

*Citizens' Dialogue on the Long-term  
Management of Used Nuclear  
Fuel in Canada*

**Workbook**

**January-March 2004**

The Nuclear Waste Management Organization (NWMO) is a new, not-for-profit organization created under federal legislation to recommend an approach for managing used nuclear fuel produced by Canada's nuclear reactors. The NWMO has begun to engage interested Canadians, stakeholders and the best experts in the world to develop an approach that safeguards the public in a way that is sustainable, ethically and socially acceptable, and respectful of the environment now and in the future. You can get more information on NWMO's work at [www.nwmo.ca](http://www.nwmo.ca) or by calling toll free 1-866-249-6966.

CPRN is a not-for-profit policy think-tank based in Ottawa. It has been using public dialogue for a number of years as a means to involve citizens more directly in research and public policy discussions on issues such as health care reform, quality of life indicators, Canada's children, aging and the society we want. You can obtain further information about CPRN and its work in public involvement and other policy areas at [www.cprn.org](http://www.cprn.org)

#### Acknowledgement

CPRN developed this citizens' dialogue, adapting Viewpoint Learning Inc.'s ChoiceWork Dialogue® methodology. The dialogue is designed to give decision makers a deeper understanding of citizens' value-based policy choices and to predict the future direction of people's preferences on important issues. CPRN initially used this methodology in the Dialogue on the Future of Health Care in Canada (Romanow Commission), and has since adapted it for use in policy research.

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Dear Dialogue Participant,

Thank you for agreeing to take part in the Citizens' Dialogue on the Management of Used Nuclear Fuel in Canada. Our purpose with this dialogue is to better understand Canadians' views and expectations for the long-term management of used nuclear fuel. How we as citizens approach this challenging issue will say a lot about how we as a society discharge our responsibilities to manage the many wastes from the technologies we use to support our quality of life.

The Nuclear Waste Management Organization (NWMO) wants to develop an approach to managing used nuclear fuel that is socially acceptable, technically sound, environmentally responsible and economically feasible. In addition to engaging with interested Canadians, stakeholders and the best experts in the world, it is committed to finding a way forward that reflects Canadian values and societal choices. As part of its efforts, the NWMO has asked Canadian Policy Research Networks (CPRN) to lead this dialogue with Canadians across the country, to seek your views on this important public policy issue.

This workbook provides you with some factual information on used nuclear fuel. It also sets out two sets of scenarios related to the long-term management of used nuclear fuel, to serve as a starting point for the dialogue. You and your fellow Canadians will explore these considerations and then construct your own vision for the future.

This dialogue is not about making decisions on technology. Rather, participants have the opportunity to explore some of the difficult trade-offs and choices associated with managing used nuclear fuel, and to define your expectations with respect to safe and effective management. There are no right or wrong answers here. What we are looking for is a better sense of what you collectively value as important and what you believe to be the best path to take, and why.

CPRN will use this information to write a report for the NWMO, focusing on what you, the participants, had to say about the way used fuel should be managed over the long-term. The report will be made public and you will be sent a copy of it. The NWMO will use the findings of this dialogue to help shape its further work, as options are explored and recommendations developed.

We sincerely appreciate the contribution you are making by participating in this dialogue. We hope you will find it a worthwhile and rewarding experience.



Elizabeth Dowdeswell, President  
Nuclear Waste Management Organization



Judith Maxwell, President  
Canadian Policy Research Networks Inc.



# **I N T R O D U C T I O N**

## The Issue

Every day we make choices in our lives. Some choices are easy. Others have a long term impact on us and on other people. Such choices require careful thought and much soul-searching. In the end, we base our choices on many considerations – but they come down to our core values.

Electricity is central to our way of life. Different places choose electricity sources based in part on the natural resources available to them. Many countries rely on nuclear fuel as an important energy source because it can provide large amounts of reliable power for homes, businesses and industries. In Canada, the provinces of Ontario, New Brunswick and Quebec use nuclear power.

Used nuclear fuel is a by-product from the production of nuclear energy. It is dangerous to human health and the environment and remains dangerous for tens of thousands of years. Like other countries, Canada is trying to decide how best to manage the used fuel over the long term. The fuel is safely stored now, but the storage is interim. It was not designed to last for thousands of years. Any decision on long-term management will take many years to implement. By discussing these issues now, our society can explore the options and plan for the future in a thoughtful and responsible way.

Governments, industry and scientists around the world have been exploring technical options for managing used nuclear fuel for the past 30 years. More recently, they have come to realize that the management approach must be more than technically sound. It must also be acceptable from a social and ethical perspective.

This is where Canadians must have a voice. We as citizens must have our say about what risks and uncertainties we are willing to live with, what trade-offs we are prepared to make and what values should guide decision making. This dialogue is being held with Canadians across the country to help determine how best to manage used nuclear fuel. It is not about looking for technical answers, but good common sense about how you as citizens would like to see this issue managed.

# Background

## Some facts about used nuclear fuel

- Used nuclear fuel comes mainly from the production of energy in nuclear power plants. There are 22 commercial reactors in Canada today – 20 in Ontario, 1 in Quebec and 1 in New Brunswick.
- A small amount of used nuclear fuel comes from 11 research reactors across Canada, used to test engineering materials and designs. They also produce many of the medical isotopes used around the world to diagnose and treat diseases like cancer.



### **LOCATIONS** (SEE MAP ABOVE)

Kincardine, ON (1 & 13)	Montreal, QC (7)	Pinawa, MAN (15)
Ajax-Pickering, ON (2)	Halifax, NS (8)	
Bowmanville, ON (3)	Saskatoon, SK (9)	
Trois-Rivières, QC (4 & 14)	Edmonton, AB (10)	
Saint John, NB (5)	Kingston, ON (11)	
Hamilton, ON (6)	Chalk River, ON (12)	

Source: *Asking the Right Questions? The Future Management of Canada's Used Nuclear Fuel*, NWMO 2003.

- In 2002, nuclear energy accounted for 35% of the electricity generated in Ontario, 30 % in New Brunswick and 2.5 % in Quebec, representing 13% of Canada's overall electricity generation.
- The uranium used in all these plants is mined in northern Saskatchewan and formed into fuel bundles that go into the reactor.
- About 85,000 used nuclear fuel bundles are produced each year – 93% of them come from Ontario's power plants. As of December 2002, there were approximately 1.7 million used fuel bundles in storage in Canada. This number is expected to increase to 3.6 million over the life of the existing reactors.
- Canada is the world's leading producer of uranium, accounting for roughly one-third of the total global production. 85% of Canadian uranium is exported to other countries, solely for peaceful purposes.
- More than 30,000 Canadians are directly employed by the nuclear industry; 70,000 are indirectly employed in providing supplies and services. The mining and milling of uranium is a \$500 million a year industry that employs over 1000 Canadians, mainly in northern Saskatchewan.
- Nuclear energy produces much lower greenhouse gas emissions than energy produced by coal or gas. On the other hand, used nuclear fuel is extremely hazardous and must be carefully managed for long periods of time. The mining and milling of uranium also produce hazardous waste that must be carefully managed for a very long time.

#### **What do we do with used nuclear fuel now?**

- Used nuclear fuel from the production of electricity is currently managed on site, at nuclear power plants where it is produced. Very small amounts of used fuel are transported to the Atomic Energy of Canada Ltd. (AECL) storage facility in Chalk River, Ontario. Transportation is regulated by the Canadian Nuclear Safety Commission and Transport Canada and must meet the requirements of the Transportation of Dangerous Goods Act.

- When first removed from the reactor, the used fuel is so hot and so radioactive that it is moved by remote control to a water-filled pool inside the plant. While in the pool, the heat and radioactivity levels decrease rapidly. After 7-10 years, it can be safely moved to a dry storage facility at the reactor site, though protective clothing and shields must still be used.
- Dry storage facilities are designed to last at least 50 years. The oldest facility was built about 13 years ago. They can be replaced or upgraded as necessary, but were not built with the intention of providing storage for thousands of years. They are all licensed by the Canadian Nuclear Safety Commission (CNSC) and their licenses must be renewed at least every five years. They must meet stringent safety and environmental standards, and are monitored on a regular basis.
- After about 500 years, people can handle used fuel with no protective clothing, but only for short periods of time. Lengthy exposure would still have serious effects on human health and the environment.
- Some level of hazard still exists even after thousands of years. If not properly contained, used nuclear fuel would release radiation and toxic contaminants into the environment. This could cause serious illness to all living organisms.

### What about the long term?

- There are three major technical methods to deal with used nuclear fuel over the long term – disposal, storage and treatment.
- Technical research for the past 30 years in Canada and in other countries has been focused on disposal. This would isolate the used fuel from humanity by containing it in engineered facilities and burying it very deep underground in a stable formation like the rock of the Canadian Shield. Ultimately, disposal is designed to make the used fuel permanently inaccessible.

- Storage is a method that relies exclusively on engineered barriers for radiation protection, and allows access to the used fuel for future use, for monitoring purposes or different treatment methods. The used fuel would be placed in special containers at or below ground level. Over the past 20 years, the utilities have developed sophisticated technology to ensure that on-site storage is secure from an attack or accident.
- Treatment is a technique used to alter the chemistry of used fuel, reduce its volume or separate out components for other uses. While current treatment methods can extract more energy from the uranium, it produces weapons grade plutonium in the process, bringing added security risks. The remaining waste product is still highly radioactive and toxic, and must be managed for the long-term. Other possible treatment methods are currently the subject of research.
- Decisions in this sector take a long time to implement because there are so many checks and balances. For example, if a decision is made to build a long-term facility, it would take 20 years or so to complete technical studies, select a site and go through the required environmental assessments. It would then take another 10 years or more to construct a facility, depending on the method chosen.

### Who pays for the management of used fuel?

- The Nuclear Fuel Waste Act adopts the Polluter Pay principle, requiring the power utilities and AECL to put aside specific amounts of money in a segregated trust fund to ensure that adequate resources will be available to pay for the long-term management of the used fuel. In 2002, \$550 million was set aside and an additional \$110 million will be added each year until the money is needed. The trust fund will also grow with interest earned. As the biggest producer of used nuclear fuel, the Ontario Power Generation contributes just over 90% of the total amount.
- The money in the trust fund cannot be used until:
  - A decision has been made by the federal government on the approach Canada is going to take to manage used nuclear fuel;
  - Locations have been agreed to; and,

- Construction of facilities is ready to begin.
- Until that date, all other costs incurred in managing used fuel are paid by the utilities producing nuclear power and their customers.
- As part of their study, the NWMO is now assessing the costs of all the possible methods. We do know that each option will be expensive. For example, it has been estimated that it would cost \$10-12 billion (in 2003 dollars) to choose a site, construct, operate and close an underground disposal facility big enough for 5 million used fuel bundles.

### What others are doing

- In 2003, 439 nuclear power plants produced 16% of the world's electricity. Around the world, countries have been examining ways to manage the used fuel produced by these plants. The choice of management approach and the decision making processes vary depending on the country's history, and its social and political circumstances.
- Sweden, Finland and the United States have been working on geological repositories for many years, and are now at the stage of working with potential host communities to obtain approvals for construction.
- France and the United Kingdom, like Canada, are studying the various options available to them.
- Some countries, like Japan and Germany are in the early stages of choosing a site for a repository, while others, like Spain, have chosen to defer any decisions for at least 10 years.
- Debate continues in some countries about the continued use of nuclear energy. For example, Sweden, Belgium and Germany have decided to phase out nuclear power as other sources of energy become available. Some countries are choosing to increase their reliance on nuclear energy. In 2003, 29 plants were under construction in Asia and Europe. Another 25 were approved for construction.
- No matter how the energy gets produced in the future, used nuclear fuel exists today and must be managed safely over a long period of time.

## Where do we go from here?

- A federal Environmental Assessment Panel reviewed the concept of deep geological disposal for Canada and reached three major conclusions in 1998:
  - First, the concept was, on balance, sound from a technical perspective.
  - Second, more work was needed to find a management approach that would be acceptable to Canadian society. To be acceptable, it should use a social and ethical framework and consult Canadians broadly.
  - Third, Aboriginal peoples must be consulted in a manner that respects their own culture, traditions and languages.
  
- In response, the federal government required the nuclear power utilities to create the Nuclear Waste Management Organization (NWMO) and gave it a mandate to develop a long-term management approach. In designing this approach, NWMO must consider issues much broader than the technical method to deal with the used fuel. **It is required to compare the costs, benefits and risks of the options available and arrive at a recommendation that is socially acceptable, technically sound, environmentally responsible and economically feasible.**
  
- The NWMO report to the federal Minister of Natural Resources is due in November 2005. That report will include the results of this dialogue and of other consultations NWMO is undertaking.
  
- The federal government will decide which approach to take. NWMO will be responsible for implementing the decision.

## Where this dialogue fits

This dialogue is part of the process NWMO is using to be able to incorporate ethical and social considerations into their work. It is not about choosing between the technical methods available to manage used nuclear fuel. You are being asked to set out your expectations for how Canada manages the used fuel over the long term.

The question of what to do with used nuclear fuel is not easy. It involves tough decisions that will need to be made by this and future generations. For example, some questions evolve around what risks we are willing to take and how decisions should be made.

- Should we bring all of the used fuel together in one location or is it better to have smaller quantities in a number of different locations?
- Can we rely on future societies to monitor and guard a waste facility, or should we design a facility that doesn't depend on monitoring?
- How do we ensure there will be enough money now and in the future to pay for the management of used fuel?
- Who should make the decisions and when?
- What type of institutions and rules and regulations are needed to ensure used fuel is safely managed?
- How can we know what society will be like in 1000 years let alone in 10,000 years? Can we presume that political and social systems will continue to function well enough to transfer our knowledge about the waste?
- How far into the future does the responsibility of this generation extend?

These kinds of questions do not have right and wrong answers. It is only by engaging in dialogue with each other, as citizens, that we can develop an approach that reflects our values today and those we want to extend into the future.

## The Purpose of Today's Meeting

- The purpose of today's meeting is for us as Canadians to wrestle with how best to deal with these challenges. We will spend most of the day considering four scenarios that deal with the long-term management of used nuclear fuel in Canada.
- By the end of the day you may think that one of the scenarios captures your views better than the others, you may invent a new one made up of parts of the others, or you may end up sharply divided. At the very least we will have had a good discussion and all of us will come away with a better understanding of the issues.
- **What should you expect the day's dialogues to produce?** None of us are technical experts. And you aren't being asked to make a decision on which technical method is best. All of us are Canadians with our own values and points of view. It is up to us, as citizens, to say what characteristics we most want to see in the approach to manage used nuclear fuel for ourselves, our children and future generations. What conditions should apply to how the used fuel is managed? What are we prepared to do, and what do we expect our governments and industry to do on our behalf? What choices and tradeoffs are we prepared to make or support? Experts can provide information, but they can't make those choices for us.
- This is one of 12 dialogue sessions being conducted across the country. We will report the overall results of this dialogue to the Nuclear Waste Management Organization. Each of you will receive a copy of our report and all Canadians will be able to read it on both CPRN and NWMO's Web sites.

## Agenda for the Day

Overview of the Issue

Opening comments

Initial thinking

What characteristics do we most want to see in a long-term approach to managing used nuclear fuel?

Lunch

What choices are we prepared to make to move us toward the kind of approach we want?

Identifying the most important insights from the day

Final determination

Closing comments

## Summary of the Two Sets of Scenarios

### *HOW DO WE BEST SHARE RIGHTS AND RESPONSIBILITIES ACROSS GENERATIONS?*

**Emphasize using the knowledge we have today.** A long-term management approach for used nuclear fuel will be adopted now, leaving as little responsibility for future generations as possible. We have enough scientific and technical knowledge to make decisions and we benefit from nuclear technology. We have a responsibility to act now and make decisions regarding the best possible approach to managing the used fuel for the long-term.

**Emphasize choice for future generations.** Our current knowledge and technology allows us to safely manage used nuclear fuel responsibly in the existing storage facilities for many years. Despite all the technical work that has been done, there is still much we do not know. We have a responsibility to develop new knowledge, technology and institutions so that future generations can make better informed decisions.

### *HOW DO WE BEST ENSURE CONFIDENCE AND TRUST IN A MANAGEMENT APPROACH?*

**Emphasize role of governments.** Canadians expect the Ontario, Quebec and New Brunswick governments and the federal government to take responsibility for protecting and promoting human health, public safety and the natural environment. As the shareholders and regulators of the power companies, these governments have an obligation and mandate to manage this issue and be held accountable for how well they do this.

**Emphasize role of affected communities and civil society\*.** Canadians expect to have a voice in long-term decisions about their future health, safety and environment, especially the communities most directly affected by used nuclear fuel. We need to ensure that those communities are effectively involved in making decisions about how to manage used fuel, including the right to refuse to host a used fuel facility. Those communities and civil society should play an ongoing role in monitoring.

\*civil society includes non-profit organizations, interest groups and associations, and the general public.

# USING DIALOGUE

Our meeting today is designed to be a dialogue. Dialogue is a special kind of conversation that draws on a diversity of points of view to develop insight and build common ground.

<b>Debate vs. Dialogue</b>
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<u>Debate</u>	<u>Dialogue</u>
Assuming that there is one right answer (and you have it)	Assuming that others have pieces of the answer.
Combative: attempting to prove the other side wrong	Collaborative: attempting to find common understanding
About winning	About finding common ground
Listening to find flaws	Listening to understand
Defending your assumptions	Bringing up your assumptions for inspection and discussion
Criticizing the other side's point of view	Re-examining all points of view
Defending one's views against others	Admitting that others' thinking can improve one's own
Searching for weaknesses and flaws in the other position	Searching for strengths and value in the other position
Seeking an outcome that agrees with your position	Discovering new possibilities and opportunities

## GROUND-RULES FOR DIALOGUE

1. The purpose of dialogue is to understand and to learn from one another (you cannot “win” a dialogue).
2. All dialogue participants speak for themselves, not as representatives of any particular interest.
3. Treat everyone in a dialogue as an equal: leave role, status and stereotypes at the door.
4. Be open and listen to others even when you disagree, and suspend judgment (try not to rush to judgment).
5. Search for assumptions (especially your own).
6. Listen with empathy to the views of others: acknowledge you have heard the other especially when you disagree.
7. Look for common ground.
8. Express disagreement in terms of ideas, not personality or motives.
9. Keep dialogue and decision-making as separate activities (dialogue should always come before decision-making).
10. All points of view deserve respect and all will be recorded (without attribution).



# **FOUR SCENARIOS**



## Scenario 1 — Emphasize using the knowledge we have today

### Introduction

A long-term management approach for used nuclear fuel will be adopted now, leaving as little responsibility for future generations as possible. We have enough scientific and technical knowledge to make decisions and we benefit from the nuclear technology. We have a responsibility to act now and make decisions regarding the best possible approach to managing the used fuel for the long-term.

## Background for Scenario 1

- There have been over 30 years of research around the world developing different methods for the long-term management of used nuclear fuel.
  - In Canada, about \$700 million has been spent to date on research, largely funded by Canadian taxpayers and electricity users in Ontario. Most of it has been dedicated to deep geological disposal.
  - At the same time, extensive experience has been gained in the storage of used fuel.
  - There has also been substantial research undertaken in Canada and internationally on extended storage concepts.
- Social and political institutions can fail. There are examples throughout history, including after World War I and II. More recent events around the world show us that social stability is fragile and can be shattered for any number of reasons.
- NWMO is required by law to fully assess and compare three technical methods – storage at the nuclear reactor sites, centralized storage, and deep geological disposal in the Canadian Shield. They can also assess any other methods deemed feasible. Much work has been and continues to be done on social acceptability and ethical issues related to the management of the used fuel.
- Canada can learn from the experience of other countries which have progressed further in defining their management approach.
- Even decisions made immediately could take a long time to implement. For example, a management approach approved today will require many years to complete technical work on specific sites and get necessary approvals. It may not lead to construction of one or more used fuel management facilities for 2 or 3 decades.

## ELEMENTS OF SCENARIO 1

- ❖ Definitive steps would be taken to implement a technical method to deal with the used nuclear fuel generated by existing nuclear plants.
- ❖ This could be a decision to keep it at the reactor sites for hundreds of years or a decision to move it all to a central facility, either deep underground or on the surface.
- ❖ The NWMO would have a clear mandate to proceed with implementation, to start a siting process if necessary or to develop long term storage structures.
- ❖ The management approach would:
  - Give clear mandates to those responsible for choosing sites, constructing infrastructure and providing oversight;
  - Commit the necessary financial and human resources;
  - Set deadlines for specific decisions; and,
  - Establish standards for security, health, safety and the environment based on today's knowledge.
- ❖ Compliance with health, safety and environmental standards would be monitored and enforced by a trusted organization and results would be publicly reported.
- ❖ Research would focus on improving existing technology.
- ❖ The Trust Fund would finance construction and ongoing management.
- ❖ The power utilities would finance site selection from operating funds, and may be required to make greater upfront contributions to the Trust Fund so as to be ready to begin construction as needed.

**PROS: ARGUMENTS IN FAVOUR OF SCENARIO 1:  
EMPHASIZE USING THE KNOWLEDGE WE HAVE TODAY**

- √ Our generation has benefited from nuclear technology and created the waste. It is our duty to deal with this problem, to protect human health and the environment for this and future generations. Other countries around the world are making decisions and so should we.
  
- √ The most responsible way to reduce the potential for harm and financial burden on future generations is to use the extensive scientific and technical knowledge we have today and commit to decisions now.
  
- √ Prevention is better than cure. Lack of full scientific certainty should not be used as a reason for postponing action in this generation. Future generations could still use different technologies to manage used fuel that may be created in the future, but we will have dealt responsibly with ours.
  
- √ Lots of decisions have a long term impact on both people and the environment, like the construction of a dam or mega projects like the tar sands. Humans have proven very adaptable to changes that take place in their society and their environment, and will continue to adapt.
  
- √ Increased security risks since 9/11 means that we cannot delay a decision.
  
- √ Future generations could have weaker economies, failing government institutions and social instability that would make it difficult to make decisions. We need to act today, in the best interest of future generations.

**CONS: ARGUMENTS AGAINST SCENARIO 1:  
EMPHASIZE USING THE KNOWLEDGE WE HAVE TODAY**

- ✘ The current interim storage facilities are safe. Why rush into making decisions that could have serious consequences for future generations?
  
- ✘ We cannot predict what will happen to the earth in thousands of years. If a decision is made now for a fixed method, we lose the ability to adapt to changes in the environment and society over time.
  
- ✘ Large investments in infrastructure in this generation will use up the Trust Fund, leaving less money to deal with research, if that is needed.
  
- ✘ The power utilities have a history of cost overruns on building and maintaining plants. We can't have confidence that the Trust Fund will provide enough money for now and for the future. Our taxes and energy costs are already high enough. There are other priorities we need to invest in.
  
- ✘ We cannot rule out that future generations may have the technology to get more energy from the used fuel or treat it differently.
  
- ✘ The best way to deal with uncertainty is to reduce it by creating more knowledge.



## Scenario 2 — Emphasize choice for future generations

### Introduction

Our current knowledge and technology allows us to safely manage used nuclear fuel responsibly in the existing storage facilities for many years. Despite all the technical work that has been done, there is still much we do not know. We have a responsibility to develop new knowledge, technology and institutions so that future generations can make better informed decisions.

## Background for Scenario 2

- The safety record of existing used nuclear fuel storage facilities in Canada is very good. It is a highly regulated industry, closely monitored by government.
- Over 33 years of transporting radioactive materials in Canada there have only been a few traffic accidents, none of which resulted in the release of radioactive material. This activity is highly regulated by the Canadian Nuclear Safety Commission and Transport Canada.
- Although much is known about nuclear chemistry and how to manage radioactive products, experts cannot predict with complete certainty how any management approach will perform over many thousands of years.
- Some countries, such as Sweden and Switzerland, have adopted a step-by-step approach to the long-term management of used nuclear fuel. This involves careful thought at each major decision point, taking the time to ensure all relevant factors and all new information have been considered.
- Research is currently underway in Europe, the U.S., Russia and South Korea on a process called **transmutation** that would transform some radioactive components into non-radioactive elements. It will take many years before we will know if it is viable. If successful, the process could significantly reduce the length of time used nuclear fuel poses a hazard.
- **Reprocessing and partitioning** are processes that allow further energy to be recovered from the used nuclear fuel, but also produce plutonium, posing an even greater security risk. The residual wastes are still very dangerous and require long-term management. This technology is used in France, Japan, the United Kingdom and Russia.

## ELEMENTS OF SCENARIO 2

- ❖ A step-by-step approach would be taken to making decisions about how best to manage used nuclear fuel. No final decisions would be taken today.
- ❖ The NWMO would be given a clear mandate and necessary resources to make deliberate investments in perfecting existing technologies and generating new knowledge and technology;
- ❖ The management approach would ensure that:
  - Health, safety and environmental standards are updated as new knowledge emerges; and,
  - Used nuclear fuel is maintained in a way that it would be accessible for treatment or reuse by future generations.
- ❖ To ensure regular stock-taking of new knowledge and technologies:
  - Deadlines would be set for regular reviews and to recommend next steps;
  - Processes would be established for reporting to the public and for future public participation in decisions.
- ❖ The Trust Fund would be used for:
  - Research on three parallel paths: perfecting existing technologies, developing new technologies, and using social sciences in support of long-term risk management;
  - Developing institutions and systems to enable future generations to make informed decisions; and
  - Developing monitoring and compliance systems which endure over long periods of time.
- ❖ Investment in the Trust Fund would take place over a longer period of time. This assumes that future generations – either users of nuclear energy or taxpayers generally - would be prepared to commit resources to managing the used fuel created by past generations.

**PROS: ARGUMENTS IN FAVOUR OF SCENARIO 2:  
EMPHASIZE CHOICE FOR FUTURE GENERATIONS**

- √ Temporary storage is working well, so why rush into choosing something we aren't certain of?
  
- √ Despite all the technical work that has been done, there is still much we cannot predict over the long time-frame we are dealing with. It is too soon to be making a decision that could narrow the options for future generations to deal with potential risks.
  
- √ We cannot presume to know what future social values will be, nor what future standards will be for health and the environment. We need an approach that is adaptable to change.
  
- √ There is a possibility of scientific and technical breakthroughs that could allow this and future generations to have more options and greater scientific certainty.
  
- √ It doesn't make sense to force people today to spend so much money on managing used fuel, when there could be a much less expensive solution in the future.
  
- √ The best thing we can do now is to invest in creating the knowledge that reduces uncertainty and enables future generations to make their own decisions. Decisions made today should be reversible by future generations.

**CONS: ARGUMENTS AGAINST SCENARIO 2:  
EMPHASIZE CHOICE FOR FUTURE GENERATIONS**

- ✘ Not making a decision now means we leave a heritage of risk and uncertainty for future generations. It is better to make a decision and reduce the uncertainty for our children's children.
  
- ✘ Much has already been invested in developing the technology we have today. We can't afford to keep spending money looking for the perfect solution by investing in new technologies that may never be feasible. We are better off working with what we know than trying to guess the future.
  
- ✘ In generations to come, existing energy sources may be replaced by some we haven't even thought of. Why should our descendants have to continue to maintain the capacity and invest time and money in managing our used nuclear fuel?
  
- ✘ Future generations may not have the social and political stability or financial resources to safely manage used nuclear fuel they inherit from our generation. They may not even have people who know how to operate a nuclear waste management facility.
  
- ✘ The safety record may be good for now, but there is always the risk of human error or some other disaster – either man-made or natural. It is better to do what we can now to minimize the risks.
  
- ✘ Communities currently hosting the temporary storage facilities have been living with uncertainty for 30 years. Those communities need an answer about long-term storage so they can plan their futures.



## Scenario 3 — Emphasize role of governments

### Introduction

Canadians expect the Ontario, Quebec and New Brunswick governments and the federal government to take responsibility for protecting and promoting human health, public safety and the natural environment. As the shareholders and regulators of the power companies, these governments have an obligation and mandate to manage this issue and be held accountable for how well they do this.

## Background for Scenario 3

- Many Canadians strongly believe that governments have an obligation to safeguard health, the environment and public safety. They are prepared to limit private choices in the interest of protecting these public goods.
- The majority of participants in focus groups held in the fall of 2002 felt they would be unlikely to engage in a process on how to manage nuclear waste because it wasn't in their "backyard". They did not live near a nuclear facility or along a route to a possible management site.
- The majority were also prepared to trust an agency to manage used nuclear fuel as long as it was independent from government and the nuclear industry, directed by multi-disciplinary science and competently managed.
- Governments and government agencies own, regulate and monitor the management of used nuclear fuel:
  - The provincial governments of Ontario, Quebec and New Brunswick are the shareholders of their respective nuclear power plants. The federal government is the single shareholder of AECL.
  - The federal government regulates and monitors the nuclear industry in areas of health, environment, transportation and international trade and to ensure that our commitments to the Non-Proliferation Treaty are upheld.
  - The nuclear facilities are licensed and monitored by the Canadian Nuclear Safety Commission to ensure they are meeting Canadian and international standards.
- The consumers of electricity in the three provinces who benefit from the electricity produced by nuclear plants are paying the bulk of the costs of managing the used fuel.
- When terrorist acts happen, as they did in September 2001, public concern for security can override all other economic and social considerations.

## ELEMENTS OF SCENARIO 3

- ❖ The federal government would choose the management approach for Canada, ensuring national security, health, safety and environmental standards are met. Federal agencies would continue to establish and monitor regulations in accordance with Canadian and international guidelines.
- ❖ The provincial governments in Ontario, Quebec and New Brunswick would have a voice in determining the approach, representing their own social, safety, economic and environmental needs.
- ❖ Any disputes would be referred to the courts for resolution.
- ❖ Public hearings would be held so people living in or near communities which would host used fuel facilities in the future would be able to express their views on a proposed decision. Governments would then decide and implement a management approach. Information would be provided to the public through annual reports.
- ❖ Communities eventually chosen would receive long-term benefits, recognizing the responsibility they take on behalf of society at large.
- ❖ If governments needed additional resources to fulfill their responsibilities, the money would come from public tax dollars.
- ❖ People would hold their governments to account for ensuring used nuclear fuel is managed safely and effectively.

**PROS: ARGUMENTS IN FAVOUR OF SCENARIO 3:  
EMPHASIZE ROLE OF GOVERNMENTS**

- √ When the health, safety and security of people or the environment are at risk, governments must act decisively. They are the guardians of the public interest. They are the only ones who have the ability to impose and enforce strict health, safety and environmental standards.
  
- √ The world can be an unstable place. If the used fuel fell into the wrong hands, it could be used for destructive purposes. Ensuring the security of the used fuel is part of the responsibility of our governments to all Canadians and to the international community.
  
- √ Managing used nuclear fuel requires a high degree of expertise and control. People who are experts in this area and related disciplines are in a position to know what needs to be done. Governments have the resources and authorities to get the experts needed to work closely with them in making these decisions.
  
- √ It is possible that no community would willingly choose to be a site for managing nuclear waste. While the views of interested Canadians and communities should be sought, governments must decide. This is what they are elected to do. Our role is to hold them accountable.
  
- √ People have their own busy lives and many are not in a position to understand all this technical jargon and make sense of the risks. When someone makes a bad decision, we all pay a price. We rely on our governments to protect us.

**CONS: ARGUMENTS AGAINST SCENARIO 3:  
EMPHASIZE ROLE OF GOVERNMENTS**

- ✘ Risk is all around us. We have to take risks every day. The government should not behave like an overly protective parent. They should be providing people and communities with information to make decisions for themselves on what risks they are prepared to live with.
  
- ✘ Top down command and control structures don't work in society today. It is no longer acceptable to defer to governments alone to solve complex societal issues. Better solutions will result if there are multiple perspectives brought into the decision making process.
  
- ✘ Governments have uneven records of enforcing health and safety regulations. Penalties for offenders are often so low that they are not taken seriously. Why should we think it will be any better with respect to used nuclear fuel?
  
- ✘ We continue to hear about cost overruns and poor management at nuclear power plants. Why should we expect them to be any better at managing used nuclear fuel?
  
- ✘ Citizens living in or near those communities hosting sites are the most affected. Their quality of life is at stake. They should have an ongoing role in ensuring used nuclear fuel is being properly managed.



## Scenario 4 — Emphasize role of affected communities and civil society\*

### Introduction

Canadians expect to have a voice in long-term decisions about their future health, safety and environment, especially the communities most directly affected by used nuclear fuel. We need to ensure that those communities are effectively involved in making decisions about how to manage used fuel, including the right to refuse to host a used fuel facility. Those communities and civil society should play an ongoing role in monitoring.

\* civil society includes non-profit organizations, interest groups and associations, and the general public.

## Background for Scenario 4

- Citizens are less deferential to governments than they used to be. They want governments to provide them with more and better information to make informed choices for themselves. They want to be more actively involved in public affairs.
- Communities in the 21<sup>st</sup> century can be defined by geographic boundaries or by communities of interest, values or beliefs.
- International incidents like the ones at Three-mile Island and Chernobyl have undermined public confidence in nuclear power industries around the world. There is an acknowledged need to build trust so people can have confidence the appropriate safeguards are in place.
- In November 2003, 41% of Canadians said they were confident authorities responsible for dealing with nuclear waste have a good system in place for dealing with it. Confidence was highest in Ontario (51%) and lowest in Quebec (27%). Other regions varied from 35 to 43%.
- Sweden, Belgium and Finland give communities the right to refuse to host a waste management facility or impose conditions around it.
- Aboriginal people in Canada have a long tradition of consultation and use of traditional knowledge in reaching decisions.
- Communities currently hosting used nuclear fuel storage facilities want to share their knowledge and experience with others. Communities near Port Hope, Ontario have developed their own solutions to clean up contamination from uranium, with federal financial and technical support.

## ELEMENTS OF SCENARIO 4

- ❖ In this scenario, civil society, especially communities most affected, would have an effective voice in the decisions made by governments and the nuclear industry, as they develop and implement approaches to managing used nuclear fuel that best respond to the needs of Canadians.
- ❖ The approach would clearly identify the authorities responsible for making and implementing the final decisions, while ensuring that:
  - Affected communities would have the right to refuse to accept used fuel storage or burial or to place conditions on implementation up to the point where construction begins;
  - These communities would participate in monitoring the impacts on their health and the environment;
  - They would have access to resources and independent experts to provide them with advice;
  - A mechanism for resolving disputes would be established; and,
  - Full and reliable information would be easy to access.
- ❖ The approach to site selection would be flexible to accommodate the interests of groups like Aboriginal peoples, who have a special relationship with the land, and to the people of Ontario who currently bear most of the financial costs and host most of the existing used fuel.
- ❖ The Trust Fund resources would be used to implement the approach and to:
  - Support participation of civil society and help citizens build the knowledge and skills needed to be able to determine an acceptable level of risk for themselves;
  - Facilitate consensus building and the resolution of conflicts; and,
  - Support affected communities to minimize the effects on their way of life or on their social, cultural or economic aspirations.

**PROS: ARGUMENTS IN FAVOUR OF SCENARIO 4:  
EMPHASIZE ROLE OF AFFECTED COMMUNITIES AND  
CIVIL SOCIETY**

- √ The health of communities is based on a sense of place and hope for the future. We have to let them consider what kind of place they want to live in and bring up their children.
  
- √ No government has all the answers. If we are to have a system in place that we can trust, citizens and communities have to be engaged.
  
- √ There is a difference between risks we choose to accept ourselves and those that are imposed on us without our consent – and often without our knowledge.
  
- √ The communities closest to the used fuel facilities have the most at stake. They need to be part of deciding, implementing and monitoring the management approach. If they have confidence the system is working, everyone else can have confidence too.
  
- √ This is an issue that concerns all Canadians and the legacy we leave our children and grandchildren. All who are interested should have the opportunity to influence decisions on the long-term management of used nuclear fuel.
  
- √ No community should be asked to bear a disproportionate share of the risks associated with managing used nuclear fuel against their will.

**CONS: ARGUMENTS AGAINST SCENARIO 4:  
EMPHASIZE ROLE OF AFFECTED COMMUNITIES AND  
CIVIL SOCIETY**

- ✘ Canada has a responsibility to manage this waste one way or another. It has to be stored or buried somewhere. We can't let one community prevent the whole country from meeting its obligations.
  
- ✘ With all of the competing interests and instability in the world today, we need strong governments to decide and act on what is best in order to protect the public interest.
  
- ✘ Aboriginal people have experienced a long history of broken promises and agreements in their dealings with non-native people and the Canadian government. They have little confidence that a community's right to refuse a facility would be applied to them, nor that agreements would be kept.
  
- ✘ Trying to include everyone's perspective only results in a stalemate. We will never find a solution to please everyone.
  
- ✘ While it is reasonable to consult those people who are most affected, a broader approach could be very costly and time consuming. It is not fair to ask the consumers of nuclear power to pay for all these extra costs.