



Implementing Adaptive Phased Management 2009 to 2013



January 2009

nwmo

NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES

Contents

02	Preface	10	Strategic Objectives
03	Executive Summary		Building Relationships
04	The Organization		Building Knowledge
06	Adaptive Phased Management		Technical Research
08	Priorities for 2009 to 2013		Social Research
			Financial Surety
			Review, Adjust and Validate Plans
			Governance Structure
			Building an Implementing Organization
			Collaborative Design and Initiation of a Siting Process
		23	The Road Ahead
		24	Glossary

Preface

In June 2008, the Nuclear Waste Management Organization (NWMO) published *Implementing Adaptive Phased Management 2008 to 2012*, its first five-year plan describing how it will begin to implement Adaptive Phased Management, Canada's plan for the safe long-term care of used nuclear fuel. This document is the first annual update to the plan and covers the period 2009 to 2013.

The Plan begins with an overview of the NWMO and Adaptive Phased Management, and then presents highlights of our work program in seven key areas. Our progress in 2008 will be described in the NWMO's Annual Report for 2008, to be published in March 2009.

The NWMO invites all interested individuals and organizations to get involved in the implementation of Adaptive Phased Management. Ideas and comments about our plans and work are always welcome and can be sent by mail or submitted to our website at www.nwmo.ca.

Executive Summary



In June 2007, the Nuclear Waste Management Organization (NWMO) was given responsibility for implementing Adaptive Phased Management (APM), Canada's plan for the long-term care of used nuclear fuel. APM links a technical method with a management system that can embrace change in technology and science, societal values and public policy. Technically, APM has as its end-point the containment and isolation of used nuclear fuel in a deep repository constructed in a suitable rock formation. From the management perspective, collaboration, continuous learning and adaptability will underpin the implementation of APM as it unfolds over many decades. All aspects of the NWMO's work will meet or exceed all applicable regulatory standards and requirements for protecting the health, safety and security of humans and the environment.

This Implementation Plan describes how the NWMO will continue to build a sustainable implementing organization through strengthening of its governance structure, policies and internal capabilities; supporting technical and social research; designing the process to decide where to contain and isolate Canada's used nuclear fuel for the long-term; and engaging Canadians meaningfully in all these activities.

The Plan is founded upon the NWMO's seven strategic objectives. It describes initiatives that we intend to undertake in a coordinated and systematic way in each of these seven areas over the period 2009 to 2013.

This update for the period 2009 to 2013 confirms the Plan as a living document that is regularly assessed, strengthened and redirected in the face of new information, advances in technology and science, changes in societal values and evolving public policy.



STRATEGIC OBJECTIVES

Seek to build long-term relationships with interested Canadians and Aboriginal people.

Advance technical and social research.

Develop and refine a funding formula and trust fund deposit schedules that address financial surety and long-term program funding.

Continually review, adjust and validate plans.

Continue to develop and maintain a governance structure.

Build NWMO as an implementing organization.

Proceed with the collaborative design of a process for site selection.

The Organization

NWMO Vision: The long-term management of Canada's nuclear waste in a manner that safeguards people and respects the environment, now and in the future.

The Government of Canada, through the *Nuclear Fuel Waste Act* (2002), assigned responsibility for the long-term management of Canada's used nuclear fuel to the NWMO. Established to operate on a not-for-profit basis by Canada's major nuclear fuel waste owners, Ontario Power Generation, Hydro-Québec and NB Power Nuclear,¹ the NWMO's mission 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.

The organization began in 2002 as a study group to examine approaches for the long-term care of used nuclear fuel. In 2007, it was given responsibility to implement the government's selected approach, Adaptive Phased Management.

The NWMO is now building a multi-disciplinary team with a range of experience in the fields of social and technical research, public engagement, communications, finance and governance. We continue to collaborate with an extensive network of consultants, practitioners and academics from across Canada and around the world to ensure that our work benefits from the best available knowledge.

We believe that the trust and the credibility that the NWMO achieved in the study phase have earned the NWMO the social licence to implement Adaptive Phased Management.

NWMO is guided by five fundamental 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.

¹ In 2004, through a transfer order, the Government of New Brunswick assigned responsibility for all aspects of the provincially-owned nuclear generating assets to a new subsidiary corporation, NB Power Nuclear.



USED NUCLEAR FUEL

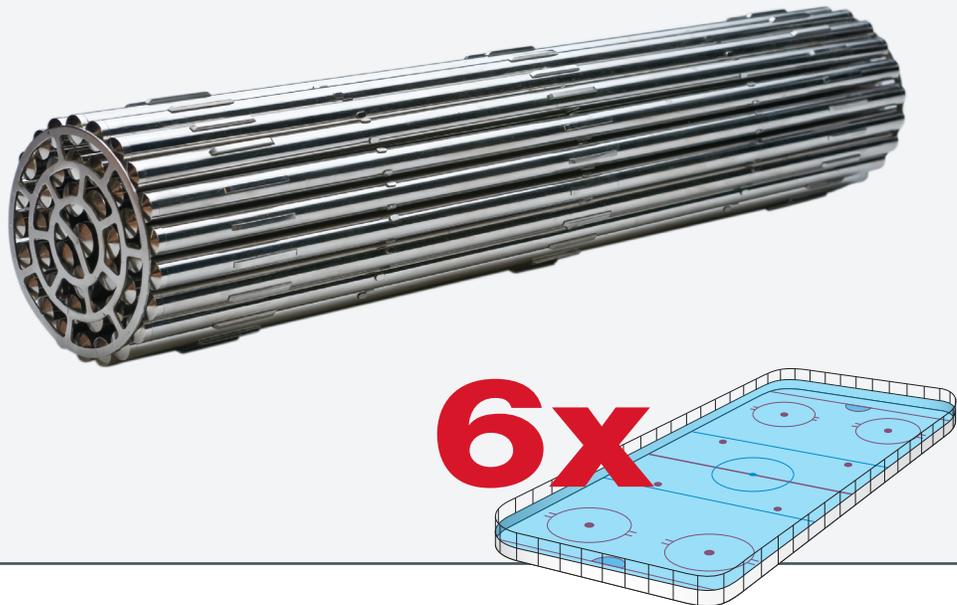
Used nuclear fuel remains radioactive for a long period of time, and the material must be contained and isolated from people and the environment essentially indefinitely. Canada's used nuclear fuel is presently safely managed in facilities licensed for temporary storage at nuclear reactor sites in Ontario, Québec and New Brunswick, and at Atomic Energy of Canada Limited's nuclear research site in Manitoba.

Over 40 years, Canada's nuclear power program has produced just over two million used fuel bundles. Each fuel bundle is about the size and shape of a fireplace log, weighing approximately 24 kilograms.

If the entire current inventory of used fuel bundles could be stacked end-to-end like cordwood, it would fit into a space the size of about six hockey rinks from the ice surface to the top of the boards.

When a fuel bundle is removed from a reactor, it is first placed in a water-filled pool for seven to 10 years where its heat and radioactivity decrease. Afterwards, used bundles are typically placed in dry storage containers, silos or vaults.

About 85,000 used nuclear fuel bundles are generated in Canada each year. The NWMO has the 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.



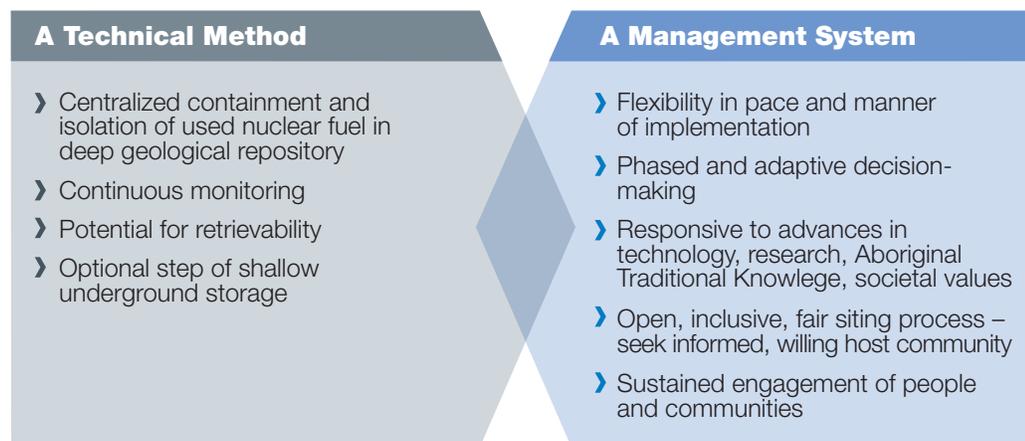
Adaptive Phased Management

Adaptive Phased Management (APM) is the Government of Canada's selected approach for the safe long-term care of used nuclear fuel. APM links a technical method to a management system that can embrace changes in technology and science, societal values and public policy.

Technically, APM has as its end-point the containment and isolation of used nuclear fuel in a deep repository constructed in an appropriate geological formation. APM will be implemented in phases each marked by explicit decision points with opportunities for input by Canadians. Collaboration, continuous learning and adaptability will underpin implementation as it unfolds over many decades.

Implementation of APM falls within federal jurisdiction and is regulated under the *Nuclear Safety and Control Act (NSCA)* and its associated regulations. Under the *NSCA*, a licence must be obtained from the Canadian Nuclear Safety Commission (CNSC) to prepare a site for a nuclear facility, as well as for its construction, operation, decommissioning or abandonment. A licensing decision by the CNSC for APM implementation will only be made after the Environmental Assessment process has been completed under the *Canadian Environmental Assessment Act*. The transportation of used nuclear fuel would be regulated by the CNSC and Transport Canada. The studies and documentation required for each of these assessments and licence applications will be addressed in future implementation and work plans. All aspects of the NWMO's work will meet or exceed all applicable regulatory standards and requirements for protecting the health, safety and security of humans and the environment.

APM moves towards a goal that Canadians themselves identified: safe and secure long-term containment and isolation of used nuclear fuel produced in Canada, with flexibility for future generations to make their own decisions.



Canadians' objectives for the long-term management of used nuclear fuel, as identified during the study phase:

FAIRNESS » To ensure fairness (in substance and process) in the distribution of costs, benefits, risks and responsibilities, within this generation and across generations.

PUBLIC HEALTH AND SAFETY » To protect public health from the risk of exposure to radioactive or other hazardous materials, and from the threat of injuries or deaths due to accidents.

WORKER HEALTH AND SAFETY » To protect workers from and minimize hazards associated with managing used nuclear fuel.

COMMUNITY WELL-BEING » To ensure the well-being of all communities with a shared interest.

SECURITY » To ensure the security of facilities, materials and infrastructure.

ENVIRONMENTAL INTEGRITY » To ensure that environmental integrity is maintained over the long term.

ECONOMIC VIABILITY » To ensure the economic viability of the waste management system, while simultaneously contributing positively to the local economy.

ADAPTABILITY » To ensure a capacity to adapt to changing knowledge and conditions over time.

Priorities for 2009 to 2013

The NWMO began the transition from a study group to a sustainable organization equipped with the resources and capability to implement Adaptive Phased Management (APM) in 2007.

Over the period 2009 to 2013, the NWMO will continue to build the organization to strengthen the governance structure and policies, build capabilities, continue its extensive technical and social research programs, and continue to engage Canadians meaningfully in these activities. In 2008, we began to work collaboratively with Canadians to design the process for deciding where to contain and isolate Canada's used nuclear fuel over the long term.

The NWMO is also preparing to adapt its plans in response to the possibility of new quantities and characteristics of used nuclear fuel from the operation of new and refurbished nuclear generation plants.

The implementation of APM in the early years is guided by seven Strategic Objectives. The objectives flow from the NWMO's Vision, Mission and Values, and the objectives that Canadians said were important for managing used nuclear fuel. The Strategic Objectives provide the foundation for the five-year implementation plan and the work programs to assess and address the many issues related to APM.



STRATEGIC OBJECTIVES

Seek to build long-term relationships with interested Canadians and Aboriginal people.

Advance technical and social research.

Develop and refine a funding formula and trust fund deposit schedules that address financial surety and long-term program funding.

Continually review, adjust and validate plans.

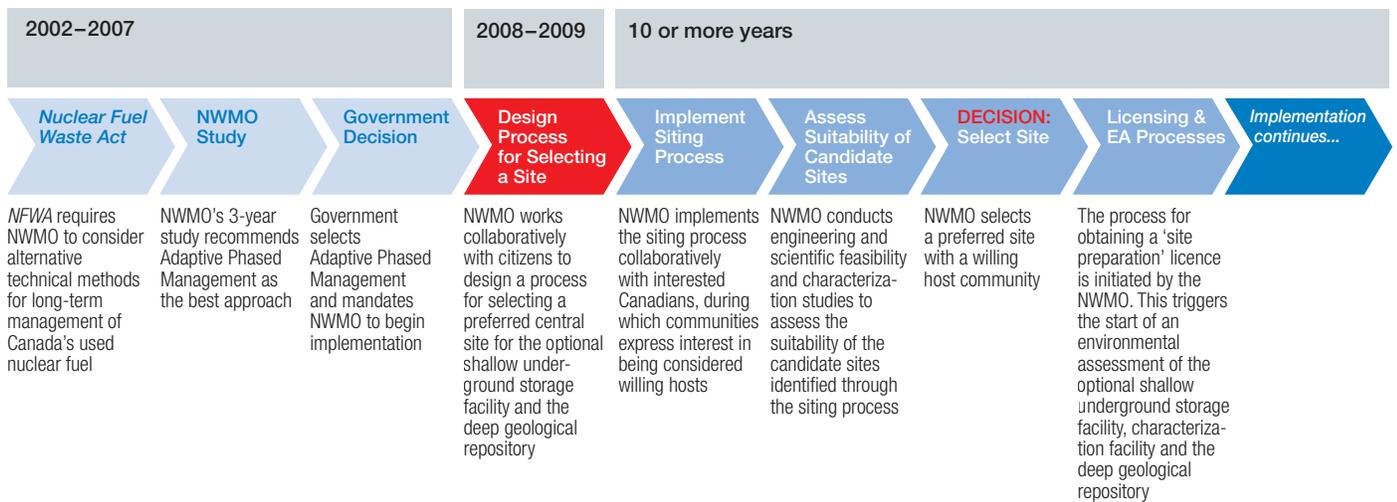
Continue to develop and maintain a governance structure.

Build NWMO as an implementing organization.

Proceed with the collaborative design of a process for site selection.

As part of the annual update of the Plan, the Strategic Objectives have been reviewed and been judged to continue to be relevant in guiding our work in a coordinated and systematic way over the period 2009 to 2013.

To ensure that resources are available when required to manage the requests for information and knowledge building, the NWMO has identified a number of milestones for the next five-year planning period. In particular, the NWMO is working towards releasing the collaboratively developed site selection process for public review in 2009. Following an extensive period of public comment and discussion, we expect to finalize the process and be in a position to launch the siting process sometime after 2009. To ensure its internal preparedness to move forward, the NWMO is developing its capability to respond to expressions of interest and initiate community evaluations and feasibility studies by 2011. By the end of 2012, the NWMO expects to be ready to start the technical and socio-economic assessment of potential candidate sites in response to communities as they express interest.



Strategic Objectives

Building Relationships

The NWMO will continue to build long-term relationships with interested Canadians and Aboriginal people and involve them in setting future direction.

Engagement is one of the five fundamental values that guide the work of the NWMO; the other four are integrity, excellence, accountability and transparency. Through engagement, the NWMO strives to build awareness, understanding and support among Canadians, particularly in the four nuclear provinces of Saskatchewan, Ontario, Québec and New Brunswick, for Canada's approach for the safe long-term management of used nuclear fuel.

Critical to the success of Adaptive Phased Management (APM) is the involvement of the Canadian public, including Aboriginal people, at all stages of implementation and in key decisions through open, transparent and inclusive engagement processes. The NWMO will seek and be responsive to a diversity of views and perspectives. The NWMO will communicate and consult actively, promoting thoughtful reflection and facilitating a constructive dialogue. A strong engagement and collaborative decision-making process will contribute to maintaining trust in the NWMO and building confidence in the implementation of APM.



THE NWMO ENGAGEMENT PROGRAM WILL:

1. Build trusting relationships with Canadians, including Aboriginal people, and communities, non-governmental organizations and other interested parties.
2. Communicate the work of the NWMO and promote understanding of management of used nuclear fuel in Canada.
3. Seek multiple perspectives to guide the review, adjustment and validation of plans for the implementation of Adaptive Phased Management.
4. Seek to sustain the engagement of interested individuals and organizations, including youth, throughout the implementation of Adaptive Phased Management.
5. Ensure that communities have access to the information and resources necessary for making informed decisions and working collaboratively with the NWMO.
6. Inform governments at all levels of the work of the NWMO in implementing Adaptive Phased Management.
7. Build understanding of the process to interweave Aboriginal Traditional Knowledge with western science during implementation.
8. Maintain in-house expertise in engagement and effective working relationships with academic institutions and external practitioners.

In the first years of implementing APM, the engagement program will focus on supporting four key areas: building knowledge; building an implementing organization; adapting to change; and designing and implementing a socially responsible process for selecting a site. A continuum of engagement activities from information sessions to partnerships will be undertaken to support each of these areas.

Going Forward » The NWMO will keep to the path it first proposed in 2008, with some improvements based on many of the valuable suggestions that it has received over the past year. In 2009 and through to 2013, the NWMO will strive to:

- » Increase awareness among the Canadian public, including Aboriginal people, about the NWMO, the management of used nuclear fuel, and APM;
- » Implement the NWMO communication strategy, and develop materials that support the implementation of APM and meet the needs of interested individuals and organizations. This will include project information packages, and an updated website with improvements in design, accessibility, graphics, and photos. We will continue to identify speaking engagements, community-based presentations and media opportunities to develop awareness about NWMO activities. We will seek meetings with editorial boards and other media;
- » Communicate progress in implementing APM to governments and related organizations and associations;
- » Establish relationships with national, provincial and regional Aboriginal organizations in the four nuclear provinces to support Aboriginal involvement in the implementation of APM;
- » Expand in-house expertise in engagement to meet information requests from Canadians and organizations; and
- » Regularly assess the effectiveness of engagement activities in order to identify opportunities for improvement in future initiatives.

In 2009, relationship development will continue with individuals and organizations that bring a broad variety of perspectives to this issue, including Aboriginal people, municipal governments, interest-based organizations, young people, and federal and provincial governments. The NWMO will:

- » Seek input specifically about the design of the site selection process;
- » Continue its work with the Elders' Forum and Niigani, collaborate in the development of Aboriginal dialogues about the site selection process, and continue to build NWMO's understanding of the interweaving of Aboriginal Traditional Knowledge and western science;
- » Continue to work with Natural Resources Canada to develop a process to meet the NWMO's statutory obligations with respect to the Crown's Duty to Consult;

- » Convene a youth roundtable to advance understanding of how to engage young people;
- » Engage with municipal associations to advance understanding of local perspectives and to involve the municipal level in the design of NWMO processes; and
- » Support community initiatives through a social responsibility program.

At the national level, the NWMO will employ a number of engagement tools to understand citizen perspectives, including public attitude research and web-based activities such as e-dialogues and deliberative surveys.

A range of activities is planned in the four nuclear provinces to discuss the design of a site selection process, including multi-party dialogues, public information and discussion sessions, open houses and information briefings upon request.

By the end of 2009, the NWMO expects to have designed collaboratively with Canadians a siting process that is responsive to Canadians' expectations for implementing APM. To prepare for the implementation of the siting process, the NWMO will:

- » Develop an engagement program for the launch of the siting process; and
- » Implement a funding program that enables communities and individuals to build knowledge about APM and the project (see also Social Research).

Building Knowledge

NWMO will advance research to broaden its foundation of technical and social knowledge, bringing to bear the most advanced Canadian and international expertise to support implementation of Adaptive Phased Management.

A program that will evolve over a long period of time will have many opportunities to improve performance, enhance effectiveness, build understanding, reduce uncertainty and address societal concerns. A vibrant and robust research and development program will aid the realization of these benefits. Citizens and specialists alike have told us of the need for significant and ongoing investment in research so that Canadians will have the benefit of technological innovation, and assurance that institutional memory and the technical capacity of the workforce to manage used fuel are not eroded.

The NWMO's technical and social research programs are designed to:

- » Enhance understanding to improve confidence in predictions, reduce uncertainty, and evaluate potential program improvements;
- » Confirm performance during and after program operations;
- » Ensure and demonstrate capacity to respond to citizens' concerns and desires;
- » Support mid-course corrections in response to new information or societal decisions;

- » Prepare for facility siting, design, licensing, development and operations, and transportation of the used fuel; and
- » Assure in-house human capacity to manage the implementation of APM.

The NWMO understands the importance of involving external parties in identifying research of relevance and interest. In addition to maintaining our in-house capability, the NWMO strives to develop effective working relationships with universities and the specialist consulting community within Canada. We also take advantage of opportunities for collaboration and participation in joint research, development and demonstration programs internationally.

TECHNICAL RESEARCH

A strong technical research and development program will ensure that APM will benefit from technological innovation in radioactive waste management developed in Canada and abroad, and will ensure that the NWMO maintains adequate human resource capacity to manage the various phases of implementation. Over the next five years, the NWMO will continue to build human capacity, develop the means to evaluate sites from a technical perspective, strengthen its understanding of safety for a deep geological repository and develop conceptual designs.



THE NWMO'S TECHNICAL RESEARCH AND DEVELOPMENT PROGRAM WILL:

1. Maintain skilled technical capability by developing in-house expertise and effective working relationships with Canadian universities and the consulting community.
2. Enhance scientific understanding of the technology for central storage and long-term containment and isolation of used fuel in a deep geological repository.
3. Further develop capability to evaluate potential sites from a technical perspective.
4. Seek opportunities for international collaboration and participation in joint technical research, development and demonstration programs, to bring the best international knowledge and practices into the technical work of the NWMO.
5. Build understanding of monitoring and retrievability during the various stages of implementation.
6. Maintain awareness of alternative means for the long-term management of used nuclear fuel.
7. Revise and update the conceptual design and cost estimate for long-term management of Canada's used nuclear fuel.
8. Build understanding of the process to interweave Aboriginal Traditional Knowledge and western science during implementation.

Specific milestones have been established in each of the four areas of geoscience, safety assessment and licensing, engineering and emerging technologies.

Going Forward » In the period 2009 to 2013, the NWMO will:

- » Develop and update geoscientific criteria to support development and implementation of the siting process;
- » Prepare conceptual engineering designs and illustrative safety assessments for a deep geological repository in crystalline rock and in sedimentary rock;
- » Evaluate conceptual designs for optional interim underground storage of used fuel at the central site;
- » Develop the capability to conduct geoscientific studies as part of site feasibility assessments, including sub-surface investigations and evaluations at potential candidate sites for crystalline and sedimentary settings;
- » Develop the capability to review and evaluate used fuel transportation options to a long-term management facility;
- » Review and update the environmental monitoring plan, including human health, for assessment of potential candidate sites;
- » Prepare preliminary safety assessments of potential candidate sites;
- » Monitor developments in Canada and internationally related to regulatory aspects of used fuel management facilities;
- » Expand working relationships with universities to advance knowledge and understanding of repository technology, geoscience and safety assessment;
- » Support engagement initiatives and continue to advance understanding of Aboriginal Traditional Knowledge and the insight it will provide for evaluating potential sites;
- » Prepare an annual report documenting alternative technologies for long-term management of used fuel, including reprocessing, partitioning and transmutation; and
- » Continue to participate in cooperation agreements with national radioactive waste management organizations around the world, specifically SKB (Sweden), Posiva (Finland), Nagra (Switzerland) and ANDRA (France). These agreements provide the framework for sharing information and participating in joint research and development programs in underground facilities such as the Äspö Hard Rock Laboratory in Sweden and the Mont Terri Project in Switzerland.

SOCIAL RESEARCH

Canadians have told the NWMO that implementing APM must be responsive to citizen expectations, priorities and concerns, even as these evolve over time. The social research program will identify and apply processes and techniques to effectively engage interested people and organizations to surface and understand these issues, and include research projects to address these issues.

The social research work plan will be reviewed annually and adjusted as required to meet the needs of citizens as identified through external scans and engagement processes. Over the next five years, the NWMO will continue to build human capacity in this area, including the ability to evaluate possible sites which may be brought forward by willing communities.



THE NWMO'S SOCIAL RESEARCH PROGRAM WILL:

1. Increase the NWMO's understanding of Canadians' expectations of NWMO and the site selection process.
2. Support the finalization and future launch of the siting process by advancing NWMO's understanding of best practices in engagement, capacity-building, impact assessment and sustaining community well-being.
3. Support knowledge building to facilitate meaningful participation by interested individuals and organizations in the implementation of Adaptive Phased Management.
4. Continue to develop social research networks by engaging experts on Adaptive Phased Management implementation issues.
5. Build understanding of the process to interweave Aboriginal Traditional Knowledge and other assessment approaches during implementation.

Going Forward » In 2009 and through to 2013, the NWMO will:

- » Collaborate with interested academics in Canada and internationally to access the best knowledge and practices of social and community-based processes; in 2009, the NWMO will convene a workshop on the topic of community well-being with external specialists and practitioners to assist the NWMO in formulating this aspect of the siting process;
- » Apply the ethical and social framework developed for the study phase to guide implementation and report regularly on activities against this framework;
- » Commission background papers and workshops on detailed aspects of siting in such areas as socio-economic impact assessment including the interweaving of insight from Aboriginal Traditional Knowledge, risk management, risk communication, and adaptive management;
- » Design and launch a new participant funding program which invites communities and organizations to learn about APM and community well-being considerations of the project;

- » Seek advice and counsel from municipal associations on the design and components of NWMO's social research program;
- » Participate in the international collaborative research on best practices in stakeholder engagement led by the OECD Forum for Stakeholder Confidence; and
- » Continue to research citizen priorities and concerns related to the NWMO's implementation work through Citizen Panels or focus groups in each of the nuclear provinces (New Brunswick, Québec, Ontario, Saskatchewan), and through completion of national telephone surveys of citizens for input on ongoing implementation plans and issues.

Financial Surety

NWMO will propose a funding formula and trust fund deposit schedules that address financial surety and long-term program funding.

Canadians expect that the necessary money will be available to pay for the long-term care of used nuclear fuel when it is needed. Financial surety has the objective of determining what costs can reasonably be expected to occur over the life of the project, along with a contingency for unexpected events, and then designing a system that collects and protects enough money to ensure that the entire cost can be covered under a variety of social and economic circumstances, and within a required timeframe.

The *Nuclear Fuel Waste Act* assigns responsibility to the major owners of used nuclear fuel to make financial provisions for its long-term management. The Act required each of the four waste owners to establish and make annual deposits to trust funds established for this purpose.

The waste owners will share the cost of development, licensing, construction and operation of the facility. The cost to each waste owner will generally be proportional to the number of fuel bundles to be stored in the facility, with special adjustments for factors such as differences in timing of shipping, transportation, fuel characteristics, etc. In its 2005 final study report, the NWMO estimated the cost of Adaptive Phased Management (APM) to be in the range of \$5 to \$6 billion (stated in present value as of January 1, 2004) assuming 3.6 million used fuel bundles would be produced over the life of Canada's existing nuclear reactors.

As APM is implemented, the NWMO has ongoing responsibility for ensuring that the cost estimates remain updated and that the funding formula will support the financing of all aspects of APM. Contributions will be adjusted periodically to reflect updated projections of overall costs of APM and the number of fuel bundles expected to be produced by each used fuel owner.



THE FUNDING PRINCIPLES:

The principles and approach used by the NWMO for calculating costs and trust fund deposits are consistent with the intent of the *Nuclear Fuel Waste Act*, the approach used by the Canadian Nuclear Safety Commission (CNSC) for financial guarantees under the *Nuclear Safety and Control Act*, and the approaches used in other member countries of the Organization for Economic Co-operation and Development (OECD). These funding principles used to develop the funding formula are:

PRODUCER PAYS Each waste owner pays based on the quantity of waste produced and usage of the repository.

FINANCIAL CONSERVATISM The highest cost option for implementing Adaptive Phased Management is used.

UNCERTAINTY ANALYSIS Provide for reasonably foreseeable and unforeseen events; contingencies are provided in the cost estimates.

INTERGENERATIONAL FAIRNESS Funds will be collected over the assumed economic life of the nuclear reactors producing the used fuel bundles.

FUND GROWTH Reasonable assumptions are used for real growth of funds to manage the used fuel over the long term.

Going Forward » In 2009 and through to 2013, the NWMO will:

- » Publish on the NWMO website the audited financial statements of the Members' nuclear fuel waste trust funds when provided by the financial institutions;
- » Provide updates to confirm that the waste owners are meeting their financial obligations, deposit schedules and other commitments. NWMO will apprise the government and waste owners of up-to-date implementation cost estimates and funding requirements;
- » Report updated cost information and the amount of the deposit required to be paid during the next fiscal year by each of the Members and AECL;
- » Estimate financial cost implications of potential future used fuel scenarios; and
- » Update the total cost estimate for APM no later than 2012.

Review, Adjust and Validate Plans

NWMO will continually review, adjust and validate plans against factors such as advances in technical learning, evolving societal expectations and values, and changes in energy and environmental policies.

A fundamental tenet of Adaptive Phased Management (APM) is the ongoing incorporation of new learning and knowledge to guide decision-making. We are committed to re-evaluating decisions where warranted, maintaining the option to change course and being prepared to act on new knowledge. Developments throughout the implementation of APM may pose technical and ethical challenges. How the NWMO considers, discusses and responds to these challenges will be critical to the success of APM.

The NWMO has established a process for ongoing monitoring, review, reporting and discussion about the changes in the management of used nuclear fuel, specifically in the areas of technology development, societal expectations, and energy and environmental policy, so that the implementation of APM can be adjusted as required. Adaptation of the implementation of APM is considered in regular dialogues with Canadians and collaborative planning. Consistent with the NWMO Transparency Policy and Engagement Procedure, the NWMO reports regularly on its progress in implementing APM and especially in response to the advice of Canadians and the changing external environment.

Recent developments in environmental and energy policies are particularly relevant to the implementation of APM. The amounts and characteristics of nuclear fuel waste to be managed are related to potential new nuclear reactor refurbishment projects and new nuclear generation plants. While decisions about Canada's nuclear energy generation options will not be made by the NWMO, we must recognize the potential implications of these decisions and put in place a process for ongoing monitoring, review and broad discussion so that our implementation path is adjusted as may be required.

Going Forward » In 2009 and through to 2013, the NWMO will:

- » Report to Canadians annually on its progress in implementing APM; the NWMO will publish its 2008 Annual Report to the Minister of Natural Resources and the public in the first quarter of 2009;
- » Regularly publish its five-year implementation plan;
- » Submit in 2011 to the Minister of Natural Resources and the public, the NWMO Triennial Report, as required under the *Nuclear Fuel Waste Act*;
- » Publish an annual update on current and future potential inventories of used fuel volumes and types;
- » Report on the implications of used fuel from new and refurbished nuclear generation plants in the implementation of APM, including the technical design implications of potential changes in volumes and types of used fuel to be managed;
- » Estimate the financial cost implications of potential future scenarios of varying volumes of used fuel to be managed and publish this information when it is available;

- » Seek the input of Canadians on how the implementation of APM should be adapted in response to current and projected inventories of used fuel;
- » Post research papers and the results of engagement activities on the NWMO website, including the comments received during the NWMO's engagement on the proposed site selection process;
- » Seek opportunities at key milestones and decision points for open and transparent review of the implementation of APM through opportunities to bring plans to formal venues (i.e., House of Commons Standing Committees); and
- » Adapt and develop plans on how to go forward against the framework of the Strategic Objectives, and the framework of values and objectives developed with Canadians during the study phase, as well as through engaging citizens, specialists and potentially affected communities, and with the guidance of our many advisors.

Governance Structure

NWMO will develop and maintain a governance structure that provides Government, Members, Board, NWMO management and the public with greater assurance, oversight, advice, and guidance about NWMO activities during the implementation phase.

The NWMO's governance comprises the Member organizations, the Board of Directors and its Advisory Council. The NWMO is subject to the requirements of the *Nuclear Fuel Waste Act* and oversight by the Minister of Natural Resources. The NWMO's activities will also be subject to external organizations' oversight through the *Nuclear and Safety Control Act* and the *Canadian Environmental Assessment Act*.

Members

Ontario Power Generation, NB Power Nuclear and Hydro-Québec are the founding Members of the NWMO. The 2007 Membership Agreement and by-law set out Member roles and responsibilities in furtherance of the objectives of the *Nuclear Fuel Waste Act* and NWMO's implementation mandate.

Board of Directors

The Board of Directors of the NWMO is responsible for oversight of the organization and taking a leadership role in the development of the corporation's strategic direction. The Members appoint the Board of Directors. There are currently nine members of the Board of Directors, representing a range of perspectives from both within and outside the nuclear industry, including capabilities in ethics, Aboriginal culture and finance management. The membership of the Board is profiled on the NWMO website.

Policies and Procedures

The NWMO established a number of corporate and financial policies and procedures during its study phase. In 2007, we developed a framework for review, update and expansion of policies and procedures as appropriate for an implementing organization with an expanded budget, a significant technical program and increased staffing levels. In 2008, the NWMO examined internationally accepted management systems and alternative frameworks. A process framework based on the ISO 9001 and ISO 14001 management systems has been adopted, and a set of essential policies and procedures identified. Work has been initiated on these essential policies and procedures with the objective of achieving full conformance to ISO 9001 standard towards the end of 2009.

The Advisory Council

The *Nuclear Fuel Waste Act* requires that the governing body of the NWMO appoint an Advisory Council to review and comment on its study and triennial reports following the Government's selection of a long-term management approach for used nuclear fuel. The Board of Directors appointed the Advisory Council in 2002, with membership renewed in 2008. In addition to meeting its statutory obligations, it provides independent guidance and advice to the NWMO. There are currently 10 members of the Advisory Council representing a broad range of expertise, including geosciences, strategic communications, environment, medicine, political science and Aboriginal Traditional Knowledge. This group of individuals is knowledgeable in nuclear waste management issues and experienced in working with citizens and communities on a range of public policy issues. The membership of the Advisory Council is profiled on the NWMO website.

Independent Technical Review Group

In 2008, the Board of Directors established the Independent Technical Review Group (ITRG) to provide review of the NWMO's technical research program on used nuclear fuel. The Group will conduct reviews to regularly inform the Board and Advisory Council whether the NWMO technical program is based on credible scientific and technical approaches and methodologies; is consistent with international practices; and will broaden and advance NWMO's technical knowledge to adequately support implementation of APM. Four members have been appointed, bringing extensive internationally-recognized expertise in the technologies associated with the implementation of nuclear waste geologic repository projects acquired through experience in Canada, the U.K., Sweden and Switzerland. Members of the ITRG are appointed by the NWMO Board on a three-year basis and may be reappointed. The members are profiled on the NWMO website. Reports of the group will be published on the NWMO website.

Peer Reviews

The NWMO will continue to seek opportunities for peer review of its work and to invite independent comment. This will benefit program design and delivery, and help to enhance public confidence in the NWMO's implementation and decision-making.

Going Forward » In 2009 and through to 2013, the NWMO will annually:

- » Convene at a minimum four meetings of the Board of Directors, four meetings of the Advisory Council and one meeting of the Independent Technical Review Group, and make their minutes and any reports publicly available;

- » Convene sub-committees of the Board of Directors as needed, including the Audit, Finance and Risk Committee, Siting Committee, and Human Resources and Compensation Committee;
- » Interact with the Canadian Nuclear Safety Commission to ensure that safety requirements are fully understood and conceptual designs being developed will be acceptable; and
- » Further develop the quality management system, and in 2009, develop the plan for ISO 9001 certification.

Building an Implementing Organization

NWMO will build an implementing organization with a full range of capabilities to implement the government decision, including social, environmental, technical and financial resources.

The NWMO must ensure that as an organization it is capable and competent to fulfill its mandate. The transition from a small organization mainly focusing on social research and engagement activities to the agency responsible for implementing Adaptive Phased Management (APM) continues.

Management of used nuclear fuel is a very long-term mandate. The NWMO must be steady, stable and long term in its outlook and actions. This requires investment in the organization to ensure resource capacity, expertise, and sound administrative and management policies and practices that provide a foundation for operations.

Recognition of the resources needed to fulfill the NWMO's implementation mandate calls for decisions about the balance between building internal expertise and continuing to contract external resources.

Going Forward » On January 1, 2009, the NWMO became its own employer with supporting infrastructure. In 2009 and through to 2013, the NWMO will:

- » Continue to increase staffing capabilities, as needed, consistent with the growth in the work program and the Human Resources Strategy;
- » Grow business support systems and processes to match the needs of the NWMO;
- » Establish a new employee orientation, staff training and succession planning programs;
- » Continue the graduate intern program to ensure institutional memory and transfer of lessons to future generations; and
- » Monitor, evaluate and update skill and capacity requirements with ongoing recruitment, retention, skill upgrading and training programs according to a multi-year human resources plan.

Collaborative Design and Initiation of a Siting Process

NWMO will proceed with the collaborative design of a siting process, supported by a public engagement program, and subsequent initiation of a siting process.

The NWMO will work to ensure that both the development of the site selection process and the process itself are judged to be inclusive, fair and transparent.

The NWMO committed in the *Final Study Report Choosing a Way Forward, The Future Management of Canada's Used Nuclear Fuel (2005)* to develop the siting process and associated engagement program with a collaborative process. The design of the siting process will build on the NWMO's principles for seeking an informed and willing community to host the long-term management facility. The design of the siting process will integrate technical, social, environmental and economic considerations, and the lessons learned from our engagement programs to date.

The site selection process that emerges must meet the expectations of Canadians and address their key issues, such as the protection of humans and the environment, fairness and transportation considerations, and continue to build trust and confidence in the NWMO and its operations. Attention will also be given to developing institutional policies, practices, structures and arrangements to support implementation of the siting process. This is important foundation work required in advance of NWMO considering the initiation of a site selection process.

Going Forward » In 2009, we will:

- » Publish for public comment the draft proposal for the process for selecting a site;
- » Test and validate the draft siting process proposal using a public engagement process that seeks the input of the Canadian public and invites a diversity of perspectives;
- » Refine the process for selecting a site based on comments received in the public dialogue and review; and
- » Introduce a participant funding program to enable communities and organizations to learn more about APM and community well-being aspects of the site selection process.

Beyond 2009, the NWMO will initiate the process for selecting a site subject to validation of the siting process proposal and readiness of the supporting engagement and information programs.

THE NWMO HAS MADE FOUR IMPORTANT COMMITMENTS AS TO HOW A SITE SELECTION PROCESS MUST WORK:

1. The decision by a community to host the site must be informed and made willingly.
2. The site selected must meet strict, scientifically determined safety requirements.
3. In the interest of fairness, the process should focus on the provinces directly involved in the nuclear fuel cycle: New Brunswick, Québec, Ontario and Saskatchewan. Communities in other regions that express an interest will also be considered.
4. Communities that decide to engage in the process for selecting a site, as potential hosts, shall have the right to withdraw consistent with any agreements between themselves and the NWMO.



The Road Ahead

The Implementation Plan derives its strength and acceptance from a shared vision of where the NWMO is headed. It is a five-year plan, reviewed and updated annually to offer guidance for the five-year planning period ahead. As such, it is a living document, regularly assessed, strengthened and redirected as may be appropriate in the face of new information and shifts in the internal or external operating landscape. Through all our activities, the NWMO seeks and welcomes input on the implementation of Adaptive Phased Management.

There is much work to be done. Adaptive Phased Management will proceed as expeditiously as Canadians, successful technology development and demonstration, and the regulatory authorities allow. This Implementation Plan represents the first update on our process. The NWMO invites all Canadians, including Aboriginal people, to stay involved. We welcome all suggestions and comments. Please write to us or submit comments to our website.

Glossary

Centralized facility means a facility used for the geological placement of used nuclear fuel. The facility would be located at a single, central location and would accept used nuclear fuel from all storage sites in Canada.

Deep geological repository is a facility for the placement of used nuclear fuel deep underground where both natural and engineered barriers shield it from humans and the environment. While placed in a deep geological repository, there is the potential for retrieving used nuclear fuel. However, the intent is that used nuclear fuel will not be retrieved, and it will remain safe in the repository.

Dialogue brings people from all walks of life together and encourages them to work through difficult issues, learning from each other as they listen to and understand perspectives that are different from their own. Participants examine their own thinking, and through talking with each other, identify areas on which they can agree, while acknowledging differences.

Repository is a nuclear facility where used fuel is placed deep underground.

Retrievability is the ability to remove waste from where it has been placed.

Safety is the protection of individuals, society and the environment, from the harmful or dangerous effects of used nuclear fuel, now and in the future.

Storage is a method of maintaining used nuclear fuel in a manner that allows access, under controlled conditions, for retrieval or future activities.

Used nuclear fuel means the irradiated fuel bundles removed from a commercial or research nuclear fission reactor.

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