



Progress Through Collaboration

Annual Report 2015

The logo for Nuclear Waste Management Organization (NWMO), featuring the lowercase letters 'nwmo' in a bold, white, sans-serif font.

nwmo

NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES



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NUCLEAR WASTE
MANAGEMENT
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SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES

**The Honourable James Gordon Carr
Minister, Natural Resources Canada
Ottawa, ON K1A 0A6**

March 2016

Dear Minister,

We are pleased to submit to you the annual report of the Nuclear Waste Management Organization (NWMO) for fiscal year 2015.

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,

A handwritten signature in black ink, appearing to read 'Pierre Charlebois'.

Pierre Charlebois
Chairman

A handwritten signature in black ink, appearing to read 'K. E. Nash'.


Kenneth E. Nash
President and CEO

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Corporate Overview

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.

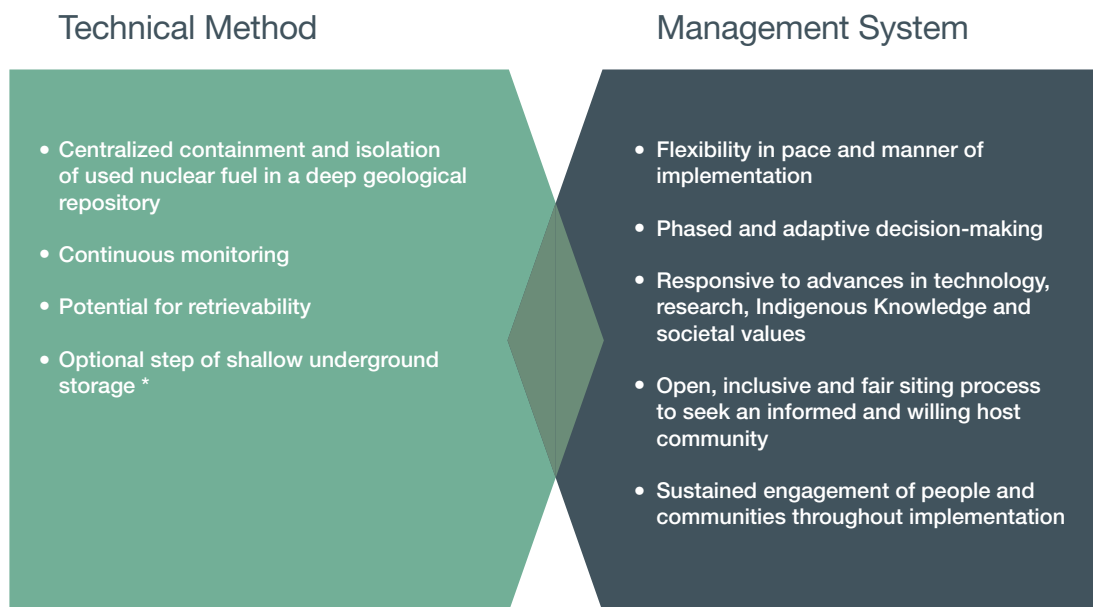
The *NFWA* required the NWMO to study approaches for the long-term management of used nuclear fuel and recommend to the Government of Canada a preferred approach. The NWMO initiated this study in 2002, and in 2005, after a three-year dialogue with Canadians from coast to coast, submitted to the Minister 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 or near where it is generated. Used nuclear fuel remains radioactive 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 Indigenous 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. In 2010, after extensive input from Canadians, that process was finalized. 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.

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, about 2.6 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 radioactive 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, as well as at Atomic Energy of Canada Limited (AECL) owned sites in Quebec, Ontario, and Manitoba.

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 engineered dry storage systems such as containers, silos or vaults.

Dry storage systems 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.

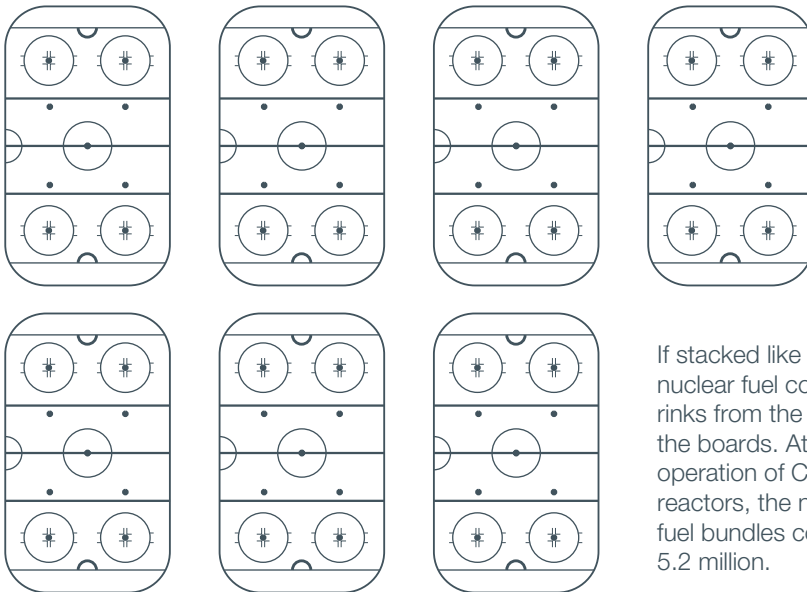
Currently, about 90,000 used nuclear fuel bundles are generated in Canada on average each year. A small amount of used nuclear fuel is also created at research and development facilities owned by AECL, and Canadian university facilities. If the entire inventory of used nuclear fuel bundles could be stacked 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.

The following table summarizes the inventory of nuclear fuel waste in Canada as of June 30, 2015.

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

CANDU Fuel Bundles



~2.6 million

There are currently just under 2.6 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 up to about 5.2 million.

Table 1: Summary of Nuclear Fuel Waste in Canada as of June 30, 2015

Location	Owner	Wet Storage (No. of Bundles)	Dry Storage (No. of Bundles)	Total (No. of Bundles)	Current Status
Bruce A	OPG ⁽²⁾	327,078	149,376	476,454	4 units operational
Bruce B	OPG ⁽²⁾	360,690	275,702	636,392	4 units operational
Darlington	OPG	335,779	153,917	489,696	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	32,801	97,140	129,941	Permanently shut down end of 2012
Pickering A	OPG	400,440	300,977	701,417	2 units operational, 2 units permanently shut down
Pickering B	OPG				4 units operational
Point Lepreau	NBPN	39,730	92,700	132,430	Operational
Whiteshell	AECL	0	2,268	2,268	Permanently shut down ⁽¹⁾
Chalk River	AECL	0	4,921	4,921	Mostly fuel from nuclear power demonstration (permanently shut down) and with small amounts from other CANDU reactors ⁽³⁾
Total		1,496,518	1,102,470	2,598,988	19 units in operation 7 units shut down (including prototype and demonstration reactors)

Notes:

AECL Atomic Energy of Canada Limited

HQ Hydro-Québec

NBPN New Brunswick Power Nuclear

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, 2.6 million bundles is equivalent to approximately 52,000 tonnes of heavy metal (t-HM – a standard unit for measuring quantities of used nuclear fuel which includes only the uranium and transuranic isotopes).

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.

Regulatory Oversight of Canada's Plan

The NWMO is committed to meeting or exceeding all applicable regulatory standards and requirements for protecting the health, safety and security of people and the environment.

Implementation of a deep geological repository falls within federal jurisdiction and will be regulated under the *Nuclear Safety and Control Act (NSCA)* and its associated regulations. The Canadian Nuclear Safety Commission (CNSC), as Canada's independent regulatory authority, regulates the use of nuclear energy and materials to protect the health, safety, and security of Canadians and the environment; and to implement Canada's international commitments on the peaceful use of nuclear energy. The CNSC also disseminates objective scientific, technical and regulatory information to the public.

Under section 26 of the *NSCA*, activities associated with a nuclear facility can occur only in accordance with a licence issued by the CNSC. The repository for Canada's used nuclear fuel will be subject to the CNSC's comprehensive licensing system, which covers the entire life cycle of the repository, from site preparation, to construction, operation, decommissioning (closure and postclosure), and abandonment (release from CNSC licensing). This stepwise approach will require a licence for each phase of the repository life cycle. The process for obtaining a "site preparation" licence will be initiated by the NWMO. The NWMO would submit an application for a Licence to Prepare Site (and possibly construct) to the CNSC. A licensing decision by the CNSC on a repository can be taken only after the successful completion of the environmental assessment, following the process established by the *Canadian Environmental Assessment Act, 2012*. More information about the CNSC's licensing process is available at www.cnscccsn.gc.ca.

The transportation of used nuclear fuel is jointly regulated by the CNSC and Transport Canada.

Although the CNSC is the main licensing authority, it administers its licensing system in co-operation with other federal and provincial government departments and agencies in areas such as health, environment, transport, and labour.

Relevant aspects of the NWMO's work will also comply with applicable provincial regulatory requirements. For example, some aspects of siting or construction of the project and the transportation of used nuclear fuel may be governed by provincial legislation:

- » Most provinces and territories include nuclear substances in legislation and regulations addressing the transportation of dangerous goods within that province or territory.
- » Provincial governments are responsible for protecting public health and safety, property and the environment within their borders, which often includes provincial emergency preparedness legislation.
- » Provincial governments are responsible for the regulation of resource exploration and/or extraction (e.g., drilling and underground mining) and Crown land management (e.g., disposition of provincial lands).
- » Provincial legislation requiring the assessment of potential environmental effects of an activity, plan or program may apply to some aspects of this work. Legislation governing endangered species, environmental protection, heritage protection or preservation, water resources protection, occupational health and safety, employment standards, or labour relations may be relevant.
- » Various permits, licences and approvals will be required, and provincial policies and guidelines may be applicable at the site selection stage.
- » Municipalities, which derive their authority from provincial legislation, may have requirements such as permits, codes, standards and/or bylaws that also need to be addressed.



Chairman's Message

In the pages that follow, the NWMO reports on its progress toward meeting its strategic objectives over the past year.

As the implementer of Canada's plan for the long-term management of used nuclear fuel, the NWMO has a number of unique responsibilities. Ensuring safety requires that all its work meets or exceeds the project's rigorous technical requirements. And because its mandate affects a large number of communities and groups, it must work closely with all interested Canadians to ensure the project is implemented in a way that is both transparent and socially acceptable.

With the completion, in 2015, of the first phase of Preliminary Assessments, all the communities remaining in the site selection process are now in a second and more intensive phase of assessment. Fieldwork has begun around several of those communities; engagement activities have been broadened to include people in the surrounding areas; and the NWMO's engineered-barrier system design has now entered the proof testing stage.

This increased commitment of resources has occurred under the close oversight of the Board of Directors, which in addition to setting the organization's strategic direction, has worked to ensure good governance and full accountability as Canada's plan moves forward.

Over the course of the year, the Board carefully reviewed progress against the organization's siting and proof testing project execution plans. It reviewed and approved the audited financial statements for 2015. As well, it set the direction for the organization's upcoming work, with reviews of the NWMO's budget for 2016, its performance objectives and measures for 2016, and its business plan for the next five years.

As in previous years, the Board reviewed and authorized all decisions about narrowing down the number of communities in the site selection process to areas with strong potential to meet the project's technical and social requirements. It closely monitored engagement activities supporting the siting process, and took a particular interest in broadening those activities to include First Nation and Métis communities and municipalities in areas surrounding interested communities.

The Board and Advisory Council met, and Council members shared their assessment of key issues and offered advice on managing priority areas. To ensure the Advisory Council's expertise continues to benefit the NWMO's work going forward, the Board of Directors reviewed the Council's membership and appointed four new members. Their expertise reflect the growing importance of addressing community well-being, and involving First Nation and Métis communities and surrounding municipalities in implementing Canada's plan.

With the Board's oversight, the NWMO revised its strategic objectives to reflect the evolving focus of its work. Two new objectives – transportation planning and the continuous improvement of technical knowledge – were accordingly added to the organization's strategic plan.

Again under the Board's oversight, the NWMO also added a new objective starting in 2016 – planning for the construction and operation of a Centre of Expertise and deep geological repository. This new objective will help communities plan for the greatly increased activities that will occur should their area be selected to continue to Detailed Site Characterization – the next step in the site selection process.

As well, the NWMO has a pre-licensing arrangement in place with the Canadian Nuclear Safety Commission for early involvement of the regulator in Adaptive Phased Management. This arrangement provides opportunities for the NWMO to obtain pre-licensing reviews of conceptual designs and illustrative postclosure safety assessments, as well as guidance to ensure that the repository will ultimately meet or exceed regulatory requirements.

As the NWMO intensifies both its technical and engagement programs, its Board of Directors will continue to ensure the organization's work is well-managed, respectful of the communities and groups that might be affected by it, and accountable to Canadians and Aboriginal peoples, now and in the future.

In the pages that follow, the NWMO reports on its progress toward meeting its strategic objectives over the past year. I urge you to learn more about its work, and become involved in ensuring Canada's used nuclear fuel is safely and securely managed over the long term.



Pierre Charlebois
Chairman



President's Message

The NWMO reached a major milestone with the completion of Phase 1 Preliminary Assessments as requested by 21 communities.

The past year was an especially successful one for the NWMO and the implementation of Canada's plan for safely managing used nuclear fuel over the long term. The organization made significant progress toward ensuring a sound technical basis for a deep geological repository where that fuel can be contained and isolated. At the same time, it continued to actively engage communities and the Canadian public in the process of selecting a site that is both technically sound and socially acceptable.

The NWMO's Council of Elders continued to play a crucial role in helping build and strengthen relationships with First Nation and Métis communities in potential siting areas. In addition to providing guidance about incorporating Indigenous Knowledge in the NWMO's engagement activities and fieldwork, members attended open houses and other events in and around communities that initiated their area's involvement in the site selection process. The NWMO's Municipal Forum also continued to provide valuable advice.

The NWMO reached a major milestone with the completion of Phase 1 Preliminary Assessments as requested by 21 communities. This work allowed the NWMO to narrow down the site selection process to a smaller number of communities with strong potential to enter into Phase 2 studies.

Phase 2 site selection work proceeded with significantly expanded regional engagement involving neighbouring municipal communities and local First Nation and Treaty Organizations.

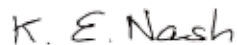
Geoscientific fieldwork, including airborne geophysical surveys and observation of general geological features, continued in several areas. Interested communities were directly involved in conducting these studies, as, importantly, were local First Nation and Métis communities.

The NWMO's engineered-barrier system (EBS) specifically designed for CANDU fuel was recognized with the Canadian Nuclear Society's 2015 Innovative Achievement Award. An extensive process to test and prove the safety performance of the EBS continued in 2015. Containers were fabricated, and several tests completed, including crush tests that demonstrated the container can withstand extreme pressure and performs as predicted.

Public interest in the NWMO's Used Fuel Transportation Package exhibit continued to be a focus of attention in every community it visited. Transportation logistics work identified methods it could consider for transporting the dry storage containers in which used fuel is currently stored in Ontario and the baskets in which the Atomic Energy of Canada Limited's used fuel is contained.

The NWMO's partnerships with universities, as well as nuclear waste management organizations in other countries, continued to ensure that its technical work is based on international best practice and is conducted in a cost-efficient way.

All these activities, from the NWMO's research partnerships to the studies it is carrying out with communities, are based on collaboration and mutual learning. In that spirit, I invite you to learn more about Canada's plan and become actively involved in its implementation.



Kenneth E. Nash
President and CEO





Our Work

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

The NWMO’s work in 2015 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 relationships;
- » Collaboratively implement the site selection process;
- » Optimize repository designs;
- » Continuously improve technical knowledge;
- » Develop transportation plans;
- » Provide financial surety; and
- » Ensure governance and accountability.

In addition to implementing APM, the NWMO has services contracts in support of the deep geologic repository for low- and intermediate-level waste proposed by Ontario Power Generation (OPG). These contracts include the regulatory approvals phase, as well as 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 2015: The Year at a Glance

Building Sustainable Relationships

Engagement with First Nation and Métis communities and nearby municipalities broadened as interested communities explored the potential of all three groups to work together to implement the project and benefit from it.

Collaboratively Implementing the Site Selection Process

The final Phase 1 Preliminary Assessments was completed. The narrowing-down process continued, allowing the NWMO to focus on sites with the strongest potential to meet the project's rigorous technical and social requirements.

Optimizing Repository Designs

The NWMO initiated multi-year proof testing of its recently developed engineered-barrier system design. The design was honoured with the Canadian Nuclear Society's 2015 Innovative Achievement Award.

Continuously Improving Technical Knowledge

In collaboration with the Natural Sciences and Engineering Research Council of Canada, the NWMO established new research partnerships with Western University and the University of Ottawa.

Developing Transportation Plans

The transportation engineering team continued advanced testing of its Used Fuel Transportation Package. As part of its ongoing dialogue and engagement, the NWMO organized a panel on transportation at the 2015 conference of the Canadian Nuclear Society, allowing nuclear experts and community representatives to learn about programs and plans for the safe and secure transportation of used nuclear fuel.

Providing Financial Surety

The NWMO performed its annual assessment of all factors that impact APM cost estimates and funding requirements, while also initiating a full update of the lifecycle cost estimate for the project.

Ensuring Governance and Accountability

NWMO staff formed part of the Canadian delegation to the fifth Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

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 construct a deep geologic repository facility for low- and intermediate-level radioactive 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. The NWMO will continue to adapt plans for the management of used nuclear fuel in response to evolving societal expectations and values, insight from Aboriginal Traditional Knowledge, and changes in public policies.

The NWMO seeks to involve a broad cross-section of individuals and groups in its planning and decision-making. This includes communities participating in the site selection process, First Nation and Métis communities, and municipalities in the surrounding areas, those who may be affected by transportation of used fuel, governments at all levels, and the youth who will one day assume responsibility for managing a project that spans several generations.

These relationships are an important means of keeping people informed about the project and involved in its planning. At the same time, they help the NWMO understand the values and priorities of Canadians, including those who could be affected by the project, and continue to guide the implementation of Canada's plan.

Understanding these priorities – and recognizing their potential to evolve over the course of the project – is key to implementing Canada's plan in a way that is both flexible and responsive. This principle of adaptive implementation is also why the NWMO closely monitors any changes in policy and the quantities as well as characteristics of used nuclear fuel that might affect its future work.



HIGHLIGHTS

FOR 2015

- » Over the course of the year, NWMO staff shared information about the project and encouraged people to become involved in planning and decision-making. Discussions with community members took place in a wide range of venues, including open houses, community events, and meetings of community liaison committees (CLCs).
- » The NWMO participated in 14 conferences of municipal associations and groups, in addition to dozens of events with interested municipalities and their community groups in each siting area.
- » The NWMO participated in more than 100 First Nation and Métis events, including powwows, conferences, general assemblies, and community events.
- » The NWMO introduced its Acknowledging Early Aboriginal Participation program to recognize communities that participated in Phase 1 Preliminary Assessments.
- » The NWMO acknowledged communities and participating neighbours that were screened out of the site selection process as a result of Phase 2 Preliminary Assessments.
- » The NWMO website underwent a major redesign to facilitate learning about Canada's plan and support involvement in the site selection process.
- » A range of material was introduced to support discussion about individual studies involved in Phase 2 Preliminary Assessments.

Acknowledging Leadership in Phase 2 Preliminary Assessments

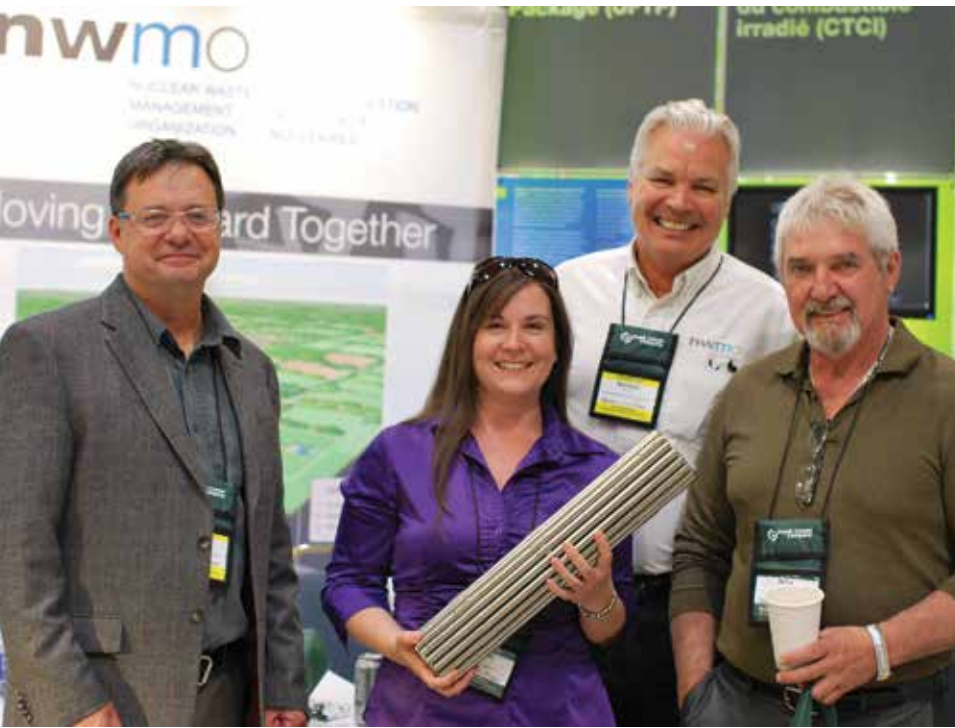
In February 2015, the communities of Creighton and Schreiber were screened out of the site selection process after Phase 2 assessments indicated geological complexities that reduce the likelihood of finding a suitable site in either area to safely host a used nuclear fuel repository. After careful thought, the NWMO acknowledged the substantial contribution made not only by Creighton and Schreiber, but also by their Aboriginal and municipal neighbours in advancing the site selection process on behalf of all Canadians.

Building Relationships With Interested Communities and Surrounding Municipalities

Building relationships involves learning about each other and considering the project together. The NWMO continues to have the privilege of learning from all the communities with which it works. This section addresses engagement activities with communities participating in the site selection process and municipalities in the surrounding areas. It is followed by a discussion of the NWMO's engagement with First Nation and Métis organizations and communities.

As part of building strong relationships in and around interested communities, NWMO staff participated in a wide range of local events, including open houses, events at local NWMO offices, meetings of CLCs, information sessions, and events organized by communities. Wherever possible, neighbouring communities – First Nation, Métis and municipal – were invited to attend and participate. Many of these meetings and events attended by NWMO staff focused on working with people in the area to learn about field studies, and develop their scope, location, and timing.

To help community members and the media learn more about Adaptive Phased Management (APM), the NWMO organized 20 tours of interim nuclear waste storage facilities, along with briefings about the project and site selection process.



Hornepayne Councillors (second and fourth from left) visit the NWMO's mobile transportation exhibit at the 2015 FONOM conference. The FONOM conference was one of 14 such conferences attended by NWMO staff over the course of 2015.

Municipal Forum and Municipal Associations

The NWMO's Municipal Forum, established in 2009 with the assistance of the Federation of Canadian Municipalities (FCM), met three times in 2015. It remained a valuable source of insight on municipal sensitivities and processes for areas currently involved in the site selection process, as well as those who may be involved in the future through transportation.

The NWMO's relationships with municipal associations, and participation in municipal association conferences, is an important means of understanding municipal needs and perspectives, and engaging with a wide range of communities in areas involved in the site selection process. As that process moves forward and regional engagement expands, municipal organizations and their conferences are providing an important opportunity to involve communities that may be located on future transportation routes.

The NWMO's long-standing practice of working with municipal associations and their members continued in 2015. These associations included the Federation of Northern Ontario Municipalities (FONOM), Northwestern Ontario Municipal Association, and Ontario Small Urban Municipalities.

Involving First Nation and Métis Communities and Organizations

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 interested 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 Indigenous Knowledge to its work in and around potential siting areas, and to help guide engagement with those communities.

In 2015, the NWMO continued to build new relationships with potentially affected First Nation and Métis communities in the province. At the same time, it maintained existing relationships with national, provincial and regional Aboriginal organizations.

Because each First Nation and Métis community is unique in its history, culture, and way of life, each has its own goals, aspirations, and perspectives on the potential for the project to benefit the area and promote community well-being.

More than a dozen First Nation and independent Métis communities participated in “Learn More” activities in 2015. A number of others, including Mississauga First Nation, Historic Saugeen Métis, and Eagle Lake First Nation, accepted the NWMO’s offer of a project briefing and update on the site selection process.

As in previous years, relationship agreements with Aboriginal organizations helped support broad-level First Nation and Métis participation in learning more about the project, capacity building, and two-way information sharing. The agreements also provided guidance and assistance in engaging with member communities.

For example, through its agreements with the Métis Nation of Ontario (MNO), the NWMO was able to brief MNO leaders and citizens in 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 Midland. The NWMO’s mobile transportation exhibit was on display, and NWMO staff made presentations about the transportation of used nuclear fuel and the use of a multiple-barrier system to safely contain and isolate used fuel over the long term.

As well, 11 First Nation and Métis organizations, including the MNO, 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.

In May, the NWMO introduced its Acknowledging Early Aboriginal Participation program. The program complements an earlier program offered to communities that had entered the site selection process and completed Phase 1 Preliminary Assessments. Under the program, communities that had participated in Phase 1 Preliminary Assessments were eligible to receive \$250,000 to support community well-being initiatives, such as programs for youth, elders and community sustainability. Eight communities accepted funding under the program in 2015.

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

Incorporating Indigenous Knowledge

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 understandings to the broad range of factors that should be considered in field studies, social assessments, and assessments of the benefits and effects to be managed.

Working in partnership with First Nation and Métis communities, the NWMO is committed to interweaving local Indigenous Knowledge in all phases of its work. In particular, the organization expects that integrating Indigenous 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.

As described in the chapter *Collaboratively Implementing the Site Selection Process*, the NWMO is currently working together with Aboriginal communities in potential siting areas to respectfully apply Indigenous 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.

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

Indigenous Knowledge

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

It emphasizes the interrelationships 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.

Council of Elders

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

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

The Council met four times in 2015.

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. They engaged with people in communities, explaining the role the Council plays in the NWMO's work and the guidance it has provided. Their presence at events has been well-received, and has helped strengthen relationships among the Council, First Nation and Métis communities, and other communities in the area.

The Council of Elders gathers for the opening ceremonies to its July meeting.



Strengthening Relationships With Federal and Provincial Governments

The NWMO continued to keep government officials informed about the project and the site selection process. At the same time, it worked with them to identify and plan for the many aspects of the project that may involve different levels of government. These aspects included potential permit requirements to advance fieldwork, the duty to consult Aboriginal peoples, and transportation.

In each jurisdiction, the NWMO worked with a lead ministry to engage across multiple ministries and departments. This approach helped streamline communications between the NWMO and government, and facilitated the co-ordination of efforts.

In addition to briefing government officials, the NWMO continued to brief elected representatives at both the federal and provincial levels.

Community volunteers plant cedars to help restore a river bank along the Pine River in Bruce County, Ontario. The trees were purchased locally by the Pine River Watershed Initiative Network. Funds from the NWMO's CSRP helped support their hard work.



Corporate Social Responsibility Program

The NWMO's Corporate Social Responsibility Program (CSRP) provides support to youth science organizations that help young Canadians enhance their appreciation of science and develop scientific skills. The CSRP's focus on enhancing the lives and skills of young Canadians reflects the NWMO's commitment to preparing them to assume leadership of a project whose implementation will span several generations.

Since 2014, the program has also been providing support to local initiatives that enhance community well-being in areas engaged in Phase 2 Preliminary Assessments. In 2015, the NWMO supported more than 80 such initiatives, including summer camps, festivals, educational initiatives, sports programs, an Aboriginal language camp, and Medicine Walks.

Support to Youth Science Organizations

The CSRP helped support three youth science initiatives in 2015: Scientists in School, Science North, and SHAD. Funding for Scientists in School and Science North helped provide classroom workshops in regions involved in the site selection process – the first for elementary schools in southern Ontario, and the second for elementary and secondary schools in northern Ontario. Funding for SHAD helped top science and technology students from Saskatchewan, Ontario, Quebec, and New Brunswick participate in SHAD’s summer educational program.

Further information about the CSRP is available online at www.nwmo.ca/csrp.



SHAD students on the McMaster University campus learn more about the project’s technical evaluation criteria.

Other Youth Engagement

NWMO staff participated in a wide range of activities designed to help young Canadians learn more about APM and become involved in implementing it. Over the course of the year, they made 16 presentations to elementary and high-school students in areas engaged in the site selection process.

Youth also participated in the NWMO's work through their membership in the Council of Elders and several of the CLCs. They participated in a wide range of events planned by communities to facilitate learning more about the project.

Building Understanding and Awareness of the NWMO's Work

The NWMO supports public engagement in Canada's plan by providing timely, accurate, and accessible information about the project and site selection process. To reach and engage with as many people as possible, it uses a wide variety of media, including print, physical exhibits, videos, and digital communications.

Printed Materials

As Phase 2 Preliminary Assessments advanced in 2015, the NWMO produced several new backgrounders designed to help communities understand the scope and types of fieldwork that might be conducted in their respective regions. These included backgrounders about detailed geological mapping, 2-D seismic surveys, and borehole drilling. The backgrounders on airborne geophysical surveys and observation of general geological features were updated.

As in previous years, existing publications were updated as new information became available. Notable examples included the NWMO's project description and transportation brochures, first published in 2012, and backgrounders on the Canadian multiple-barrier system, other countries' plans for managing radioactive waste, and financing for the APM Project.

The NWMO also launched a series of newsletters for distribution in communities participating in the site selection process. Published in local newspapers, these newsletters provided information about local events, the site selection process, and various aspects of the project. The NWMO's corporate newsletter, *NWMO News*, also continued to provide updates on the site selection process, the APM technical program, and collaborative work undertaken with universities and other nuclear waste management organizations.

Making It Easier to Learn About Canada's Plan

The NWMO continued to encourage public involvement in the project by making information available in a variety of locations and formats. Its physical exhibit was seen at 14 open houses conducted in 2015, as well as at many of the conferences attended by staff. The matching virtual exhibit, available online since 2014, was also made available in various community offices through the installation of touch screens. The mobile transportation exhibit, discussed in *Developing Transportation Plans*, continued to travel to communities interested in learning more about transportation aspects of the project, as well as to many of the conferences attended by community members.

The NWMO website underwent a major redesign in 2015, making it easier for users to access information and become involved in the project. The redesigned website is meant to make information more accessible to a wide audience while supporting ongoing engagement activities. The website expands the NWMO's capacity to answer questions, provide updates about its work, and engage with key audiences.

NWMO staff also responded to numerous media inquiries, both from national and international media, as well as outlets serving potential siting areas.

Dialogue With Citizens

What We Heard in 2015

The NWMO's website, engagement activities, and draft five-year implementation plans all provide an opportunity for people to learn more about Canada's plan and become involved in setting its direction. As part of its commitment to engagement and transparency, the NWMO publishes annual summaries of the questions, comments and feedback it receives. The summaries are publicly available on the NWMO's website (www.nwmo.ca) and include summaries of how the NWMO acted on what it heard.

To ensure its planning is responsive to evolving societal values, the NWMO welcomes input on its plans.

In 2015, as in previous years, the NWMO solicited broad public input on its corporate strategic objectives and associated activities for the next five years.

In response to input from communities and the public at large, the NWMO added a new strategic objective to its draft implementation plan for 2016 to 2020: planning for the construction and operation of a Centre of Expertise and a deep geological repository. The new objective was added in response to input indicating that communities wished to know more about the activities that they would be undertaking with the NWMO should they advance to the next step (detailed site evaluations) in the site selection process.

A visitor stops at the NWMO booth at the 2015 Ripley-Huron Fall Fair.



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 *Continuously Improving Technical Knowledge*.) The NWMO also monitors developments in used fuel reprocessing and the 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. 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.

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, as well as related activities in Canada and internationally.

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 byproduct with characteristics similar to used fuel.

International scientific consensus, as recognized by the International Atomic Energy Agency, the European Union, the Organisation for Economic Co-operation and Development Nuclear Energy Agency (NEA), and other international bodies, identifies deep geological disposal as the best practice for long-term management for used nuclear fuel and HLW.

Almost all countries with commercial nuclear power production are planning to isolate the byproduct 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.

Energy Policy

As 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 2015. It is posted online at www.nwmo.ca.

International Best Practice

NWMO staff continued to participate in the NEA's Radioactive Waste Management Committee. The NWMO was also represented in two working groups of the committee: the Integration Group for the Safety Case (IGSC) and the Forum on Stakeholder Confidence. The IGSC assists member countries in developing effective safety cases for deep geological repositories. The Forum works to facilitate sharing experience 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.

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, a project currently in its second phase. 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.





Collaboratively Implementing the Site Selection Process

Strategic Objective: The NWMO will implement collaboratively with communities the preliminary assessments of site suitability for locating a deep geological repository and Centre of Expertise in a safe location in an informed, willing host community.

Since 2010, the NWMO has been working collaboratively with interested communities to select a site where Canada's used nuclear fuel can be safely and securely contained and isolated over the long term. Those communities are now in Step 3 of a nine-step, multi-year site selection process. Step 3 is where the NWMO and interested communities move beyond technical desktop studies and initiate field studies. At the same time, there is a more intensive engagement of people in surrounding areas to help them learn more about the project, involve them in planning and decision-making, and explore whether there is potential to implement the project in partnership.

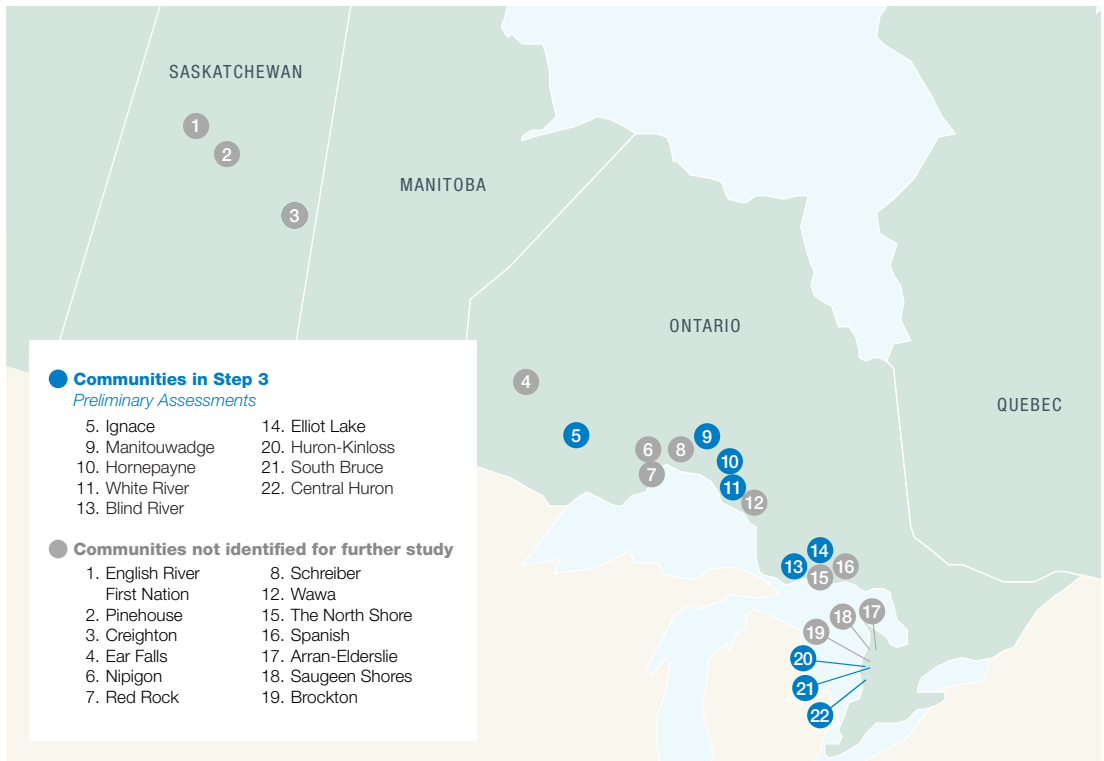
Preliminary assessments are conducted in two phases. Communities that successfully complete initial screenings (Step 2) can then request to proceed to a first phase of preliminary assessments (the beginning of Step 3). Between 2012 and 2015, the NWMO conducted 21 Phase 1 assessments. With these assessments now completed, the nine Ontario communities remaining in the site selection process are all engaged in a second and more intensive phase of preliminary assessments, supported by broadened engagement both within and around the communities.

Communities Learning More About Canada's Plan

The initiative to begin to explore the suitability of an area for the project came from communities expressing interest in learning more about Adaptive Phased Management (APM). This began a process of technical studies that identified potentially suitable study areas within and around those communities. Engagement and outreach are now broadening to engage First Nation and Métis communities and neighbouring municipalities in learning more about the project and becoming involved in decision-making.

HIGHLIGHTS FOR 2015

- » Phase 1 Preliminary Assessments were completed for the Ontario communities of Blind River, Central Huron, Elliot Lake, Manitouwadge, The North Shore, Spanish, and White River. Of these, areas around Blind River, Central Huron, Elliot Lake, Manitouwadge, and White River were identified for further study.
- » Airborne geophysical surveys of potential siting areas were conducted in the vicinities of Hornepayne, Manitouwadge and White River.
- » Phase 2 Preliminary Assessments were concluded in Creighton, Saskatchewan, and Schreiber, Ontario, after studies showed geological complexities that reduce the likelihood of finding a suitable site for a used nuclear fuel repository.
- » The NWMO launched a program to acknowledge First Nation and Métis communities and organizations involved in early stages of engagement and learning about Canada's plan.
- » More than 40 municipal, First Nation, and Métis community representatives participated in the annual conference of the Canadian Nuclear Society (CNS).
- » The NWMO recognized communities that participated in preliminary assessments and engagement in the areas of Creighton, Saskatchewan, and Schreiber, Ontario.
- » Detailed geological mapping was initiated in the vicinity of Ignace. An Indigenous Knowledge Program and ceremonies preceded fieldwork.



The Nine Steps of the Site Selection Process

Getting Ready	The NWMO publishes the finalized siting process.
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.
Step 2	Communities identify their interest in learning more, and the NWMO provides a detailed briefing and conducts an initial screening.
Step 3	For interested communities that successfully complete an initial screening, a preliminary assessment of potential suitability is conducted in two phases.
Step 4	Detailed site evaluations are completed in one site identified as having strong potential to meet project requirements in Step 3 Preliminary Assessments.
Step 5	Acceptance to host the repository is confirmed.
Step 6	Formal agreement to host the repository is ratified, subject to all regulatory requirements being met and regulatory approval received.
Step 7	An independent, formal and public process is conducted under the Canadian Nuclear Safety Commission's (CNSC) regulatory framework to ensure that all requirements are met (see <i>Regulatory Oversight of Canada's Plan</i>).
Step 8	Construction and operation of an underground demonstration facility proceeds.
Step 9	Construction and operation of the facility proceeds.

What Are Preliminary Assessments?

All the areas currently engaged in learning more about Canada's plan are undergoing preliminary assessments. In addition to assessing potential to meet the project's rigorous technical requirements, preliminary assessments also look at the project's possible impact on well-being, both in the community that requested the assessment and in the area as a whole.

Throughout all phases of work, resources are available to communities to cover costs associated with their participation in the site selection process.

The goal is to evaluate suitability from a wide variety of perspectives, integrating geoscientific, environmental, engineering, and transportation assessments with Indigenous Knowledge and community well-being studies. Evaluations are also informed by continuing input from all the communities that might be involved in implementing the project.

Preliminary assessments began with desktop studies of communities that have asked to learn more about Canada's plan and that have passed initial screenings. If these indicated a strong potential to meet the rigorous requirements of the project, a second phase of more detailed studies, including fieldwork, has been initiated.

Protecting People and the Environment

The NWMO's work must meet or exceed all applicable federal and provincial regulatory standards and requirements for protecting the health, safety, and security of people and the environment. As part of meeting this goal, the preliminary assessments carried out in Step 3 include a series of progressively more detailed and complementary studies designed to address the geological, environmental, transportation, and engineering suitability of potential siting areas.

Two types of geoscientific fieldwork were conducted in 2015: airborne geophysical surveys and detailed geological mapping. Both were conducted in areas located on crystalline rock. As in previous years, NWMO staff worked closely with people in potential siting areas to develop the scope, location and timing of field studies.

Airborne geophysical surveys of potential siting areas were conducted in the vicinities of the northern Ontario communities of Hornepayne, Manitouwadge and White River. Surveys were made in locations where earlier assessments suggested there might be large areas of land with the potential to meet the technical safety requirements for a deep geological repository. In these surveys, small, fixed-wing planes flew approximately 100 metres over the ground surface, allowing geoscientists to collect data about rock types, homogeneity, potential presence of faults and fractures, and the depth and extent of potentially suitable host rock formations.

Detailed geological mapping was started in potential siting areas around the northern Ontario community of Ignace. This fieldwork, also known as detailed outcrop mapping, builds on preliminary geoscientific studies completed in the area in 2014. It will help geoscientists develop a more detailed understanding of the structural character of bedrock in the area, including the type and location of fractures. The mapping will also provide additional information about the distribution

You May Also Want to Learn More About...

- » **Transportation planning.** Go to *Developing Transportation Plans*.
- » The NWMO's innovative **engineering program.** Go to *Optimizing Repository Designs*.
- » The NWMO's extensive **engagement activities.** Go to *Building Sustainable Relationships*.

and thickness of overburden, or the looser materials that overlie bedrock in some areas.

Through ongoing reviews of approaches, criteria, and methods, the APM-Geoscientific Review Group (APM-GRG) continued to help ensure preliminary geoscientific assessments are planned and conducted according to best international practices. In 2015, the NWMO and APM-GRG had several meetings to review community-specific fieldwork plans, such as airborne geophysical surveys and geological mapping, as well as the interpretation and integration of collected field data. The APM-GRG continues to report that the NWMO approach to geoscientific site assessments follows or exceeds best international practices. Further information about the APM-GRG is available online at www.nwmo.ca/apm-grg.

Geoscientists conduct detailed geological mapping in the vicinity of Ignace, Ontario.



Fostering Well-Being

Beyond ensuring safety, the NWMO is committed to implementing Canada's plan in a way that contributes to the long-term well-being of the area in which the project is sited. The NWMO therefore conducts numerous engagement activities and assessments that focus on understanding both the long-term objectives and vision of the area and the potential for the project to advance these.

In Phase 1, the NWMO produced community profiles. These descriptions, produced in collaboration with each community that requested an assessment, provide a preliminary look at the vision, objectives, infrastructure, and characteristics of the community. The community well-being assessment then examines the project's potential to foster well-being in the community in light of actual conditions there. The last seven of these studies were completed in 2015.

Phase 2 assessments have begun the work of broadening this conversation to include First Nation and Métis communities and municipalities in the broader area. The NWMO continued to provide resources to engaged communities to facilitate their participation in these discussions. A program is also in place to support learning by neighbouring communities. The goal is to better understand the vision people in the area have for their future and then address ways in which the project might best fit with that vision. A more detailed analysis of potential economic and other effects of the project will help inform discussions of how the well-being of the area as a whole might be fostered.

What is Community Well-Being?

Each community has its own unique definition of well-being. Many factors go into that definition, including economic considerations, population growth, and cultural and spiritual values. The NWMO is committed to working with communities to foster their well-being as *they* define it.

The mobile transportation exhibit pays a visit to Blind River. The Blind River Community Liaison Committee was one of the CLCs that helped arrange for the exhibit to come to their communities in 2015.



Community Liaison Committees

Community liaison committees (CLCs) are an important local resource for communities in Step 3 of the site selection process. Appointed by their local municipal councils, these working groups help their communities stay informed about the project and be involved in the site selection process. Toward that end, they help plan open houses and other information sessions, invite guest speakers to make presentations, convene regular public meetings, and ensure local questions and concerns are addressed. They also publish newsletters and maintain websites. These can be accessed at www.clcinfo.ca.

As the site selection process has moved forward, CLCs have been playing an increasingly active role in encouraging people in the surrounding area to attend open houses, information sessions, and community events where they might learn more about the project and become involved in decision-making.

The NWMO helps defray administrative expenses of communities involved in the site selection process.

In 2015, CLCs in Phase 2 communities continued to involve people in the area in planning and conducting geoscientific fieldwork. This included identifying those who might have an interest or be affected, seasonal activities that might affect timing, and areas that might be culturally or ecologically sensitive.

Continuing Learning and Dialogue

To help communities learn more about the project, CLCs invited guest speakers, including Tom Isaacs, the lead advisor to President Obama’s Blue Ribbon Commission on America’s Nuclear Future; Jeremy Whitlock, the Manager of Non-Proliferation and Safeguards at Canadian Nuclear Laboratories; subject matter experts from the NWMO; and representatives from groups opposed to building a deep geological repository for used nuclear fuel.

As in previous years, staff from the CNSC travelled to communities to explain the Commission’s independent regulatory role. They did so at the request of the communities and at meetings organized by those communities.



Dr. Jeremy Whitlock, Manager of Non-Proliferation and Safeguards at Canadian Nuclear Laboratories, discusses radiation at a meeting of the Ignace Community Nuclear Liaison Committee.



The CNS conference in Saint John, New Brunswick, provides an excellent opportunity for representatives from areas learning more about APM to share experiences and learning.

Community Members From Siting Areas Attend the 2015 CNS Conference

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

The attendees included representatives from communities that initiated their area's involvement in the process, as well as many of their First Nation, Métis and municipal neighbours. Two members of the NWMO's Council of Elders attended, as did two of the Council's youth members.

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

Engaging and Working With First Nation and Métis Communities

In 2015, the NWMO significantly broadened its engagement with First Nation and Métis communities. It did so through a wide variety of activities, including information sessions, workshops, attendance at Aboriginal trade shows, participation in the annual conference of the CNS (described earlier in this chapter), and meetings with community members.

The NWMO continued to support First Nation and Métis communities in potential siting areas in the development of their understanding of how the project might align with their values and long-term objectives. The NWMO provided resources for communities to explore historical, current and future land use in their traditional territories. It also sought to understand how the project might proceed in a manner consistent with the communities' concepts of well-being.

The NWMO also worked closely with local First Nation and Métis communities to apply Indigenous Knowledge to its work in potential siting areas. A notable example was the participation of Wabigoon Lake Ojibway Nation in a comprehensive Indigenous Knowledge Program before detailed mapping activities began around Ignace. The program included Indigenous Knowledge Holders workshops, local First Nation guides, Cultural Awareness training, community feasts, and most importantly, the incorporation of ceremony prior to commencing any mapping activities.

As with all other communities, the NWMO's engagement of First Nation and Métis communities is based on the understanding that such activities are a two-way learning process; participation is not an indication of support for the project.



A member of the NWMO Aboriginal Relations team answers questions at an open house.

Looking Ahead

Over the next several years, as the NWMO continues to work with communities, there will be progressively more detailed assessments of potential siting areas. Questions and concerns about the safety of the project will continue to be an active part of dialogue with communities, and technical assessments will be complemented by a series of progressively more detailed studies to explore opportunities for the project to contribute to the long-term well-being of the area. The project's potential environmental, social, cultural, and economic effects will be explored, as well as the spiritual considerations and ways of life of people in the area.

Safety *and* well-being will be the basis for identifying a preferred site to be the focus of detailed site characterization (Step 4).

Not all communities that begin Phase 2 assessments will necessarily complete them. Decisions may be made to conclude studies in an area if at any point they suggest that the community does not have potential to meet the project's rigorous technical and social requirements.

Throughout, all work will be planned and conducted in collaboration with interested communities, First Nation and Métis communities in the area, and surrounding municipalities. The project will only proceed with their involvement.



The NWMO is presented with the Canadian Nuclear Society's (CNS) 2015 Innovative Achievement Award for its leading-edge work in developing an EBS for safely containing and isolating used CANDU fuel over the long term.



Optimizing Repository Designs

Strategic Objective: The NWMO will conduct testing to prove that engineered barriers meet all safety requirements and can be produced effectively and efficiently.

A deep geological repository will contain and isolate used nuclear fuel through a set of natural and engineered barriers. The engineered-barrier system (EBS) includes the used fuel bundle, the used fuel container, and the surrounding clay-based (“buffer”) layer. The overall repository is designed to ensure the containers can be safely emplaced and to work with the natural features of the geosphere.

In 2014, the NWMO’s repository engineering design program designed an EBS optimized for the CANDU fuel that will be contained and isolated in Canada’s deep geological repository. Since then, the design has been further optimized, in part to take advantage of current manufacturing capabilities. A proof testing program has also been initiated to demonstrate that the EBS can meet the project’s technical requirements.



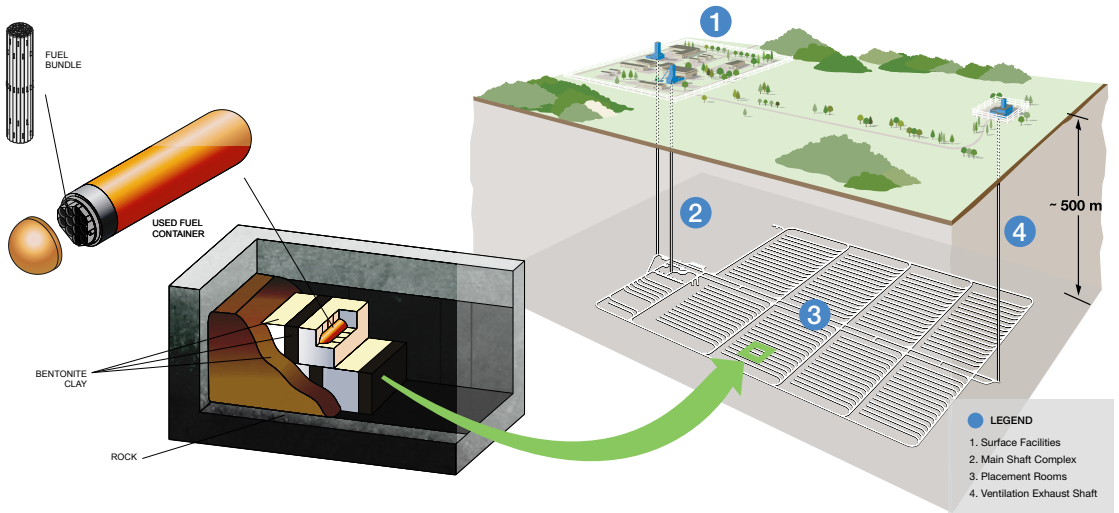
HIGHLIGHTS FOR 2015

- » Proof testing began on the EBS design.
- » The EBS designed by the NWMO's technical program received the CNS 2015 Innovative Achievement Award.
- » The NWMO designed a slip-skid pallet and mechanism for emplacement of the used fuel container.
- » Updates to the conceptual repository designs were completed.
- » Process tolerances for cold-spray copper production were established.
- » A full-scale buffer box was fabricated.
- » A full-scale prototype steel used fuel container was fabricated and pressure-tested.

Proof Testing of the NWMO's EBS Design

In 2015, the NWMO continued to further the design on elements of its EBS and demonstrate the performance of many of its components through the fabrication and testing of physical prototypes. The results of these tests further demonstrated the NWMO's ability to meet the rigorous requirements of the repository environment, as well as the ability to manufacture using proven processes and practices. Designs and prototypes were also developed for emplacement equipment required to place the buffer boxes underground.

The requirements of the container test facility were also further developed in 2015, with the facility to be established in 2016.



Conceptual Repository Designs

Conceptual repository designs were completed in 2015 to reflect the NWMO's EBS design for both crystalline and sedimentary environments. This included assessing the impacts of the EBS design on the repository layout, used fuel container handling, and surface facilities. The conceptual repository designs supported both the update to the lifecycle cost estimate (initiated in 2015) and further development of preliminary safety assessments.



A used fuel container is lowered into the isostatic press at the Applied Research Laboratory's High-Pressure Test Facility at Pennsylvania State University.

Used Fuel Container

In 2015, the NWMO continued with prototype used fuel container development and testing. This work included the fabrication of full-size copper-coated containers, as well as a steel prototype for the purpose of pressure testing. The steel used fuel container was placed in an isostatic press at the Applied Research Laboratory's High-Pressure Test Facility at Pennsylvania State University and was loaded to failure. The results demonstrated that the container can withstand loads in excess of those anticipated at repository depth and matched the predicted failure load from the NWMO's computer models.

The NWMO also advanced the assessment of process tolerances for the manufacturing of used fuel containers, as well as the development of non-destructive examination processes and equipment requirements.

Buffer Box

The buffer box consists of a carbon steel shell filled with highly compacted bentonite blocks. In 2015, the NWMO initiated the development and testing of bentonite blocks to be used to surround the used fuel container in the buffer box. An area of particular interest was demonstrating the required dry density of the bentonite block, and the ability to manufacture and assemble the buffer box within specification.

NWMO engineers worked with researchers at Pennsylvania State University to develop procedures for manufacturing large buffer blocks. Bentonite is pressed under very high pressure to form a large block. The block is then shaped to receive the used fuel container, with matching blocks on the top and the bottom.

A 3,000-kilogram block made of bentonite clay, freshly pressed at Pennsylvania State University.



Bentonite Placement

The NWMO made progress in the placement methods for bentonite pellets, or gapfill, that will be placed around the buffer boxes in the emplacement rooms underground. Bentonite powder is pressed into pellets, and these pellets are then placed by an auger into the void spaces around the buffer boxes until all space is filled. Small-scale placement trials were completed in 2015, and full-size mock-ups initiated for demonstration in 2016. The NWMO team has been exchanging data on bentonite placement with Nagra, Switzerland's radioactive waste management organization, to the benefit of both organizations.





Continuously Improving Technical Knowledge

Strategic Objective: The NWMO will continuously improve technical knowledge in collaboration with universities and international partners, and adapt plans consistent with international best practices.

The NWMO works closely with universities and other national waste management organizations to advance and share research on safely containing and isolating used nuclear fuel over the long term. Through these collaborative arrangements, the NWMO helps foster international co-operation on the development and demonstration of technology, learns from other countries' experience, and keeps abreast of developments in repository design and safety case development for different host rock formations.



HIGHLIGHTS FOR 2015

- » The NWMO, together with the Natural Sciences and Engineering Research Council of Canada (NSERC) and the University Network of Excellence in Nuclear Engineering (UNENE), initiated an Industrial Research Chair in Radiation-Induced Corrosion at Western University.
- » NSERC awarded a five-year grant to the NWMO and the University of Ottawa to establish a hydrogeochemistry centre of excellence in the university's new Advanced Research Complex.
- » NWMO researchers participated in collaborative research programs in international underground research labs, including the POST (fracture parameterization for repository design and postclosure analysis) project with Sweden and Finland, several experiments at Mont Terri in Switzerland, and the GAST (gas permeable seal test) experiment at Grimsel in Switzerland.
- » NWMO researchers published peer-reviewed journal articles, conference papers and technical reports.
- » The NWMO supported research projects with 15 Canadian university groups.



New in 2015

In 2015, the NWMO underscored the importance of its ongoing commitment to continuously improving technical knowledge by making it one of its seven planning priorities for the next five years. The new priority brings together in a single program stream the NWMO's long-standing work to contribute to and learn from best practices in Canada and other countries.

Geoscientific Research

The key objective of the NWMO's geoscience program is to advance the understanding of the geosphere, in both crystalline and sedimentary settings, as part of developing a safety case for a deep geological repository for used nuclear fuel.

Key activities in 2015 focused on the continued development and refinement of multidisciplinary surface-based site characterization and interpretative methods necessary to assess site-specific suitability for repository implementation and safety case development. Examples include:

- » The characterization of porewater composition in low permeability sedimentary and crystalline rocks to determine origin and residence time;
- » The assessment of glacial ice sheet and strong ground motions on the geomechanical stability of a deep geological repository;
- » The prediction of excavation damage zone generation and evolution as relevant to prevention and mitigation;
- » The international benchmarking of reactive mass transport codes used to predict ion diffusion and chemical reactions influencing radionuclide mobility;
- » The estimation of radionuclide sorption that retards migration under expected reducing electrochemical repository conditions; and
- » The characterization of fracture infill mineralogy as relevant to understanding the time history of fluid migration on geologic time scales.

Repository Safety

The objective of the repository safety technical program is to improve our understanding of the features and processes beyond geoscience that are important to safety.

The main activities in 2015 were the ongoing work to improve characterization of the properties of sealing materials, especially under highly saline groundwater conditions, and on the processes relevant to the long-term stability of uranium dioxide.

Other activities in 2015 included:

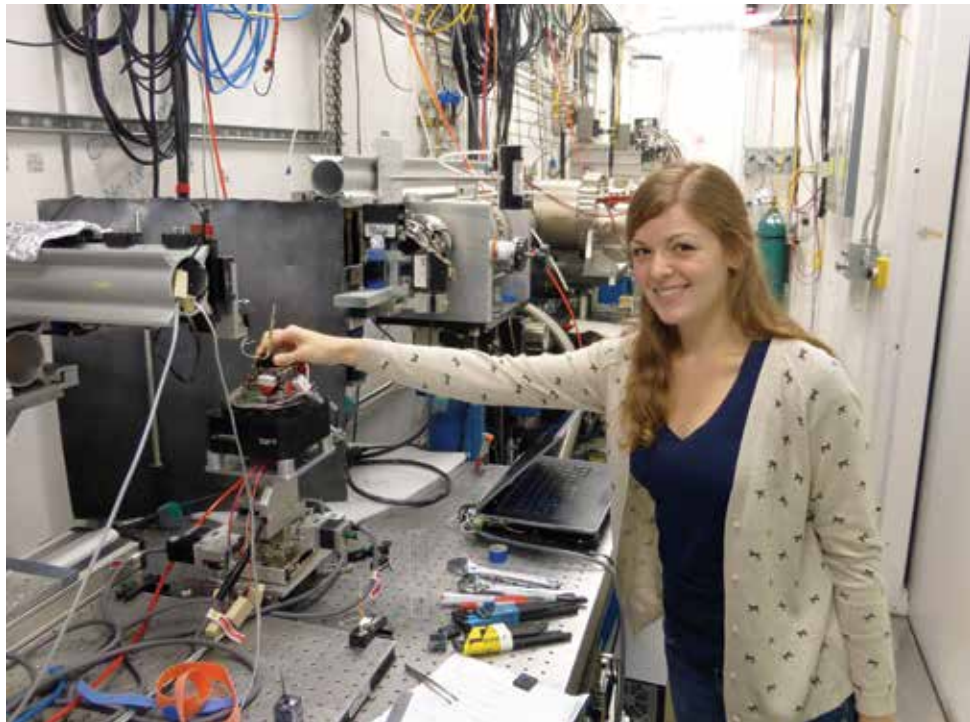
- » Support for prototype buffer/backfill tests underway at Grimsel and Mont Terri in Switzerland;
- » Development of capabilities for determining element solubilities; and
- » Documenting current perspective on assessing potential impacts on non-human biota.

Partnerships With Universities

Research partnerships with universities play an important role in ensuring the NWMO's technical work is scientifically rigorous. In 2015, NWMO supported research with 15 universities. This collaboration included continued support for some projects, as well as the establishment of new research programs.

A notable example is Prof. David Shoesmith, of Western University's Electrochemistry and Corrosion Studies program. Professor Shoesmith holds an NSERC/NWMO Industrial Research Chair in Used Fuel Disposal Chemistry. His work has focused on the durability of uranium dioxide, the main used fuel waste form, as well as on corrosion of copper and steel in the near-field region. One area of current research is the behaviour of the interface between the copper coating and steel shell.

NWMO-funded graduate student from Professor Shoesmith's research group performs tests at the U.S. Department of Energy's Argonne National Laboratory.



New Joint Research Programs With NSERC

In 2015, the NWMO supported the establishment of new research programs, in collaboration with NSERC.

A five-year Collaborative Research and Development grant to the University of Ottawa will allow geoscientists to conduct advanced research in the field of hydrogeochemistry. The work will be jointly funded by NSERC and the NWMO.

The research will be conducted at laboratories in the university's new Advanced Research Complex. The laboratories will be used both to develop and test new methods, and to advance knowledge in this field, which is relevant to geoscientific investigation and understanding of potential repository sites.

The program will also help train 14 graduate students and three post-doctoral fellows.

Researchers gather outside the University of Ottawa's Advanced Research Complex.





Dr. J. Clara Wren (fourth from right, front row) with her lab group at Western University.

Dr. J. Clara Wren, a professor in Western University's Department of Chemistry, was awarded a senior Industrial Research Chair in Radiation-Induced Corrosion. Her work will be jointly funded by the NWMO, NSERC and UNENE.

Dr. Wren's work covers research into understanding radiation effects in water and will include studies on the effect of radiation on the weld used to close used fuel containers.

A NSERC Collaborative Research and Development Grant was awarded to Prof. Ming Cai at Laurentian University to explore and test the application of geostatistical approaches for characterization of three-dimensional bedrock fracture network systems. The methodology is directed toward providing a direct linkage between field-observed fracture network patterns and numerical realizations of the enclosing repository geosphere. Co-funded by NSERC and the NWMO, the grant will support four graduate students and one postdoctoral research fellow.



A PhD student whose research is being funded by the NWMO discusses her findings at the sixth international conference on Clays in Natural and Engineered Barriers for Radioactive Waste Confinement.

International Partnerships and Networking

In 2015, the NWMO continued to conduct joint research projects with international organizations and its counterparts in other countries, including Sweden, Switzerland, Finland, France, and the United Kingdom.

These included the POST project with Sweden and Finland, several experiments at Mont Terri in Switzerland, and the GAST experiment at Grimsel, also in Switzerland.

Other Collaborative Work

In June, the NWMO hosted its 13th annual Geoscience Seminar. Fifteen universities sent representatives to this year's seminar, as did the Canadian Nuclear Safety Commission, the Geological Survey of Canada, and the nuclear waste management organizations of Finland, Sweden, Switzerland, and the United Kingdom. Ten graduate students whose work is being supported by the NWMO also made presentations.

Attendees at the
2015 Geoscience
Seminar.







Developing Transportation Plans

Strategic Objective: The NWMO will establish safe, secure and socially acceptable plans for transporting used nuclear fuel.

The NWMO's work includes designing and developing a transportation system for the safe and secure delivery of used nuclear fuel from the interim sites where it is currently stored to a deep geological repository where it can be contained and isolated over the long term. Two programs help the NWMO meet this important goal: a technical program that addresses all aspects of safety and security, and an engagement program that helps communities learn more about the transportation of used nuclear fuel and become involved in its planning.



HIGHLIGHTS FOR 2015

- » The NWMO initiated a review of logistics for transporting used nuclear fuel by road and rail from three Ontario Power Generation interim storage facilities to four Phase 2 siting regions.
- » A dose report for transportation workers was completed.
- » The NWMO co-organized a panel on transportation at the 2015 conference of the Canadian Nuclear Society (CNS).
- » The NWMO assessed several conceptual designs and selected one for development of a transportation package for used fuel stored in Atomic Energy of Canada Limited (AECL) designed baskets.
- » The NWMO initiated analytical fire and impact modelling of the new transportation package design.
- » Community learning continued, with the NWMO's mobile transportation exhibit visiting 15 communities and numerous conferences, including that of the 2015 CNS.

► New in 2015

This is the first year in which the NWMO has made transportation planning a strategic objective in its own right. This integrates into one program stream the NWMO's ongoing work to ensure Canada's used nuclear fuel is transported in a way that is safe, secure and socially acceptable.

A Strong International Track Record

For more than half a century, Canada and countries around the world have been safely transporting used nuclear fuel, using road, rail and water transport. In that time, there have been more than 20,000 shipments, with no serious injuries, health impacts, fatalities, or environmental consequences attributable to the radiological nature of used nuclear fuel shipments.

Technical Program

Used nuclear fuel transportation packages are designed and tested to ensure protection of the public and the environment during normal operations, as well as during accident conditions. There are several used nuclear fuel transportation packages certified for use in Canada, including the Used Fuel Transportation Package (UFTP) and the Dry Storage Container Transportation Package (DSC-TP). Before a transportation package can be used in Canada, the Canadian Nuclear Safety Commission (CNSC) must certify the design as meeting its regulatory requirements, which incorporate international safety standards issued by the International Atomic Energy Agency. The requirements include successfully passing tests designed to demonstrate the package's ability to withstand severe impact, fire and immersion in water.

In 2015, using state-of-the-art software to simulate thermal and impact scenarios, the NWMO began an intensive engineering training program for transportation package design and testing. This program reflects the NWMO's commitment to developing its own highly trained and skilled design team, rather than relying solely on outside vendors for transportation packaging. As part of the training program, staff attended an advanced course offered by the Lawrence Livermore National Laboratory for the U.S. Nuclear Regulatory Commission and Department of Energy. This course focused on package testing, verification and analysis.

The NWMO is also currently designing a third used nuclear fuel transportation package, suitable for transporting used fuel stored in the cylindrical AECL basket.

The NWMO continued to conduct studies of radiological dose to members of the public and transportation workers during the transport of a UFTP. Its initial assessment, prepared in 2012, was based on generic, internationally available exposure time, distance, and frequency assumptions. In 2015, these factors were refined by researchers at Carleton University to reflect Canadian road and development conditions. A study was completed for transportation workers and concluded that the dose to workers and the public during normal transport was below the CNSC regulatory limit of 1 milliSievert per year.

Engagement Program

The NWMO recognizes that communities have a strong interest in ensuring that used nuclear fuel is transported in a way that protects both their safety and well-being. Because of this, the NWMO works with communities to help them learn more about its transportation planning. At the same time, it has committed to seeking input from a wide variety of communities: those directly participating in the site selection process; First Nation, Métis and other communities in the surrounding areas; and as a group with a shared interest, communities on potential transportation routes.

The NWMO's Mobile Transportation Exhibit

The NWMO's mobile transportation exhibit, launched in 2013, features a full-size UFTP that has been certified by the CNSC. In addition to the UFTP, the exhibit provides information about aspects of transporting used nuclear fuel, including its safety record in Canada and other countries, regulatory oversight, and security measures.



Attendees at the 2015 CNS conference.

Talking About Transportation at the CNS Conference

The 2015 CNS conference provided an opportunity for community representatives to learn more about international best practices in transporting used nuclear fuel. The NWMO co-organized a panel on transportation, with panelists from the World Nuclear Transport Institute, the United Kingdom's EDF Energy, the CNSC, Ontario Power Generation, and the NWMO. The NWMO also organized a learning session for community representatives about the work underway to advance the NWMO's technical transportation program.

For more about community participation at the CNS conference, please see the chapter *Collaboratively Implementing the Site Selection Process*.

Learning More About Transportation

NWMO staff offered numerous briefings about transportation over the course of the year. Among those briefed were local residents, members of community liaison committees (CLCs), First Nation and Métis communities, and first responders in potential siting areas.

The NWMO's mobile transportation exhibit travelled to 15 communities, including First Nation and Métis communities. CLCs, first responders, local, provincial, and federal officials, and representatives of the media were among the visitors. The exhibit also travelled to numerous conferences, including that of the CNS.

NWMO attendance at municipal conferences (discussed in *Building Sustainable Relationships*) provided an important opportunity to engage groups of municipalities in learning about transportation plans and discussing areas of interest. A notable example was the annual conference of the Ontario Good Roads Association, where the NWMO hosted a booth that featured a scale model of a UFTP and videos on the transportation of used fuel.

To help communities and the general public learn more about the transportation of used nuclear fuel, the NWMO updated its transportation brochure (*Safe and Secure Transportation of Canada's Used Nuclear Fuel*), translating it into five Aboriginal languages, and produced a booklet answering frequently asked questions about transportation.



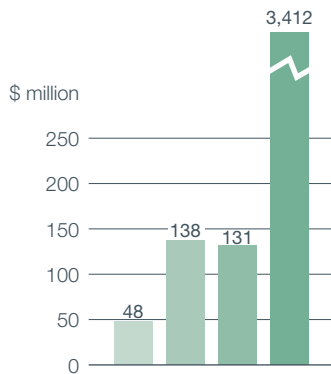


Providing Financial Surety

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 \$3.7 billion as of the end of 2015. 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 2015



Owner

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

Total: \$3,729 million



HIGHLIGHTS FOR 2015

- » The NWMO performed its annual assessment of all factors that impact Adaptive Phased Management (APM) cost estimates and funding requirements.
- » The NWMO determined 2015 trust fund contribution requirements in accordance with the funding formula.
- » The NWMO initiated a full update of lifecycle cost estimate for the APM Project.

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 sub-section 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 available for year 2015 total \$19.1 billion and are reviewed independently by the CNSC as part of the waste owner licence requirements. A large portion of these guarantees, approximately \$17.1 billion (as of year-end 2015), 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 APM program was completed in 2011. This estimate provides the basis for financial planning and trust fund deposits for future years.

In producing the 2011 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, 2016, present value, the estimate cost of APM is \$9.2 billion (for liabilities from 2016 onwards). Of the \$9.2 billion, approximately \$7.9 billion is the estimated cost of developing and building a repository, transporting the used fuel, and operating the repository for the 2.6 million fuel bundles produced as of the end of June 2015. The \$7.9 billion present value cost estimate of a deep geological repository for the 2.6 million used fuel bundles includes \$2.1 billion to develop the repository to a point of obtaining a construction licence and \$5.8 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 \$9.2 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 in 2016. 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 \$5.8 billion) must be funded through contributions to the *NFWA* trust funds established by OPG, HQ, NBPN and AECL. As of December 2015, the total value of these funds, including investment income, was approximately \$3.7 billion.

Budget Forecast for 2016 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 \$2.1 billion (as stated in present value as of January 1, 2016) 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 2016, the NWMO Board of Directors approved a budget envelope of \$76 million. Annual costs beyond 2016 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 2016 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.

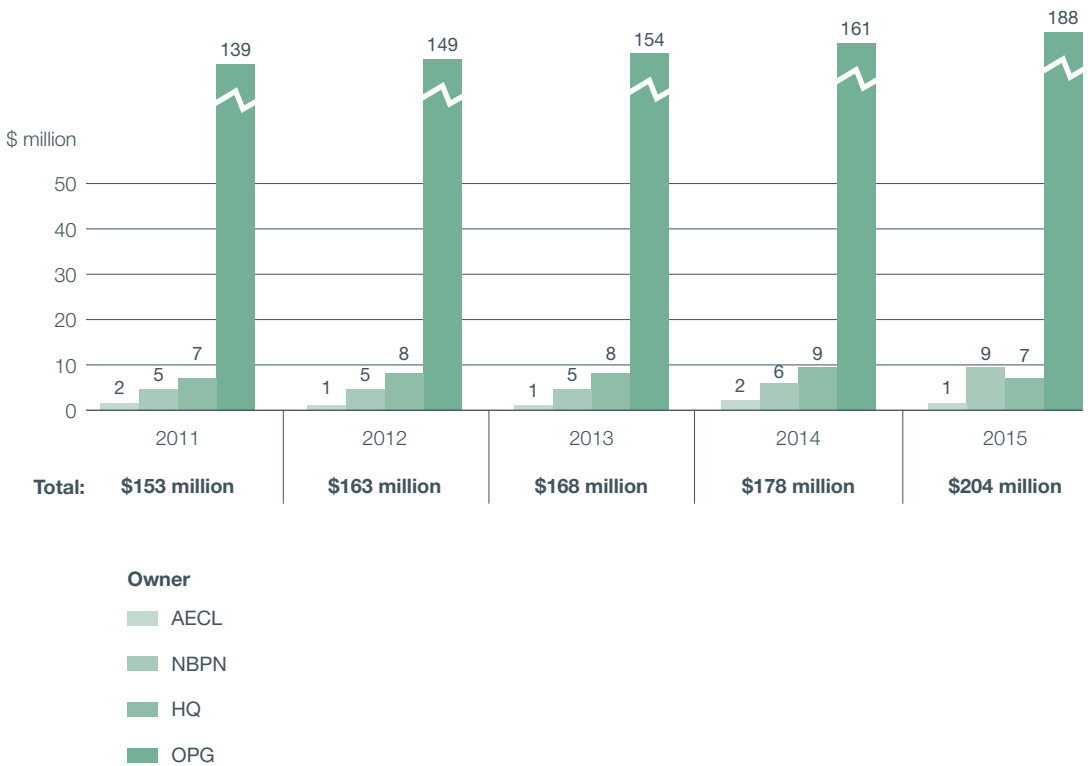
The NWMO proposed to apply the above principles to specific circumstances related to new owners and new reactors when they arise.

Trust Fund Deposits 2011 to 2015 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 2016 as Required by NFWA Section 16(2)(e)

The NFWA trust fund deposits for 2016 stated herein have been developed based on the funding formula for 2016. 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 2016 Trust Fund Deposits are shown in the table below.

Total Trust Fund Deposits: Year 2016

Owner	Trust Fund Balance (\$ million)	Deposits to Trust Funds (Committed and Future Bundles) (\$ million)*
	December 2015	2016
OPG	3,412	200
HQ	131	5
NBPN	138	10
AECL	48	1
Total	3,729	215

* 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 2016 shows a Financial Guarantee requirement of \$15,373 million. This will be satisfied by a 2015 year-end Used Fuel Fund balance of \$8,578 million, a Decommissioning Fund balance of \$7,828 million and a Provincial Guarantee of \$1,551 million for a total available guarantee of \$17,957 million.

The value of the OPG *NFWA* Trust Fund as of year-end 2015 is \$3,412 million. This value forms part of the segregated fund balance shown above.

Hydro-Québec

The HQ *NFWA* Trust Fund contained \$131 million as of December 31, 2015, and the fair value is estimated at \$153 million.

In addition to the trust fund, HQ has provided the CNSC with a Decommissioning Financial Guarantee of \$685 million 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 guarantee is in the form of an expressed commitment of the Province of Quebec to HQ that provides a guarantee of payment.

The *NFWA* Trust Fund and the Financial Guarantee provided by the Province of Quebec covered the future financial obligations as follows:

- » \$493 million for decommissioning and long-term management of low- and intermediate-level radioactive waste
- » \$315 million for used fuel

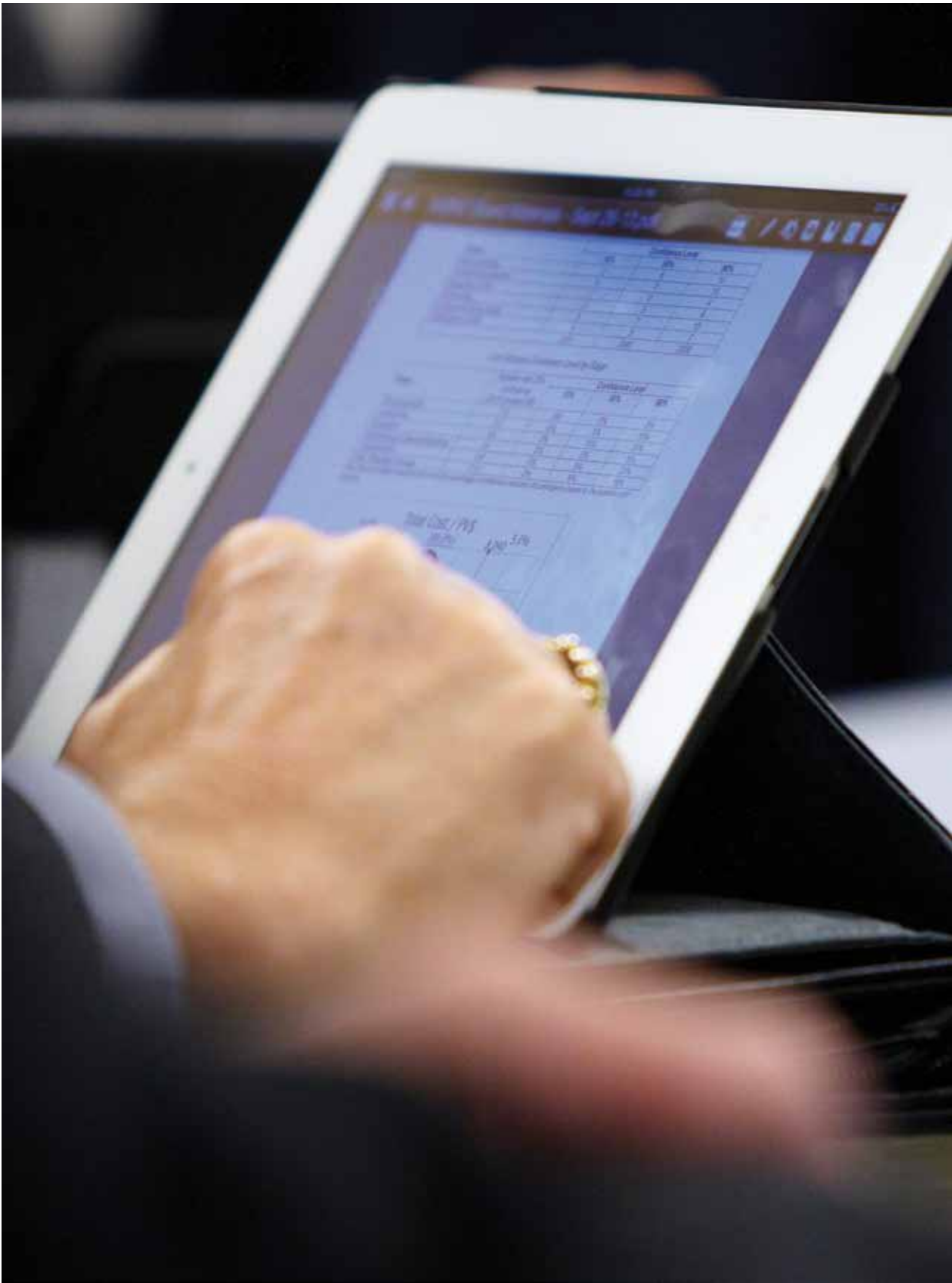
NB Power Nuclear

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 2015. 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, 2015, was approximately \$706 million and was comprised of the following:
 - Used Fuel Fund – \$262 million
 - Station Decommissioning Fund – \$306 million
 - *NFWA* Trust Fund – \$138 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 \$47.8 million as of December 31, 2015.





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.

Multiple layers of oversight and peer review help ensure the integrity of the NWMO's work. 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 NWMO's work.

In addition, a range of external reviews and reports, along with a robust management system, help ensure the integrity of the Adaptive Phased Management (APM) program.



HIGHLIGHTS

FOR 2015

- » NWMO staff formed part of the Canadian delegation to the fifth Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.
- » Through ongoing reviews of approaches, methods, and interpretation of data, the APM-Geoscientific Review Group (APM-GRG) continued to help ensure preliminary geoscientific assessments were conducted according to best international practice.
- » The NWMO's integrated management system was audited by an accredited organization and found to be compliant with Canadian (CSA) and international (ISO) management system standards.

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.

In March, the NWMO presented its annual report for 2014, *Progress Through Collaboration*, to the Honourable Greg Rickford, Minister of Natural Resources Canada.

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

The minister’s full statement can be viewed online at www.nrcan.gc.ca. The annual report is posted on the NWMO’s website at www.nwmo.ca.

Technical Review

The work of the APM technical program is reviewed annually to evaluate whether appropriate scientific and engineering approaches are in place to support the implementation of APM. Conducted by internationally recognized specialists, these reviews evaluate whether the NWMO's work in geoscience, safety assessment, and engineering technology development is consistent with the current international state of knowledge, and whether there is an adequate scientific, technical, and resource basis to implement APM.

In responding to peer review recommendations, the NWMO develops action plans whose progress can be publicly tracked. Reviews completed to date and the NWMO's responses are available at www.nwmo.ca.

Peer review on geological work associated with the project is provided by the APM-GRG, which was established in 2012. Its five members combine extensive multidisciplinary experience in areas relevant to siting deep geological repositories in both crystalline and sedimentary rock formations. In 2015, they continued to provide expert reviews of the approaches and methods used in preliminary geoscientific assessments, as well as in the interpretation of the results.

Further information about the APM-GRG is available online at www.nwmo.ca/apm-grg.

Quality Management

In 2015, the NWMO continued to execute work in accordance with its integrated management system. This system is designed to be compliant with Canadian and international management system standards such as CSA N286-12 (Management System Requirements for Nuclear Facilities) and ISO 9001:2008. The organization successfully completed re-certification and certification maintenance audits; retained certification to ISO 9001:2008; and was re-certified to ISO 14001:2004 and CSA Z1000:2006. Going forward, the management system will be updated to meet the requirements of the new ISO 9001:2015 standard for quality and the new ISO 14001:2015 standard for environment, which were issued in 2015.

NWMO Participation at the Joint Convention

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

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

As part of Canada's presentation, NWMO staff provided an update on progress made toward the long-term management of Canada's used nuclear fuel since 2012, the year of the most recent Review Meeting of the Joint Convention. The update included the current inventory of Canada's used nuclear fuel, the status of the site selection process, and information about the engineered-barrier system developed by the NWMO's repository engineering team.



Canadian delegation to the 2015 Joint Convention.





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 management 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 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, a licensing decision can only be taken after the successful completion of the environmental assessment process under the *Canadian Environmental Assessment Act (CEAA), 2012*. The NWMO's involvement in the project reflects its unique expertise in repository development. Once complete, OPG will assume operation of the repository.

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.

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.

Site Investigations

Groundwater and surface water monitoring at the proposed site continues to provide baseline data, which will be used for comparison purposes during site preparation, construction and operation of the proposed deep geologic repository.

One of the site features being monitored is the northeast marsh, which is a small wetland located near the proposed waste rock management area and stormwater management pond. Water levels in the marsh are monitored routinely year-round. The information collected will help verify that the marsh is not disturbed by the construction of the repository.

Data is also being collected on the quality and quantity of surface water flowing from the proposed site. Information on peak and average flows will be used to confirm the extent of predicted changes to flow as a result of regrading the site and constructing the stormwater management pond.



Regulatory Approvals

The Joint Review Panel (JRP) established in 2012 is responsible for (1) examining the potential environmental effects 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 May 2015, the JRP delivered its Report to the federal Minister of Environment for review and decision under the *CEAA*. Citing "a strong safety case," "highly suitable geology," and "robust engineering," it concluded that the "project is not likely to cause significant adverse effects on the health and safety of the public and workers taking into consideration the commitments made by OPG, the proposed mitigation measures, and the additional recommendations from the Panel".

Following the release of the report, the Canadian Environmental Assessment Agency invited public comments until September 1, 2015, on potential conditions related to possible mitigation measures and followup requirements that could be necessary should the project be authorized to proceed. A Decision Statement from the Minister of Environment is anticipated on March 1, 2016.

More information about the project and regulatory approvals process is available online at www.opgdgr.com.





The Organization





As of December 31, 2015, the NWMO had 145 people working for the organization, both at its Toronto headquarters and in different communities.

The Members

The NWMO was established in 2002 by Canada's nuclear electricity generators in accordance with 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, 2015, the Board was composed of nine directors. Mr. Pierre Charlebois served as Chairman, Mr. Wayne Robbins as Vice-Chair, and Mr. Kenneth E. Nash as President and CEO. Of the remaining five 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. Ronald L. Jamieson, Dr. Deborah C. Poff, and Ms. Beth Summers by Ontario Power Generation (OPG). Their biographies can be viewed online at www.nwmo.ca/board.

The Board of Directors convened four formal meetings in 2015. The minutes can be viewed online at www.nwmo.ca/board. At the request of the Advisory Council, a joint meeting of the Board and Council was also convened in 2015.

In 2015, the Board continued its close oversight of Canada's plan for the long-term management of used nuclear fuel. Among others, it reviewed:

- » Findings from preliminary assessments and decisions about narrowing down study areas to those with strong potential to meet the project's rigorous requirements;
- » Engagement activities to support the site selection process, including enhanced engagement with First Nation and Métis communities and municipalities in the vicinity of potential siting areas;
- » Project execution plans for site selection and proof testing;
- » The NWMO's business plan and budget for 2016 to 2020;
- » The audited financial statements for 2014;
- » The NWMO's performance objectives and measures for 2016;
- » Proof testing of the NWMO's recently completed engineered-barrier system design;
- » Progress in planning for the safe and secure transportation of used fuel to a deep geological repository; and
- » The membership of the Advisory Council.

Committees of the Board of Directors

Audit, Finance and Risk Committee

The committee met five times in 2015. The committee oversees external audits of the NWMO's financial statements. It also advises the Board annually on the selection of the auditor for the following year and the terms of the Audit Service Plan. Meetings are held with the auditor each year to discuss their findings.

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

- » The NWMO's 2016-2020 business plan and budget;
- » The plan for an updated Adaptive Phased Management (APM) Lifecycle Cost Estimate;
- » Key risks for the APM program, and for the licensing phase, and design and construction phase of OPG's Low- and Intermediate-Level Waste Deep Geologic Repository Project;
- » The NWMO's internal governance and audit systems;
- » The NWMO's 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, a special session of the committee was held to review the progress of the APM lifecycle cost estimate and reference plan update.

Two joint meetings of the Audit, Finance and Risk Committee, and the Human Resources and Compensation Committee were held during the year – the first to review the NWMO's pension plan funding and sustainability, and the second to review the NWMO's corporate performance for 2015 and corporate objectives for 2016.

As of December 31, 2015, there were three directors on the committee:

- » C. Ian Ross, Chair;
- » Ronald L. 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 2015. Its activities included reviews of:

- » Activities and progress associated with Phase 1 and Phase 2 Preliminary Assessments;
- » The NWMO's engagement program, including municipal and Aboriginal engagement in communities currently undergoing Phase 2 Preliminary Assessments;
- » The APM siting project execution plan;
- » Capacity-building plans in siting areas;
- » The work of the APM-Geoscientific Review Group;
- » Updates about the work of the Council of Elders;
- » Programs to recognize the contributions of communities upon completion of Phase 1 and Phase 2 studies;
- » Aboriginal and local procurement policies; and
- » The committee's charter.

As of December 31, 2015, there were five directors on the committee:

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

Human Resources and Compensation Committee

The committee met four times in 2015. It is responsible for overseeing the NWMO's human resources functions, including compensation practices, human resources policy, organization design, labour relations, and pension plan.

As of December 31, 2015, the committee had four directors:

- » C. Ian Ross, Chair;
- » Pierre Charlebois;
- » Josée Pilon; and
- » Deborah C. Poff.

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

The committee met once in 2015. It has responsibility for monitoring the NWMO's role in managing the regulatory approvals, engineering, procurement, and construction for 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 2015 included reviews of:

- » Updated regulatory approvals, and design and construction work plans;
- » Planning assumptions;
- » Recommendations of the Joint Review Panel on OPG's Low- and Intermediate-Level Waste Deep Geologic Repository; and
- » The 2016-2020 Business Plan finalized and approved by OPG.

As of December 31, 2015, the committee had four members:

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

Members of the Board of Directors

Chair

Pierre Charlebois

Vice-Chair

Wayne Robbins

President and CEO of the NWMO

Kenneth E. Nash

Ronald L. Jamieson

Darren Murphy

Josée Pilon

Deborah C. Poff

C. Ian Ross

Beth Summers



Pierre Charlebois,
Chair



Ronald L. Jamieson



Deborah C. Poff



Wayne Robbins,
Vice-Chair



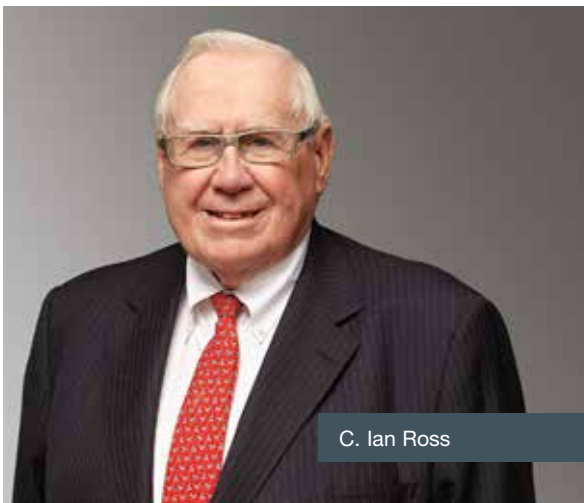
Kenneth E. Nash,
President and CEO



Darren Murphy



Josée Pilon



C. Ian Ross



Beth Summers

Officers and Executive Committee

Officers

Chairman of the Board

Pierre Charlebois

President and CEO

Kenneth E. Nash

Vice-Presidents

Michael Hung
Patrick Moran

Treasurer and Chief Financial Officer
General Counsel and Corporate Secretary
(until September 2015)

Kathryn Shaver
Jennifer Spragge
Derek Wilson

Vice-President, APM Engagement and Site Selection
Vice-President, Human Resources
Vice-President, Design and Construction

Executive Committee

Kenneth E. Nash
Paul Gierszewski
Marni Halter
Christopher Hatton
Michael Hung
Patrick Moran

President and CEO
Director, Safety and Licensing
Senior Counsel (since October 2015)
Director, Nuclear Design and Transportation
Treasurer and Chief Financial Officer
General Counsel and Corporate Secretary
(until September 2015)
Director, Environmental Assessment (until May 2015)
Vice-President, APM Engagement and Site Selection
Vice-President, Human Resources
Associate Vice-President, Aboriginal Relations
Vice-President, Design and Construction

Members of the Executive Committee







Advisory Council



As required by the *Nuclear Fuel Waste Act* (NFWA), the NWMO Board of Directors established an Advisory Council in 2002. In 2015, the Advisory Council comprised 10 members. The Honourable David Crombie continued to serve as Chair. The full Advisory Council membership is profiled online at www.nwmo.ca/advisory.

The Advisory Council is made up of people knowledgeable in nuclear waste management issues, and experienced in working with citizens and communities on a range of public policy issues. Current membership of the Advisory Council represents a broad range of expertise, including geotechnical engineering, chemical engineering, nuclear engineering, engagement, public affairs, nuclear community relations, environment, sustainable development, law, political science, municipal affairs and government relations, Aboriginal relations, Indigenous Knowledge, and community-based research.

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 analyses 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 on these are also published in the NWMO's triennial reports.

Council Operations

The Council meets with 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/advisory, along with the NWMO's responses to the Council's recommendations.

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 2015, the Board and Council held a joint meeting to facilitate the exchange of ideas and information.

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.

Advisory Council Membership

Appointments to the Council are guided by 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*.

In 2015, the NWMO Board of Directors appointed four new members to its Advisory Council: Mr. Joseph Cavalancia, Dr. Dean Jacobs, Ms. Diane M. Kelly, and Ms. Linda Thompson.

The Honourable David Crombie agreed to continue as the Advisory Council Chair, while Mr. David R. Cameron accepted the newly created position of Vice-Chair.

The NWMO gratefully acknowledges the important contributions of the members of the Advisory Council who completed their terms in 2015: Dr. Marlyn Cook, Dr. Wesley Cragg, Dr. Frederick Gilbert, and Mr. Michel R. Rhéaume.

Highlights of the Council's Activities in 2015

The Adaptive Phased Management Site Selection Process

Members were briefed on the progress of the site selection process throughout the year, with updates provided at each meeting on the status of the communities involved in Phase 1 and Phase 2 Preliminary Assessments. The Council discussed with management each set of findings from Phase 1 and Phase 2 Preliminary Assessments, along with interpretations and draft recommendations. Updates provided by management included reports on ongoing and upcoming fieldwork in Phase 2 study areas, as well as on engagement activities both in and around communities that initiated their area's involvement in the site selection process.

Management also reported on the NWMO's progress against its siting project execution plan for the multi-year period of Phase 2 site selection assessments. In each of its meetings, the Council discussed the components of Phase 2 siting studies and the programs of work planned to support selection of a preferred site by the end of those studies. At the same time, members had opportunities to ask questions, comment and provide advice about all areas of the site selection process. Members also provided input on how the NWMO should recognize community contributions in Phase 2. At the Council's request, management provided an update on how communities were using funds provided under the Community Well-Being Reserve Fund.

Council members encouraged the NWMO to continue to assist in fostering relationships among the municipal, First Nation, and Métis communities in each siting area. They felt the NWMO should have a solid understanding of the extent of support in remaining siting communities before areas are further screened out of the site selection process. Members also advised that the site ultimately selected for the project should be one in which communities share the NWMO's core corporate values.

The chair of the Adaptive Phased Management-Geoscientific Review Group (APM-GRG) made a presentation to the Council on the geoscientific assessments that are planned or underway in potential siting areas, and outlined the group's mandate, review process, findings, and future review plans.

Aboriginal Engagement

Relationships and interaction between interested communities and First Nation and Métis communities in the surrounding areas were discussed with management throughout the year. Management provided updates on the nature of agreements in place with First Nation and Métis communities and organizations, and the contributions of these agreements to supporting engagement, dialogue and learning about the APM Project.

Members were presented with an opportunity to comment on the NWMO's draft Indigenous Knowledge Policy. The Council continued to follow with interest the reports from recent Council of Elders meetings.

At Council's request, Chief Isadore Day from Serpent River First Nation (SRFN) was invited to the February meeting to discuss perspectives on Aboriginal Governance and Indigenous Law. Chief Day spoke about how the SRFN is developing a sustainable development decision-making model. In commenting on Chief Day's presentation, Council members observed that the focus on building communities' institutional capacity to decide on and implement projects is consistent with the NWMO's approach. They also encouraged the NWMO to continue to explore Aboriginal partnership models.

Transportation

The Council identified transportation as a crucial component of implementing Canada's plan. Several times during the year, management updated the Council on its transportation work. The Council reviewed plans and progress in both technical work and engagement to support the objective of establishing safe, secure, and socially acceptable plans for transporting used nuclear fuel to the preferred location for the deep geological repository. Members discussed how the NWMO's technical and engagement transportation work plans integrate with the overall site selection plan, and how that plan addresses safety issues. They were impressed by the NWMO's progress in developing Used Fuel Transportation Packages and underscored the public educational value of videos demonstrating the packages' robustness.

There was also the suggestion that the NWMO should continue to brief elected officials in Quebec and New Brunswick on the progress of APM, especially as it relates to the transportation of used nuclear fuel to an eventual deep geological repository.

Transparency

NWMO staff presented a revised Transparency Policy that reflected the Council's earlier advice. Council members proposed additional areas for the NWMO to review before finalizing policy, and management agreed to a further review of the policy based on the Council's discussion.

Technical Aspects of APM

At each meeting, members were briefed on progress in the NWMO's engineered-barrier system (EBS) design and proof testing program. At the Council's request, management provided an in-depth presentation on the EBS the NWMO has optimized for used CANDU fuel.

Evolving External Landscape

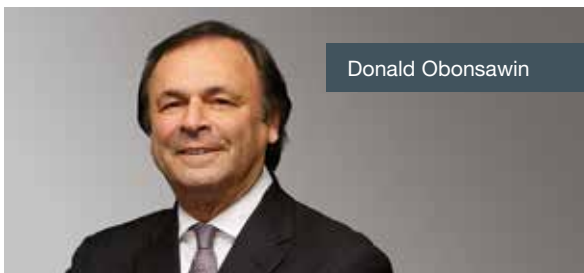
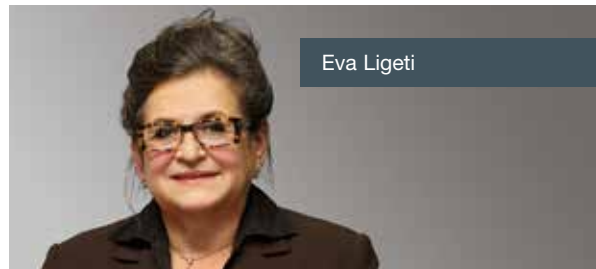
The Council discussed the 2014 events at the Waste Isolation Pilot Plant in Carlsbad, New Mexico. In answer to the Council's question, management reported that the NWMO had thoroughly reviewed all reports and recommendations related to those events.

The Council also had an interest in discussing developments related to alternative fuel cycles. At the Council's request, management made a presentation on the subject, and provided the organization's latest watching brief on reprocessing, partitioning, and transmutation. Members found this brief to be an effective communication tool and thought its impact might be enhanced by having it validated by independent sources.

Business and Strategic Planning

The Council had an opportunity to comment on the NWMO's five-year business plan and give advice to the Board of Directors on strategic issues facing the organization. On the Council's request, they met with the Board of Directors to have a discussion that centred on identifying trends in the broader external landscape in which the NWMO is operating, and gaining the Council's thoughts on key areas of advice it would like to provide to the NWMO in 2016. These included the NWMO's ethical and social framework, engagement, environmental policies, and transportation-related matters.

Members of the Advisory Council







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, 2016.

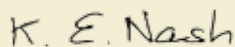
Management has a system of internal controls designed to provide reasonable assurance that the financial statements are accurate and complete in all material respects. The internal control system includes an established business conduct policy that applies to all employees. Management believes that the 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 fulfils 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, 2016



Kenneth E. 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, 2015, 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, 2015, 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
Licensed Public Accountants
February 19, 2016
Toronto, Ontario**

**Statement of financial position
as at December 31, 2015**

	2015	2014
	\$	\$
Assets		
Current assets		
Cash	1,915,785	4,954,918
Accounts receivable	150,751	2,216
Member contributions receivable (Note 5a)	5,784,851	14,324,691
Prepaid expenses and deposits	796,920	817,603
	8,648,307	20,099,428
Capital assets (Note 3)	3,456,844	3,193,221
Other assets (Note 4)	5,000	5,000
Deferred pension asset (Note 7)	36,726,610	31,730,570
	48,836,761	55,028,219
Liabilities		
Current liabilities		
Accounts payable and accrued liabilities (Note 12)	8,564,064	19,888,837
Deferred lease inducements (Note 8)	75,717	125,205
Deferred member contributions (Note 5b)	128,526	184,386
	8,768,307	20,198,428
Deferred capital contribution (Note 6)	3,456,844	3,193,221
Deferred member contributions (Note 5c)	10,495,462	10,044,822
Other post-employment and pension benefits liability (Note 7)	17,915,794	20,010,594
	31,868,100	33,248,637
Net assets	8,200,354	1,581,154
	48,836,761	55,028,219

Approved by the Board of Directors, February 19, 2016

K. E. Nash

Kenneth E. 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, 2015

	2015	2014
	\$	\$
Revenue		
Member cash contributions received (Note 4)	66,762,580	59,794,562
Non-member cash contributions received	411,744	754,979
	67,174,324	60,549,541
Change in deferred capital contributions (Note 6)	(263,623)	(364,377)
Change in long-term deferred member contributions (Note 5c)	(450,640)	(2,849,176)
Change in member contributions receivable (Note 5a)	(8,539,840)	11,985,157
Change in deferred member contributions (Note 5b)	55,860	250,433
Total contribution revenue (Note 11)	57,976,081	69,571,578
Interest income (Note 11)	12,761	52,579
Total revenue	57,988,842	69,624,157
Expenses		
Adaptive Phased Management		
Staffing and administration	24,467,493	23,067,846
Siting process	10,988,186	18,964,752
Design and development safety case	9,799,624	11,777,443
Building relationships	3,760,874	3,251,152
Governance structure	527,084	512,091
Adapting to change	216,874	332,815
	49,760,135	57,906,099
Deep Geologic Repository		
Regulatory review stage	2,930,513	6,266,087
Design stage	1,180,238	1,054,676
Staffing and administration	1,721,944	2,196,258
	5,832,695	9,517,021
Lifecycle Liability Management		
Contract services	141,067	47,634
Staffing and administration	1,197,382	1,201,440
	1,338,449	1,249,074
Amortization	1,057,563	951,963
Total expenses (Note 11)	57,988,842	69,624,157
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 year ended December 31, 2015

	2015	2014
	\$	\$
Excess of revenue over expenses for the year	-	-
Net assets, beginning of year	1,581,154	1,392,154
Remeasurements during the year:		
Deferred pension asset	2,341,000	3,382,000
Other post-employment and pension benefits liability	4,278,200	(3,193,000)
Net assets, end of year	8,200,354	1,581,154

Statement of cash flows year ended December 31, 2015

	2015	2014
	\$	\$
Operating activities		
Cash received from contributions	67,174,324	60,549,541
Interest received	12,761	52,579
	67,187,085	60,602,120
Cash paid for salaries and benefits, materials and services	(68,805,209)	(60,755,881)
	(1,618,124)	(153,761)
Investing activities		
Purchase of capital assets	(1,421,009)	(1,191,991)
Net decrease in cash	(3,039,133)	(1,345,752)
Cash, beginning of year	4,954,918	6,300,670
Cash, end of year	1,915,785	4,954,918

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

Notes to the financial statements

December 31, 2015

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* (“NFWA”), 2002, 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 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 byproduct 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. 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 Chartered Professional Accountants Canada (“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 4).

Capital assets

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

Furniture and office equipment	7 years
Transport and work equipment	7 years
Vehicles	5 years
Computer equipment and software	3 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 shortfall 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:

2. Significant accounting policies (continued)

Pension and other post-employment benefits (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 as indicated in Note 7. 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 the end of the year.
- (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.

3. Capital assets

			2015	2014
	Cost	Accumulated amortization	Net book value	Net book value
	\$	\$	\$	\$
Land	10,000	-	10,000	-
Computer equipment and software	3,334,893	2,098,076	1,236,817	1,295,137
Furniture and office equipment	2,113,420	1,701,066	412,354	605,465
Leasehold improvements	2,234,099	1,700,238	533,861	836,000
Transport and work equipment	503,420	66,735	436,685	200,047
Vehicles	374,231	190,965	183,266	256,572
Construction in progress	643,861	-	643,861	-
	9,213,924	5,757,080	3,456,844	3,193,221

Construction in progress relates to an office building that is being renovated and is not amortized. Amortization will commence once the asset is ready for use.

4. Related party transactions, balances and other information

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

			2015	2014
	APM	LLM/DGR	Total	Total
	\$	\$	\$	\$
Transactions during the year				
Member contributions received				
Ontario Power Generation Inc.	54,450,000	7,996,580	62,446,580	55,961,950
New Brunswick Power	2,069,000	-	2,069,000	2,029,153
Hydro-Québec	2,247,000	-	2,247,000	1,803,459
	58,766,000	7,996,580	66,762,580	59,794,562

4. 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, 2015, are presented below. Revenues, expenses, net income, and cash flows from operating, financing and investing activities for the year ended December 31, 2015, were \$Nil (2014 – \$Nil).

	2015	2014
	\$	\$
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	-	-

5. 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:

	2015	2014
	\$	\$
Ontario Power Generation	5,583,884	13,486,796
New Brunswick Power	200,967	474,406
Hydro-Québec	-	363,489
	5,784,851	14,324,691

(b) Deferred member contributions

Deferred member contributions are made up of the following:

	2015	2014
	\$	\$
Atomic Energy of Canada Limited	117,697	184,386
Hydro-Québec	10,829	-
	128,526	184,386

(c) Long-term deferred member contributions

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

	2015	2014
	\$	\$
Deferred pension asset	36,726,610	31,730,570
Other post-employment benefits	(17,915,794)	(20,010,594)
Pension and other post-employment benefit liabilities – short term (Note 7)	(115,000)	(94,000)
Less remeasurements and other items in net assets	(8,200,354)	(1,581,154)
	10,495,462	10,044,822

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

(d) Continuity of deferred member contributions

The continuity of deferred member contributions is as follows:

	2015	2014
	\$	\$
Balance, beginning of year		
Deferred member contributions – current	184,386	434,819
Deferred member contributions – long term	10,044,822	7,195,646
	10,229,208	7,630,465
Contributions received	67,174,324	60,549,541
Contributions receivable	5,784,851	14,324,691
Contribution revenue recognized	(57,976,081)	(69,571,578)
Amounts received previously recognized	(14,324,691)	(2,339,534)
Change related to capital contributions	(263,623)	(364,377)
	10,623,988	10,229,208
Balance, end of year		
Deferred member contributions – current	(128,526)	(184,386)
Deferred member contributions – long term	10,495,462	10,044,822

6. Deferred capital contributions

	2015	2014
	\$	\$
Balance, beginning of year	3,193,221	2,828,844
Contributions for the purchase of capital assets	1,321,186	1,316,340
Less amortization into revenue	(1,057,563)	(951,963)
Balance, end of year	3,456,844	3,193,221

7. 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 and other post-employment benefit plans was completed as of December 31, 2014, and as of December 31, 2013, for the supplementary pension plan. The liability as at December 31, 2015, is based on an extrapolation of the previous valuation.

A funding valuation, which was completed for the pension plan as of January 1, 2015, reported a surplus of \$32.8 million on a going concern basis and a deficit of \$1.8 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	
	2015	2014	2015	2014	2015	2014
	%	%	%	%	%	%
Discount rate at the beginning of the period	6.0	6.0	4.1	4.8	4.1	4.8
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	-	-	-	-	5.3	5.5
Discount rate at the end of the period	6.0	6.0	4.2	4.1	4.2	4.1
Average remaining service life for employees	13 years	14 years	13 years	13 years	15 years	15 years

7. 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	
	2015	2014	2015	2014	2015	2014
	\$	\$	\$	\$	\$	\$
Changes in accrued benefit obligation						
Accrued benefit obligation, January 1	(47,375,000)	(42,678,000)	(4,451,200)	(3,032,200)	(15,653,394)	(12,069,000)
Current service cost	(1,781,000)	(1,737,000)	(309,000)	(243,000)	(1,205,000)	(967,000)
Interest cost	(2,940,000)	(2,662,000)	(209,000)	(169,000)	(686,000)	(621,000)
Employee contribution	(955,000)	(919,000)	-	-	-	-
Benefits paid	692,000	729,000	74,000	104,000	131,000	86,000
Net actuarial gain (loss)	1,060,000	(108,000)	82,800	(1,111,000)	4,195,000	(2,082,394)
Accrued benefit obligation, December 31	(51,299,000)	(47,375,000)	(4,812,400)	(4,451,200)	(13,218,394)	(15,653,394)
Changes in plan assets						
Fair value of plan assets, January 1	79,105,570	66,367,000	-	-	-	-
Expected return on plan assets	4,819,040	4,117,570	-	-	-	-
Benefits paid	(692,000)	(729,000)	-	-	(131,000)	(86,000)
Net actuarial gain (loss)	1,281,000	3,490,000	-	-	-	-
Employer contribution	2,557,000	4,941,000	-	-	131,000	86,000
Employee contribution	955,000	919,000	-	-	-	-
Fair value of plan assets, December 31	88,025,610	79,105,570	-	-	-	-
Funded status						
Fair value of plan assets	88,025,610	79,105,570	-	-	-	-
Accrued benefit obligation	(51,299,000)	(47,375,000)	(4,812,400)	(4,451,200)	(13,218,394)	(15,653,394)
Accrued benefit asset (liability)	36,726,610	31,730,570	(4,812,400)	(4,451,200)	(13,218,394)	(15,653,394)
Short-term portion	-	-	(19,000)	(5,000)	(96,000)	(89,000)
Long-term portion	36,726,610	31,730,570	(4,793,400)	(4,446,200)	(13,122,394)	(15,564,394)
	36,726,610	31,730,570	(4,812,400)	(4,451,200)	(13,218,394)	(15,653,394)
Components of cost recognized						
Current service cost, net of employee contribution	1,781,000	1,737,000	309,000	243,000	1,205,000	967,000
Interest cost on accrued benefit obligation	2,940,000	2,662,000	209,000	169,000	686,000	621,000
Expected return on plan asset	(4,819,040)	(4,117,570)	-	-	-	-
Cost recognized	(98,040)	281,430	518,000	412,000	1,891,000	1,588,000

An amount of \$115,000 (2014 – \$94,000) that is included in accounts payable and accrued liabilities is part of the total \$18,030,794 (2014 – \$20,104,594) accrued benefit liability at the end of the year for 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:

	2015	2014
	\$	\$
Effect of 1% increase in health-care cost trends on		
Accrued benefit obligation	2,940,000	4,059,000
Service cost and interest cost	585,000	454,000
Effect of 1% decrease in health-care cost trends on		
Accrued benefit obligation	(2,217,000)	(2,994,000)
Service cost and interest cost	(417,000)	(324,000)

The supplementary pension plan is unfunded and is secured by a Letter of Credit of \$5,810,500 (2014 – \$4,790,500) issued by OPG.

8. Deferred lease inducements

	2015	2014
	\$	\$
Tenant inducements	461,757	461,757
Less accumulated amortization	(386,040)	(336,552)
	75,717	125,205

9. 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 issued by OPG to secure its supplementary pension plan (Note 7).

10. Operating leases

The NWMO has entered into a number of leases for office premises which expire at various dates up to August 31, 2018.

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

	\$
2016	920,206
2017	459,311
2018	24,000
	1,403,517

11. 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:

	APM		DGR/LLM			Total
	2015	2014	2015	2014	2015	2014
	\$	\$	\$	\$	\$	\$
Contribution revenue	50,728,815	58,746,938	7,247,266	10,824,640	57,976,081	69,571,578
Interest income	10,661	41,862	2,100	10,717	12,761	52,579
Total revenue	50,739,476	58,788,800	7,249,366	10,835,357	57,988,842	69,624,157
Amortization of capital assets	979,340	882,702	78,223	69,261	1,057,563	951,963
Operating cost	49,760,136	57,906,098	7,171,143	10,766,096	56,931,279	68,672,194
Total cost	50,739,476	58,788,800	7,249,366	10,835,357	57,988,842	69,624,157
Expenditure for capital assets	1,292,703	1,196,526	28,483	119,813	1,321,186	1,316,339

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

12. Government remittances

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

	2015	2014
	\$	\$
Goods and services tax/harmonized sales tax ("GST/HST")	739,700	1,206,774
Less GST/HST receivable	(357,387)	(522,922)
Net GST/HST payable	382,313	683,852
Workplace Safety and Insurance Board premiums payable	758	-
	383,071	683,852

nwmo

NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES