorded as contributions receivable when the amount is determinable and the ultimate collection is likely. Information in this note includes amounts related to Atomic Energy of Canada Limited.

(a) Member contributions receivable

Member contributions receivable are made up of the following:

	2014	2013
	\$	\$
Ontario Power Generation	13,486,796	2,339,534
New Brunswick Power	474,406	-
Hydro-Québec	363,489	-
	<u>14,324,691</u>	<u>2,339,534</u>

(b) Deferred member contributions

Deferred member contributions are made up of the following:

	2014	2013
	\$	\$
Atomic Energy of Canada Limited	184,386	149,431
New Brunswick Power	-	69,847
Hydro-Québec	-	215,541
	<u>184,386</u>	<u>434,819</u>

(c) Long-term deferred member contributions

Long-term deferred member contributions represent amounts received or receivable to fund various employee future benefits as follows:

	2014	2013 Restated (Note 2)
	\$	\$
Deferred pension asset	31,730,570	23,689,000
Other post-employment benefits	(20,010,594)	(15,007,200)
Pension and other post-employment benefit liabilities – short term (Note 9)	(94,000)	(94,000)
Less remeasurements and other items in net assets	(1,581,154)	(1,392,154)
	<u>10,044,822</u>	<u>7,195,646</u>

7. Member contributions receivable and deferred member contributions (continued)

(d) Continuity of deferred member contributions

The continuity of deferred member contributions is as follows:

	2014	2013 Restated (Note 2)
	\$	\$
Balance, beginning of year		
Deferred member contributions – current	434,819	601,941
Deferred member contributions – long term	7,195,646	4,968,770
	7,630,465	5,570,711
Contributions received	60,549,541	66,004,732
Contributions receivable	14,324,691	2,339,534
Contribution revenue recognized	(69,571,578)	(62,783,253)
Amounts received previously recognized	(2,339,534)	(3,821,793)
Change related to capital contributions	(364,377)	320,534
	10,229,208	7,630,465
Balance, end of year		
Deferred member contributions – current	(184,386)	(434,819)
Deferred member contributions – long term	10,044,822	7,195,646

8. Deferred capital contributions

	2014	2013
	\$	\$
Balance, beginning of year	2,828,844	3,149,378
Contributions for the purchase of capital assets	1,316,340	591,174
Less amortization into revenue	(951,963)	(911,708)
Balance, end of year	3,193,221	2,828,844

9. Pension and other post-employment benefit plans

Effective January 1, 2009, the NWMO offers certain benefits to employees and retirees. A brief overview of these benefit plans is set out below:

(a) Registered pension plan

The registered pension plan is a contributory defined benefit plan covering most employees and retirees. The Plan is funded, and fund assets include pooled funds that are managed by Connor, Clark and Lunn. The benefit costs and assets related to this plan are recorded in the NWMO's financial statements.

(b) Supplementary pension plan

The supplementary pension plans are defined benefit plans covering certain employees and retirees. The plan is unfunded.

(c) Other post-employment benefit plans

These other post-employment benefit plans provide medical, dental, and group life insurance coverage for certain groups of full-time employees who have retired from the NWMO.

The most recent actuarial valuation in accordance with CPA Canada Handbook Section 3463 of the registered pension plan, supplementary pension plan and other post-employment benefit plans was completed as of December 31, 2013. The liability as at December 31, 2014, is based on an extrapolation of the previous valuation.

A funding valuation, which was completed for the pension plan as of January 1, 2014, reported a surplus of \$23 million on a going concern basis and a deficit of \$1 million on a solvency basis.

The significant actuarial assumptions for benefit obligation and costs adopted in estimating the NWMO's accrued benefit obligations are as follows:

	Registered pension plan		Supplementary pension plan		Other post-employment benefit plans	
	2014	2013 Restated (Note 2)	2014	2013 Restated (Note 2)	2014	2013 Restated (Note 2)
	%	%	%	%	%	%
Discount rate at the beginning of the period	6.0	6.0	4.8	4.0	4.8	4.0
Salary schedule escalation rate	3	3	3	3	-	-
Rate of cost of living increase	2	2	2	2	-	-
Rate of increase in health-care cost trend	-	-	-	-	5.7	6.5
Discount rate at the end of the period	6.0	6.0	4.1	4.8	4.1	4.8
Average remaining service life for employees	15 years	14 years	15 years	15 years	15 years	15 years

9. Pension and other post-employment benefit plans (continued)

Information for the NWMO's pension and post-employment benefits, including long-term disability ("LTD") is as follows:

	Registered pension plan		Supplementary pension plan		Other post-employment benefit plans	
	2014	2013 Restated (Note 2)	2014	2013 Restated (Note 2)	2014	2013 Restated (Note 2)
	\$	\$	\$	\$	\$	\$
Changes in accrued benefit obligation						
Accrued benefit obligation, January 1	(42,678,000)	(36,737,000)	(3,032,200)	(2,846,200)	(12,069,000)	(11,885,000)
Current service cost	(1,737,000)	(1,557,000)	(243,000)	(283,000)	(967,000)	(1,084,000)
Interest cost	(2,662,000)	(2,297,000)	(169,000)	(132,000)	(621,000)	(516,000)
Employee contribution	(919,000)	(890,000)	-	-	-	-
Benefits paid	729,000	738,000	104,000	144,000	86,000	80,000
Net actuarial gain (loss)	(108,000)	(1,935,000)	(1,111,000)	85,000	(2,082,394)	1,336,000
Accrued benefit obligation, December 31	(47,375,000)	(42,678,000)	(4,451,200)	(3,032,200)	(15,653,394)	(12,069,000)
Changes in plan assets						
Fair value of plan assets, January 1	66,367,000	51,073,000	-	-	-	-
Expected return on plan assets	4,117,570	3,202,000	-	-	-	-
Benefits paid	(729,000)	(738,000)	-	-	(86,000)	(80,000)
Net actuarial gain (loss)	3,490,000	7,269,000	-	-	-	-
Employer contribution	4,941,000	4,671,000	-	-	86,000	80,000
Employee contribution	919,000	890,000	-	-	-	-
Fair value of plan assets, December 31	79,105,570	66,367,000	-	-	-	-
Funded status						
Fair value of plan assets	79,105,570	66,367,000	-	-	-	-
Accrued benefit obligation	(47,375,000)	(42,678,000)	(4,451,200)	(3,032,200)	(15,653,394)	(12,069,000)
Accrued benefit asset (liability)	31,730,570	23,689,000	(4,451,200)	(3,032,200)	(15,653,394)	(12,069,000)
Short-term portion	-	-	(5,000)	(5,000)	(89,000)	(89,000)
Long-term portion	31,730,570	23,689,000	(4,446,200)	(3,027,200)	(15,564,394)	(11,980,000)
	31,730,570	23,689,000	(4,451,200)	(3,032,200)	(15,653,394)	(12,069,000)
Components of cost recognized						
Current service cost, net of employee contribution	1,737,000	1,557,000	243,000	283,000	967,000	1,084,000
Interest cost on accrued benefit obligation	2,662,000	2,297,000	169,000	132,000	621,000	516,000
Expected return on plan asset	(4,117,570)	(3,202,000)	-	-	-	-
Cost recognized	281,430	652,000	412,000	415,000	1,588,000	1,600,000

An amount of \$94,000 (2013 – \$94,000) that is included in accounts payable and accrued liabilities, is part of the total \$20,104,594 (2013 – \$15,101,200) accrued benefit liability at end of year of the supplementary pension and other post-employment benefits/LTD plans.

The pension and other post-employment benefit costs recognized are included in the respective expense categories in the Statement of operations.

Sensitivity information related to the other post-employment benefit plans is as follows:

	2014	2013
	\$	\$
Effect of 1% increase in health-care cost trends on		
Accrued benefit obligation	4,059,000	2,856,000
Service cost and interest cost	454,000	462,000
Effect of 1% decrease in health-care cost trends on		
Accrued benefit obligation	(2,994,000)	(2,127,000)
Service cost and interest cost	(324,000)	(338,000)

The supplementary pension plan is unfunded and is secured by a Letter of Credit (Note 4).

10. Deferred lease inducements

	2014	2013
	\$	\$
Tenant inducements	461,757	408,242
Less accumulated amortization	(336,552)	(277,645)
	125,205	130,597

11. Guarantees

In the normal course of business, the NWMO enters into agreements that meet the definition of a guarantee.

- (a) The NWMO has provided indemnities for various agreements. Under the terms of these agreements, the NWMO agrees to indemnify the counterparty for various items, including, but not limited to, all liabilities, loss, suits and damages arising during, on or after the term of the agreement.
- (b) The NWMO indemnifies all directors, officers and employees acting on behalf of the NWMO for various items, including, but not limited to, all costs to settle suits or actions due to services provided to the NWMO, subject to certain restrictions.

The nature of these indemnification agreements prevents the NWMO from making a reasonable estimate of the maximum exposure due to the difficulties in assessing the amount of liability which stems from the unpredictability of future events and the unlimited coverage offered to counterparties. Historically, the NWMO has not made any payments under such or similar indemnification agreements, and therefore, no amount has been accrued with respect to these agreements.

The NWMO also arranged a standby Letter of Credit to secure its supplementary pension plan (Note 9).

12. Operating leases

The NWMO has entered into a number of leases for office premises which expire at various dates up to July 31, 2017.

The estimated annual minimum payments over the initial term of these leases up to their expiration are as follows:

	\$
2015	895,058
2016	785,066
2017	393,671
	2,073,795

13. Segment reporting

The NWMO has two reportable segments as follows:

- » Federal mandated program (APM);
- » Other direct services outside its mandated programs, which include DGR and LLM for OPG, with service contracts which became effective January 1, 2009, and February 1, 2011.

Segment information is as follows:

Year ended December 31	APM		DGR/LLM		Total	
	2014	2013 Restated (Note 2)	2014	2013 Restated (Note 2)	2014	2013 Restated (Note 2)
	\$	\$	\$	\$	\$	\$
Contribution revenue	58,746,938	43,725,331	10,824,640	19,057,922	69,571,578	62,783,253
Interest income	41,862	39,359	10,717	17,683	52,579	57,042
Total revenue	58,788,800	43,764,690	10,835,357	19,075,605	69,624,157	62,840,295
Amortization of capital assets	882,702	776,265	69,261	135,443	951,963	911,708
Operating cost	57,906,098	42,988,425	10,766,096	18,940,162	68,672,194	61,928,587
Total cost	58,788,800	43,764,690	10,835,357	19,075,605	69,624,157	62,840,295
Expenditure for capital assets	1,196,526	513,632	119,813	77,542	1,316,339	591,174

The allocation of the common service costs to each function of the above segment is based on direct staff in each function.

14. Government remittances

Accounts payable and accrued liabilities include the following amounts with respect to government remittances:

	2014	2013
	\$	\$
Goods and services tax/harmonized sales tax (GST/HST)	1,206,774	982,800
Less GST/HST receivable	(522,922)	(253,558)
Net GST/HST payable	683,852	729,242

Commonly Used Abbreviations

AECL	Atomic Energy of Canada Limited
ALARA	As low as reasonably achievable
APM	Adaptive Phased Management
APM-GRG	Adaptive Phased Management-Geoscientific Review Group
CANDU	CANada Deuterium Uranium
CANHC	Canadian Association of Nuclear Host Communities
CLC	Community liaison committee
CNSC	Canadian Nuclear Safety Commission
CSR	Corporate Social Responsibility Program
EDRAM	International Association for Environmentally Safe Disposal of Radioactive Materials
GTS	Grimsel Test Site
HLW	High-level waste
HQ	Hydro-Québec
JOIN	Job Opportunity Information Network
MNO	Métis Nation of Ontario
NBPN	NB Power Nuclear
NEA	Nuclear Energy Agency
NFWA	<i>Nuclear Fuel Waste Act</i>
NSCA	<i>Nuclear Safety and Control Act</i>
NWMO	Nuclear Waste Management Organization
ONFA	<i>Ontario Nuclear Funds Agreement</i>
OPG	Ontario Power Generation, Inc.
Posiva	Finnish Nuclear Fuel Waste Management Company
SKB	Swedish Nuclear Fuel and Waste Management Company
UFTP	Used fuel transportation package
UNENE	University Network of Excellence in Nuclear Engineering
URL	Underground research laboratory

