



# The Continuing Quest

## *Managing nuclear waste goes far beyond the science*

*by E. Dowdeswell*

**I**n the early years of this new millennium our world is changing dramatically. This is a time of blinding technological change, increasingly interconnected economies and growing alienation between citizens and their institutions. A sustainable world is not an unreachable goal, but any critical environmental, social or economic analysis would certainly raise questions about our current trajectory.

The issue of the long-term management of nuclear waste illustrates well the conundrum that society faces. It is an issue that embodies scientific complexity and uncertainty.

It inspires fear and insecurity and polarizes citizens. It is very long-term in character, raising questions of inter-generational equity quite inconsistent with the time frames of elected governments. It raises discussion of trade-offs: energy sufficiency versus significant financial investment and long-term security. In sum, it is an issue that requires much better understanding of resilience, vulnerability and the dynamic interaction between nature, technology and society.

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*Questions of environmental protection are among those raised for waste management.*

All nuclear nations have faced significant challenges in their quest for an acceptable approach for the long term management of the nuclear waste they generate. The story behind that fact illustrates the degree to which the nuclear industry is being shaped by factors much beyond the scientific and technical. Social, ethical and economic considerations are now being recognized as legitimate aspects of the public policy process.

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Of 32 nations that harness nuclear energy to generate electricity some have declared, or even legislated, that deep geological disposal is their ultimate intent. However, few have progressed to the point of final repository site selection. Over the past decade a number of national management programs have had to be reigned in and re-thought, put on hold, or even abandoned, in the face of public opposition and activist electorates. Radioactive waste decisions, once considered the exclusive purview of governments and the nuclear community, are now clearly in the public domain.

In Canada there may not have been marches in the streets, but the experience was not dissimilar to what happened elsewhere. Interveners made it clear that social acceptability is as important as technical safety.

## **The Process in Canada**

By the late 1980s extensive scientific work had been done by Atomic Energy of Canada Ltd. (AECL) on a concept for geological disposal of used nuclear fuel deep in the plutonic rock of the Canadian Shield. The concept was put to an environmental assessment panel for public review. After a nine-year study the Seaborn Panel concluded that, on balance, from a technical perspective, the safety of the AECL concept had been demonstrated but, from a social perspective it had not. Just as had happened in many other countries, Canadian nuclear waste producers were sent back to the drawing board.

The Nuclear Waste Management Organization (NWMO) was established in late 2002 in response to federal legislation requiring Canada's nuclear energy corporations to cre-

ate an organization to investigate and develop an approach for the long-term management of their used nuclear fuel. An independent Advisory Council acts as a guarantor of the public interest. The companies were also required to put in place trust funds to ensure that the money will be available to finance the nuclear waste management approach ultimately adopted by the government.

The NWMO has been given three years to study, at a minimum, three approaches including deep geological disposal, storage at the nuclear reactor sites and, centralized storage, either above or below ground. We must examine the risks, costs and benefits, develop implementation plans and consult with Canadians. Once the Government of Canada takes a decision on our recommendations the NWMO will be responsible for implementation.

It is reasonable to ask, "What will make this attempt any different than those of the past?" The answer may lie in our search to understand the deeply held values of citizens and to review our options through a multi-dimensional lens that is in part shaped by citizens themselves.

Sustainable development is our conceptual underpinning. We see as our purpose, to develop collaboratively with Canadians a management approach that is socially acceptable, technically sound, environmentally responsible and economically feasible.

Our approach includes a focus on broad engagement of society; a comprehensive (not just technical) review; a study built around three milestone documents so that we could learn together with citizens — first about the framework for the study itself, then the assessment and finally the recommendations and implementation plan. We provide a forum for recognizing divergent viewpoints and seeking common ground.

## **From Dialogue to Decision**

Our journey from dialogue to decision is well underway. Our first discussion document "Asking the Right Questions? The Future Management of Canada's Used Nuclear Fuel" defines the problem, communicates potential choices and poses a way of assessing the alternatives. Key questions have emerged from our preliminary conversations with a broad cross-section of Canadians. They brought perspectives and ideas that were instrumental in advancing our knowledge and understanding. We listened and learned.

Scenario workshops helped us imagine the future. Workshops with environmental interests, representatives of aboriginal communities and those with technical and scientific expertise contributed insights about expectations and concerns, the knowns and unknowns and suggested possible ways forward. Papers were commissioned



to capture the current state of knowledge on a broad range of technical matters as well as evolving concepts related to our work. And of course we benefited from the experiences of other countries around the globe. Throughout, a panel of ethicists reminds us of the ethical implications of our process and thinking.

Ours is a work in progress. Two interrelated tracks of activity are underway: an assessment which thoroughly examines the options and an engagement program through which we are testing our initial observations and refining our thinking. This iterative process of seeking input and exposing our evolving ideas will continue until our task is completed.

A multidisciplinary assessment team has developed an assessment methodology that builds on the framework identified by citizens. It is being applied to each of the alternatives, identifying the risks, costs and benefits and describing the social, economic and ethical considerations associated with each of them. The team is also testing the robustness of different approaches against different time frames contemplated in the earlier scenarios workshops. All of this work will be shared with the public for review before recommendations are developed.

The core of our engagement program is our web site. It is becoming a significant repository of information and an active venue for engagement and exchange. It offers simple polls and short surveys, invites more comprehensive electronic submissions and will host moderated “e-dialogues.”

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An innovative National Citizens’ Dialogue has brought together a representative sample of citizens in 12 communities across Canada to learn about nuclear waste in a group setting and think through their views and expectations for its long-term management. In considering the key issues and trade-offs we are trying to identify and understand the core values of the general public.

Additionally, dialogues tailored to the specific needs and requirements of aboriginal peoples, communities that currently store used nuclear fuel and organizations active in social and environmental matters have been organized.

## **Meeting the Challenge**

There are no “right” answers to many of the ethical questions. How do we accommodate the desires of the current generation while recognizing that the decisions we make now may affect the lives of our children, their children and many generations to come? How heavily should we rely on emerging technologies? What forms of institutions and governance inspire trust and confidence?

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These questions and more are fundamental to meeting the challenge of managing used nuclear fuel in an appropriate and acceptable manner. To be able to choose the right technical solutions we must first ask what requirements the technology has to live up to. Despite the fact that scientific and technical research into waste management options has been going on for decades a solution has eluded us. Perhaps that is because there has been no agreement on the societal values we wish to protect. Perhaps also because we have been arrogant in our assumptions that expertise resides only in the minds of a select few.

Within Canada and internationally, the landscape against which our study is being conducted is shifting. Issues of energy policy, security, health and safety, environmental protection, and good governance are prominent on the public agenda.

How we approach this challenging public policy issue will say a lot about our values and priorities as a society — how we want to live. Fundamentally it is about developing a contract between science and society: a contract that allows us to benefit from technology while managing the risks and respecting the values of Canadians.

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