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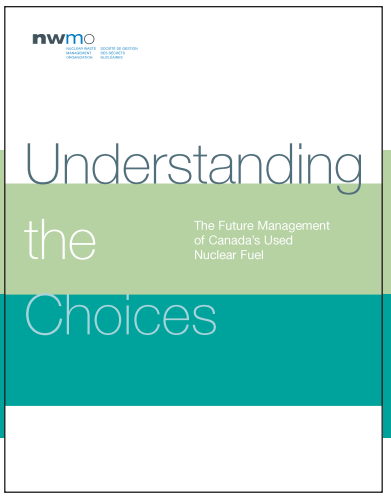
NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

February 2005

Summary Report

Information and Discussion Sessions

DPRA Canada



Discussion Document 2: Understanding the Choices

The NWMO has committed to using a variety of methods to dialogue with Canadians in order to ensure that the study of nuclear waste management approaches reflects the values, concerns and expectations of Canadians at each step along the way.

A number of dialogue activities have been planned to learn from Canadians whether the elements they expect to be addressed in the study have been appropriately reflected and considered in Discussion Document 2. Reports on these activities will be posted on the NWMO website. Your comment is invited and appreciated.

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EXECUTIVE SUMMARY

This report summarizes the perspectives of Canadians with respect to the future of Canada's used nuclear fuel as described in the Nuclear Waste Management Organization's (NWMO) Discussion Document #2: "Understanding the Choices."

Canada's major owners of used nuclear fuel created the NWMO in 2002 to meet their obligations under the Nuclear Fuel Waste Act. The NWMO's mandate is to conduct a comprehensive study of approaches for the long-term management of Canada's used nuclear fuel, to recommend a preferred approach to the Government of Canada by November 15, 2005, and to implement the approach when selected by the Government based on the recommendation of the Minister of Natural Resources.

The NWMO has committed to "develop collaboratively with Canadians a management approach that is socially acceptable, technically sound, environmentally responsible and economically feasible." The Nuclear Fuel Waste Act requires the organization to consider, at a minimum, three management approaches: deep geological disposal in the Canadian Shield; storage at nuclear reactor sites; and centralized storage, either above- or belowground. Individuals, organizations and communities have been engaged in an open and transparent dialogue with the NWMO throughout all phases of its study plan, as it seeks to identify a preferred approach for the long-term management of Canada's used nuclear fuel.

As part of its extensive study process, the NWMO has involved a wide range of Canadians in workshops, meetings, national dialogues and information sharing events and engagements. As part of that study process, during fall 2004, the NWMO released Discussion Document #2: "Understanding the Choices." In order to better understand the views of Canadians about the future of Canada's used nuclear fuel, the NWMO conducted information and discussion sessions in all provinces and territories across Canada.

To understand more about the perspectives of the general public on Discussion Document #2, the NWMO visited 34 communities between September and December 2004. The NWMO also welcomed comments and submissions via mail or directly through its website (www.nwmo.ca). Discussion Document #2 is available on the NWMO's website, or by contacting them directly[1]. The report includes:

- A report-back to Canadians about the results of engagement and research activities to-date;
- A proposed Framework for comparing management approaches;
- A preliminary assessment of the management approaches for discussion; and
- The next steps in the study process.

[1] Discussion Document #2 is available at: www.nwmo.ca/understandingthechoices or by calling 1.866.249.6966

The objectives of the fall 2004 engagement process to provide comment as input to the study process related to Discussion Document #2 were three-fold:

- To provide opportunities for the general public to learn about the NWMO and its study, and to review and discuss Discussion Document #2 and the three key questions included in the document:
    - Is the Assessment Framework comprehensive and balanced? Are there gaps, and if so, what do we need to add?
    - What are your thoughts on the strengths and weaknesses of each management approach: deep geological disposal; centralized storage; and reactor site storage?
    - Are there specific elements that you feel must be built into an Implementation Plan? What are your thoughts on what a phased approach must include?
- To record and present the comments of participants
- To ensure that local and regional decision makers were aware of the actions of the NWMO and its work to engage the public in the study process

This report summarizes the results of the information and discussion sessions' submissions and comments related to Discussion Document #2: "Understanding the Choices." The report focuses on the answers to the three key questions and summarizes other, pertinent comments made by participants.

General Comments

- There was wide support for the NWMO Assessment Framework. Generally, participants found the Framework to be comprehensive and balanced. It was suggested that NWMO had done a good job in developing a Framework that reflects the values and ethical principles of most Canadians.

- There were several specific suggestions for additions to the Assessment Framework; these are included in Section 3.1

- Participants sought clarity as to the role and relationship among the values, ethical principles and objectives. Specifically, participants wanted to understand how these would be used in the assessment of approaches and whether the objectives would be weighted in terms of their significance.

- Many participants viewed the inclusion of societal values and ethical considerations alongside technical and financial considerations as a significant improvement over past efforts to manage used nuclear fuel.

- While participants viewed all of the values, principles and objectives as important, it was clear that safety from harm, responsibility, respect for life, respect for future generations and security were considered to be of greater significance.

- Safety from harm means different things to different people. Some felt that safety can best be achieved through burying the used fuel and ensuring it is removed from the surface biosphere. Others felt strongly that safety is best assured by storing used fuel above ground where it can be maintained and actively managed.

- Most participants want Canada to take responsibility for the used fuel and to take action now. However, there was no consensus as to the type of action. Some felt our generation should make a decision as to the final solution about management of the used fuel and to resolve the matter now. There were others who felt that we should leave a decision as to the final solution for the future. Our responsibility is to ensure that the used fuel remains safely managed pending this future decision.

- There was a strong suggestion from participants that the selected management approach needs to be adaptable and embrace flexibility. The reason for this is that many participants expressed support for the potential to retrieve the used fuel for future use or future management. In this regard, a phased approach to management was widely supported. Such an approach would allow time to learn more and to potentially develop better long-term management solutions.

- Participants were also clear that they wanted to be kept informed about upcoming and future decisions about the NWMO's work and any decisions Canada makes on long-term used fuel management. In addition, participants noted that education is an important component of the process; this is so that Canadians can be informed enough to better weigh the risks and benefits of the used fuel management approaches.

- Many participants were concerned about the potential risks associated with the transportation of used nuclear fuel from reactor sites to a centralized location. A centralized location is a feature of deep geological disposal and centralized storage. Some concerns included: risk of terrorist activity, risk of spills, inadequate road conditions and remoteness from emergency crews.

- Participants while widely supportive of a voluntary approach to siting a long-term management facility recognized that siting even though a voluntary approach would likely be difficult. With respect to this, participants expressed a need to clearly define in advance the key criteria for facilities. Prior distribution of the criteria will help communities understand the nature of the voluntary approach and how they can participate.

- Participants felt that Canada needed to collaborate with other nations involved in radioactive waste management and to keep a watching brief on emerging technologies.

The Assessment Framework

The first question discussed at discussion sessions across the country was *"Is the Assessment Framework comprehensive and balanced? Are there gaps, and if so, what do we need to add?"* Facilitators presented each of the three components of the Framework and asked Canadians what they thought. The three components of the Assessment Framework are: (1) Citizen Values; (2) Ethical Principles; and (3) Objectives. The Citizen Values were garnered from a research project carried out by the Canadian Policy Research Network (CPRN) from January to March 2004 on behalf of the NWMO. The CPRN process identified seven distinct citizen values, and they were discussed as a part of this engagement process. In summary, Canadians were comfortable with the citizen values, but felt that some superseded others and wanted to understand more about how the values will be applied and/or weighted in the final decision-making process.

In January 2004, the NWMO convened a Roundtable on Ethics. The panel of renowned ethicists developed a set of six ethical principles to be used to consider the future management of used nuclear fuel. Participants viewed the ethical principles as essentially complete. Questions were asked about how the principles will be applied.

Eight objectives were presented in Discussion Document #2. An Assessment Team (that was established by the NWMO) developed these objectives based on the citizen values, the ethical principles and the ten questions that Canadians had said it was important to ask and answer in the study. The objectives were viewed as being representative of the important matters that need to be considered in assessing approaches. Participants felt that the objectives were appropriate for assessing options. While some participants saw the Assessment Framework as a mechanism to evaluate assess safety and risk, others sought the inclusion of a comprehensive, quantitative safety and risk assessment to compare the proposed management approaches. During the dialogue at sessions, NWMO representatives assured participants that a formal safety assessment or safety case will be conducted at a later stage as part of the environmental assessment, licensing and approval process.

Preliminary Assessment of Management Approaches

The second key question that Discussion Document #2 raised was *"What are your thoughts on the strengths and weaknesses of each management approach: deep geological disposal; centralized storage; and reactor site storage?"* Participants had varied and insightful responses to this question. Some participants considered a particular feature of an approach as a strength, while other participants viewed the same feature as a weakness. For clarity, responses have been summarized and delineated according to each of the three proposed management approaches:

Long-Term Storage at Reactor Site Management Approach

Strengths

The following summarizes the participants' views as to the strengths of this management approach:

- The key strength of reactor site storage was felt to be that there is little need to handle the used fuel in the near term and no need to transport the used fuel.

- The reactor site storage approach maintains flexibility and allows future access to the used fuel either as an energy source or for further treatment and management as a result of the development of any new knowledge and technological advancement.

- The used fuel would be easily accessible and therefore it is more likely that research will continue into better management solutions. Community guardianship of the used fuel would be maintained.

- The reactor site communities are currently familiar with and understand the nuclear industry. This may create a comfort level with leaving the used fuel where it is.

- The reactor site communities already possess the management and technical expertise as well as the emergency response infrastructure to effectively mange the used fuel.

Limitations

The following is a summary of the participants' comments as to the limitations of this approach:

- Many participants viewed the selection of long-term storage at the reactor sites as a "default" option. People said things such as: "Why not leave it where it is now?" "If it is safe, why not leave it?" and "There would be no need to transport the used fuel if it is being safely managed now." This approach would leave the ultimate long-term decision to future generations, and some viewed this as being irresponsible.

- This approach requires a long-term commitment by society to continue to care for and fund management activities for many thousands of years. Some participants expressed doubt that such a commitment would stand over the long term. Further, it was suggested that no one can predict the future and the potential for societal conditions to change over time is great and as a result, the standard of care required cannot be guaranteed.

- Costs for this approach are significant and too open-ended and this is the most expensive approach of the three over the long term.

- On-site storage may be an attractive target for terrorist action or sabotage. With multiple sites storing used fuel, the potential for attack or sabotage becomes greater.

- All of the reactor sites are situated on bodies of water. An accident or spill or change in climatic conditions may result in the storage facilities contaminating water supplies.

Deep Geological Disposal Management Approach

Strengths

The following is a summary of the participants' views as to the strengths of this management approach:

- For some participants, deep geological disposal in the Canadian Shield offers the greatest potential of the three for a final resolution to the management of the used fuel. However, there were many participants who felt that it would be irresponsible to dispose of used nuclear fuel and leave it unmonitored forever as they feel the issue of its long-term management is not really amenable to a final resolution.

- In the opinion of several participants, deep geologic disposal would most effectively isolate the used fuel from human populations and the environment. It would be best at preventing possible terrorist actions or sabotage.

- As an immediate step, this management approach does not allow for adaptability and flexibility in decision-making for future generations but when seen as the final step in a continuum of a long-term management approach it provides great flexibility as it can be used as interim storage and later as a final solution for the long-term management of the used fuel.

Limitations

The following points summarized participants' views as to the limitations of this management approach:

- Many participants, especially those from northern Ontario and other locations removed from the reactor sites, expressed concern as to the risk to people and the environment with the transportation of the used fuel.

- Some participants felt that deep geological disposal has not been demonstrated to be a safe and secure method. There is much to be learned. There are no guarantees that the repository will not be breached by either nature or humans. Any breach could contaminate groundwater and may impact surface water. Once breached, it will be difficult or impossible to mitigate and remediate.

- The selection of deep geological disposal was viewed by some as a final decision in the management of the used fuel. Many argued that the opportunity to use the

fuel in the future or to neutralize the used fuel hazard in the future would be lost. This was viewed as undesirable.

- Some participants from northern Ontario opposed the deep geological disposal management approach on the basis of fairness. It was argued that since northern Ontario did not directly benefit from the generation and use of nuclear energy, it should not be considered as the location for the storage or disposal of the used fuel.

Centralized Storage Management Approach

Strengths and Limitations

Participants offered the following comments on the strengths and limitations of this approach:

- The significant advantage of centralized storage is that it allows for potentially greater siting choices than the two other approaches for the location of a management facility. It shares this strength somewhat with deep geological disposal.

- It shares the following strengths with reactor site storage: economic benefits, adaptability and flexibility, ease of retrieval of the used fuel and ongoing community oversight and monitoring.

- It shares the following limitations with on-site storage: on-going costs, no final solution, security concerns and need for an on-going commitment to the approach.

- It shares the following limitations with deep geological disposal: transportation costs and risks, potential siting difficulties and possible geographic unfairness.

Phased Approach

- There were suggestions that the NWMO should consider a fourth management approach, which would be a combination of the best features of the three options and implemented over a period of time. Participants described the form and nature of the phased approach differently. They key elements include: storage for a period of time allowing for new knowledge and technology to emerge for the purpose of neutralizing the used fuel or possible re-use or better management technology. The possible development in parallel, or a commitment to future development of a deep geologic repository either as further storage or as final disposal, if needed.

- Many participants viewed the phased management approach as making good sense for Canada and urged NWMO to consider this approach further.

Implementation Plan Considerations

The final question posed in Discussion Document #2 was *"Are there specific elements that you feel must be built into an Implementation Plan? What are your thoughts on what a phased approach must include?"* This future-focused question asked participants to propose ideas for the implementation of any management approach. The following is a summary of what was heard in terms of implementation considerations:

- There is a desire for the NWMO to commit to continue the spirit and intent of the Assessment Framework in the implementation phase and for all aspects of used fuel management.

- There will be a need to define, in advance, the factors for determining an appropriate site for any used fuel facility and widespread discussions about how people can participate in the decision-making process.

- The Implementation Plan should define the form and nature of commitments to and agreements with communities. This should include commitments for monitoring, community involvement in decision-making, economic benefits, property value protection, emergency response and insurance.

- An independent and objective organization should be responsible for the implementation and oversight of the management approach. There was a difference of opinion as to the relationship of the organization to government and the nuclear industry. The action of the organization must be open, transparent, balanced and shared.

- The affected communities must play a key role in the monitoring of the management approach. Composition of the monitoring committee should include representatives from the community, broad public interests, government officials, technical experts, social scientists and ethics.

- The Implementation Plan should ensure a full emergency preparedness and response program. In addition to ensuring that all communities have trained personnel, they must also have equipment and financial resources to support all emergency response in the host community and along transportation routes.

- The Implementation Plan should include activities to prepare a comprehensive safety risk assessment of the selected approach. Included must be mitigation measures and contingency plans.

- In northern/rural communities, there was an expressed desire for an assessment of the different modes for transportation of used fuel, if either deep geological disposal or centralized storage is selected.

- Many participants were concerned that Canada should not allow the importation of used nuclear fuel from other countries. However, it should also be noted that a

few participants suggested that Canada might have an obligation to take back CANDU used fuel from other countries or guarantee proper management of the used fuel.

- There should be an understanding, supported by legislation that all trust funds established for the management of used fuel will not be allocated for other uses by future governments. Mechanisms must be established to ensure this does not happen.

- Public engagement by the NWMO must continue throughout the implementation phases.

Other Participant Comments

During the engagement process related to Discussion Document #2, the NWMO sought feedback from Canadians on the three key questions discussed above. In addition to answers to the three questions, Canadians expressed a number of other thoughts on issues ranging from energy policy to the nature of the used nuclear fuel hazard to international research and development. These thoughts are reflected in Section 3.4 of this report to show the breadth and depth of feelings about used nuclear fuel and its associated issues.

- NWMO should reflect to the government the wishes of some participants that full debate on the role of nuclear energy in federal and provincial energy policy occurs. Some participants openly advocated for a phase out of nuclear energy as the most effective response to the long-term management of used fuel. Other participants had the opposite point of view. Those holding this opposite view see nuclear power as an essential component of the energy supply mix. Some participants suggested that nuclear power was both safe and clean, and suggested that alternate energy supply would meet future demands.

- Canada should be proactive in learning from the experience of other countries and to use this experience in managing our used fuel.

- Many participants expressed support for the NWMO public engagement process and recommended that engagement opportunities continue.

Final Comments

This report attempts to summarize the key opinions, views and suggestions of those who participated in the nationwide engagement on Understanding the Choices. Comments on the contents of this summary report are welcomed and may be provided to the NWMO through its website – www.nwmo.ca

Ce rapport est aussi disponible en français

1.0 Introduction

The Nuclear Waste Management Organization (NWMO) was created by Canada's owners of used nuclear fuel to meet their obligations under the *Nuclear Fuel Waste Act, 2002.* The NWMO's mandate is to conduct a comprehensive study of approaches for the long-term management of Canada's used nuclear fuel, to recommend a preferred approach to the Government of Canada by November 15, 2005, and to implement the approach when approved by the Government based on the recommendation of the Minister of Natural Resources.

The NWMO has committed to "develop collaboratively with Canadians a management approach that is socially acceptable, technically sound, environmentally responsible and economically feasible." The *Nuclear Fuel Waste Act* requires the organization to consider, at a minimum, three management approaches: deep geological disposal in the Canadian Shield; storage at nuclear reactor sites; and centralized storage. Individuals, organizations and communities have been engaged in an open and transparent dialogue with the NWMO throughout all phases of its study plan, as it seeks to identify a preferred approach for the long-term management of Canada's used nuclear fuel.

The NWMO study process has involved many opportunities for public engagement and comment. Some of the many activities to engage Canadians have included:

- An opportunity to review, comment and dialogue through the NWMO website (www.nwmo.ca)
- A national citizens' dialogue designed to identify core Canadian values
- Working collaboratively with Aboriginal people to establish a dialogue consistent with their needs (including Aboriginal dialogue sessions and workshops)
- Public opinion research
- Community events and tradeshows
- Workshops with experts, government agencies and the public
- Roundtable dialogues with youth, experts on ethics, and opinion leaders
- Workshops on the technical and environmental aspects of used nuclear fuel management
- Meetings with: elected officials and representatives in reactor site communities; scientific experts in used nuclear fuel management; community health committees; international experts
- Interviews and discussions with the media
- Newsletters and fact sheets for general distribution
- Speeches and presentations to academic, technical, government and business leaders both nationally and internationally
- The publication of Discussion Document #1: "*Asking the Right Questions"*; this document was an invitation for Canadians to reflect on the complex issues posed by used nuclear fuel and provide perspectives on various methods and approaches for its long-term management and evaluation

- A series of national and regional dialogues for organizations and individuals with an active interest in the management of used nuclear fuel and public policy
- The publication of Discussion Document #2: "*Understanding the Choices"* in September 2004.
- A series of national information and discussion sessions to discuss the contents of Discussion Document #2 and to confirm what the NWMO has heard from Canadians throughout the engagement process

This report outlines the engagement process and summarizes the results of the nationwide information and discussion sessions related to Discussion Document #2: "*Understanding the Choices."* This is a report prepared by DPRA, a firm hired to assist NWMO with facilitation, project management and logistics for this engagement. The report presents a summary and observations of what was heard during the information and discussion sessions and the content of other submissions related to Discussion Document #2.

Questions or comments on this report are welcome, and may be directed to the Nuclear Waste Management Organization (NWMO):

Web: www.nwmo.ca Tel: 1.866.249.6966
Fax: 416.934.9526 Email: info@nwmo.ca

Ce rapport est aussi disponible en français

2.0 Community Information and Discussion Session Process

The NWMO released Discussion Document #2: *"Understanding the Choices"* in September 2004. The report presents:

- A report-back to Canadians about the results of the engagement and research activities to-date
- A proposed Framework for comparing management approaches
- A preliminary assessment of the management approaches for discussion
- The next steps in the study process

Discussion Document #2 is available in electronic format on-line, or in hard copy by contacting the: www.nwmo.ca/understandingthechoices or 1.866.249.6966.

To understand more about the perspectives of the general public on Discussion Document #2, NWMO embarked on a series of information and discussion sessions across Canada from September to December 2004. More information about the NWMO's objectives and approach for these sessions is included in this chapter.

2.1 Objectives

The objectives of the fall 2004 engagement process related to Discussion Document #2 were three-fold:

- To provide opportunities for the general public to learn about the NWMO and its study, and to review and discuss Discussion Document #2 and the three key questions included in the document:
    - Is the Assessment Framework comprehensive and balanced? Are there gaps, and if so, what do we need to add?
    - What are your thoughts on the strengths and weaknesses of each management approach: deep geological disposal; centralized storage; and reactor site storage?
    - Are there specific elements that you feel must be built into an Implementation Plan? What are your thoughts on what a phased approach must include?
- To record and present the comments of participants
- To ensure that local and regional decision makers were aware of the actions of the NWMO and its work to engage the public in the study process

2.2 Approach

In order to achieve the three objectives related to Discussion Document #2, the NWMO sought the support of a firm to assist with logistics and facilitation. DPRA Canada was selected to design, develop and implement the community information and discussion sessions.

NWMO and DPRA Canada designed a series of nationwide community information and discussion sessions in 34 communities across Canada between September 27 and December 16, 2004. The information and discussion sessions were the heart of the engagement process for Discussion Document #2. The NWMO endeavoured to reach as many Canadians as were interested in discussing the future management of Canada's used nuclear fuel; as such, 87 information sessions and 33 discussion sessions were held in 34 communities across Canada.

Information and Discussion Sessions

At least one information session was hosted in each of 34 communities. Information sessions were designed as drop-in, information-gathering events for community members providing opportunities to understand more about the NWMO and its study process. The following materials were available for review at the information sessions:

- 20 information panels summarizing the content of Discussion Document #2
- Copies of Discussion Documents #1 and #2
- Executive summaries of Discussion Document #2
- Self-guided mail-in workbooks and questionnaires (Copy available in *Appendix I*)
- Fact sheets about the NWMO

At each of the information sessions, NWMO representatives were available to answer questions and discuss issues with participants. Two DPRA representatives attended each of the information sessions for logistics and facilitation support. As presented in the following section *(Locations and Venues)*, more than one information session was hosted in some communities. Summary reports were written and posted to the NWMO website for each of the community information sessions.

The information sessions were followed up by a discussion session in each community. The discussion sessions provided an opportunity for participants to openly discuss issues related to the future management of used nuclear fuel in Canada and the three key questions included in Discussion Document #2. Each session was attended by an NWMO representative and/or a member of the NWMO Assessment Team. A facilitator and recorder were also present from DPRA Canada.

A recorder took notes and prepared a summary report for each of the discussion session locations. These summary reports were posted on the NWMO website and are available at: www.nwmo.ca/infoanddiscussion.

Locations and Venues

The NWMO views the future management of Canada's used nuclear fuel as a national public policy issue, therefore at least one community in every Canadian province and territory was visited for this engagement process. This process aimed to attract a cross-section of Canadians with a diversity of views. When selecting communities, the NWMO considered regional centres and centres near major populations wherever possible; this enhanced accessibility from across regions and efficient use of resources. The 34 communities were chosen to broadly cover Canada to ensure:

- Representative large and small population centres
- Urban and rural perspectives
- Coverage of north and south jurisdictions
- Perspectives in reactor site communities
- Perspectives of the current users of nuclear power in Ontario, Quebec and New Brunswick
- Balance in areas that the NWMO had not previously visited

The 34 communities visited by the NWMO for the engagement process related to Discussion Document #2 are listed in alphabetical order:

- Becancour, PQ
- Charlottetown, PEI
- Clarington, ON
- Edmonton, AB
- Edmundston, NB
- Fredericton, NB
- Goose Bay, NL
- Halifax, NS
- Huntsville, ON
- Iqaluit, NU
- Kenora, ON
- Kingston, ON
- London, ON
- Montreal, PQ
- Musquash, NB
- Ottawa, ON
- Owen Sound, ON
- Pembroke, ON
- Pickering, ON
- Pinawa, MB
- Québec City, PQ
- Regina, SK
- Rivière-du-Loup, PQ
- Rouyn-Noranda, PQ
- Sept Iles, PQ
- St. John's, NL
- Sudbury, ON
- Thunder Bay, ON
- Timmins, ON
- Toronto, ON
- Vancouver, BC
- Whitehorse, YT
- Winnipeg, MB
- Yellowknife, NWT

(More details on the community information and discussion sessions, including times and locations are included in *Appendix A*)

Venues for the information and discussion sessions were chosen based on accessibility, proximity to a downtown core or local highways, ability to access via public transit and

the ability of the event room to hold at least 30 participants. As such, most sessions were held in hotel or community centre facilities.

The One- and Two-Visit Approach

For many Canadians, this engagement process might have been their first exposure to used nuclear fuel management issues. Therefore, creating a phased approach with a two- to three-week period between some community's information and discussion sessions allowed Canadians time to collect information and understand what it meant to them. In addition, the NWMO recognized that Canadians would have varying degrees of knowledge about used nuclear fuel. Providing space between the information and discussion sessions allowed those that were interested, but who had no prior experience with the issue to become better informed.

Therefore, to enable the most effective use of time and resources, NWMO tailored its approach into two categories: (1) one-visit to jurisdictions *without* nuclear generation; and (2) two-visits to jurisdictions with nuclear generation or existing used fuel storage facilities.

The communities in which the information and discussion sessions were held during one-visit were outside of the three provinces in Canada with nuclear generation. For these 11 communities (listed alphabetically below), two information sessions and one discussion session were held over a two-day period. As noted, these communities are outside of jurisdictions with used nuclear fuel generation, however, from a national public policy perspective, these communities were viewed as having an interest in the future management of Canada's used nuclear fuel.

- Charlottetown, PEI
- Edmonton, AB
- Goose Bay, NL
- Halifax, NS
- Iqaluit, NU
- Owen Sound, ON
- Regina, SK
- St. John's, NL
- Vancouver, BC
- Whitehorse, YT
- Winnipeg, MB
- Yellowknife, NWT

For the remainder of communities – 23 in Ontario, New Brunswick and Quebec – three information sessions were held during one two-day visit and the NWMO and DPRA teams returned for a second visit to host the discussion session. The gap between the information and discussion sessions varied, but most sessions were at least two weeks apart.

The two-visit approach was favoured for these 23 communities because they are located within provinces with nuclear generation and existing used fuel storage facilities. By virtue of living in a province with nuclear power, it was felt that these participants have a

different relationship with the issue, warranting additional effort from the NWMO to solicit their opinions. [2]

Additional Input

In addition to input received during community information and discussion session, the NWMO sought feedback from Canadians through other means. This included regularly updating its website (www.nwmo.ca) and soliciting on-line feedback from Canadians.

A simple, self-directed workbook and questionnaire were created about Discussion Document #2; these were distributed at information and discussion sessions and participants were encouraged to mail them back. These were also available on-line for participants that could not attend sessions or for those that prefer to submit written comments. 38 workbooks and comment sheets (hard copy and electronic versions) were collected during the engagement process.

A toll-free phone number was established for this project and Canadians were welcome to register for the sessions, ask questions or provide input over the phone.

Written submissions from Canadians have been welcomed throughout the study process. These are available for review on-line at the NWMO's "Submission Library." (www.nwmo.ca/submissions)

All information received from the various sources (website submissions, information and discussion session report, etc.) has been synthesized, imputed into a database, and forms the basis for the summaries in Chapter 3 of this report.

2.3 Notification Process

Prior to the start of the engagement process, NWMO developed a media information plan and notification process. This process, as described below, included media kits, radio and newspaper advertising and post-participation information.

Notification Letters

At least two weeks prior to the first visit to a community, letters were sent to all media outlets in each of the 34 locations. The media packages contained:

- Covering letter
- NWMO News Release: NWMO Releases Second Discussion Document – Seeks Further Public Dialogue
- Notice for local information and discussion sessions

[2] Note that in some communities, only a one-day information session was held; a complete list of information session times and locations are in included in *Appendix A*. Also note that due to inclement weather conditions, the discussion session originally scheduled in Edmundston, New Brunswick was cancelled.

- Background information on the NWMO
- Executive Summary of the NWMO Discussion Document #2: *"Understanding the Choices"*

Notification letters were also mailed to all MPs, MPPs, mayors and clerks in the municipalities that the NWMO visited during this engagement process. Those notification packages included:

- Covering letter with details about the information and discussion sessions
- Background information on the NWMO
- Executive summary of the NWMO Discussion Document #2: *"Understanding the Choices"*

In addition, letters were sent to all participants that registered at information sessions in two-visit communities to invite them to attend the upcoming discussion session in their community.

National Advertising

A national English advertisement was run twice in the Globe and Mail (A copy of this ad is included in *Appendix F*).

Local Advertising

Newspaper ads were placed in each of the 34 community's major local newspapers. The ads ran weekly for two weeks prior to the information or discussion sessions. A sample copy of the local ad and a list of papers and dates in which it was run are included in *Appendix G*.

A standardized 20-second radio ad with a 10-second local tag line (announcing the date, time and location) was placed on local radio stations in each of the 34 communities. Radio spots were run in each community for two weeks prior to each visit. For more details about the local stations chosen for ad placements, refer to *Appendix H*.

2.4 Language Considerations

In recognition of Canada's two official languages, NWMO made English and French materials were available at all session for those participants who requested it. In addition, French and English team members and materials were available at information and discussion sessions in the following communities[3]:

- Becancour, PQ
- Edmunston, NB
- Fredericton, NB
- Quebec City, PQ
- Riviere-du-Loup, PQ
- Rouyn-Noranda, PQ

[3] Simultaneous translation was used in some of these communities

- Montreal, PQ
- Musquash, NB
- Ottawa, ON
- Sept Iles, PQ
- Sudbury, ON
- Timmins, ON

English to Inuktituk materials and simultaneous translation were provided in Iqaluit, Nunavut.

Summary

This chapter examined the considerations of the NWMO in creating a nationwide engagement process for Canadians to review and comment on Discussion Document #2: these included language, location, venue, and staffing concerns. The following chapter begins to summarize what the NWMO heard from participants at the information and discussion sessions in fall 2004.

3.0 Summary of Information and Discussion Sessions

This chapter presents a summary of what was heard at the information and discussion sessions held across Canada during fall 2004. The report is organized according to the three key questions posed to Canadians by the NWMO in Discussion Document #2: "Understanding the Choices". These three key questions were:

- Is the Assessment Framework comprehensive and balanced? Are there gaps, and if so, what do we need to add?
- What are your thoughts on the strengths and weaknesses of each management approach: deep geological disposal; centralized storage; and reactor site storage?
- Are there specific elements that you feel must be built into an Implementation Plan? What are your thoughts on what a phased approach must include?

The chapter is organized into three sections based on participants' responses to the key questions:

3.1 Assessment Framework
3.2 Preliminary Assessment
3.3 Implementation Plan and Phased Approach

In addition to comments and questions about these three questions, the NWMO heard from Canadians about other issues. These themes, although not directly related to the contents of Discussion Document #2, were of concern to a number of Canadians; therefore, this report encapsulates those thoughts in a separate section:

3.4 Other Comments

Information and discussion session comments were not the sole input sources for this report; the NWMO also heard from Canadians over the phone, and via email and mail submissions. These other comments have been included in this summary report.

3.1 The Assessment Framework

Background

Since its inception, the NWMO has sought the views and opinions of Canadians to help form and shape a long term approach for the future management of Canada's used nuclear fuel.

Through dialogues with Canadians the NWMO has gained an appreciation of what Canadians feel are the important considerations that should be included in developing and selecting a management approach.

With the release of Discussion Document #1: "Asking The Right Questions", NWMO reflected back to Canadians what it had heard through the first phase of its engagement activities. "Asking the Right Questions?" summarized and presented Ten Key Questions that Canadians felt must be addressed in selecting a management approach.

As part of its continuing efforts to better understand what Canadians view as important, NWMO also initiated a formal Citizen's Dialogue, a major undertaking aimed at enhancing its understanding of Canadian values as related to the long-term management of used fuel. This dialogue included twelve workshops held in different centres across the country involving more than 450 participants selected to generally reflect the composition of Canadian society. This research project undertaken by the Canadian Policy Research Network (CPRN) articulated seven core values which participants felt should direct the long-term management of used nuclear fuel. The seven core values are presented in *Table 3.1*.

Table 3.1

Citizen Values

Safety from harm
- An overarching requirement. First and foremost, human health and the environment must be safe as possible from harm, now and for the future.

Responsibility
- We need to live up to our responsibilities to ourselves and to future generations, and deal with the problems we create.

Adaptability
- We need to build in capacity to respond to new knowledge.

Stewardship
- We have a duty to use all resources with care and to conserve, leaving a sound legacy for future generations.

Accountability and Transparency
- To rebuild trust. Governments are ultimately accountable for the public good concerning safety and security but must involve citizens, experts and stakeholders in any decision-making. Honour and respect must be shown to all.

Knowledge
- We need to continue to invest in informing citizens, and in increasing knowledge, to support decision-making now and in the future.

Inclusion
- The best decisions reflect broad engagement and many perspectives; we all have a role to play.

(For more information on the origin of these statements, refer to the CPRN study available on the NWMO website: www.nwmo.ca/canadianvalues)

NWMO also sought the insight and advice of a Roundtable on Ethics. This group of ethicists, through its deliberations, proposed a set of ethical principles to help guide the NWMO's approach to developing and selecting a management approach. The ethical principles are presented in *Table 3.2*.

Table 3.2

Ethical Principles

Respect for Life
- In all forms, including minimization of harm to human beings and other sentient creatures

Respect for Future Generations
- Of human beings, other species, and the biosphere as a whole

Respect for People and Cultures

Justice
- Across groups, regions, and generations

Fairness
- To everyone affected and particularly to minorities and marginalized groups

Sensitivity
- To the differences of values and interpretations that different individuals and groups bring to the dialogue

(For more information on the origin of the ethical principles, refer to Ethical and Social Framework suggested by the Roundtable on Ethics, available on the NWMO website: www.nwmo.ca/ethicsroundtable)

These three inputs: the ten key questions, the seven core values and six ethical principles were important considerations for the development of a Framework to be used for the assessment of management approaches.

To complete the development of the Assessment Framework, NWMO early in 2004, assembled a multi-disciplinary group of individuals as an Assessment Team. The responsibility of the Assessment Team was to develop and apply, in a preliminary way, an Assessment Framework to distinguish the strengths and limitations of the management approaches.

In doing so, the assessment team drew upon the Ten Key Questions, the core citizen values and ethical principles to develop a set of objectives to help distinguish between and among the alternative management approaches, in particular to help identify the strengths and limitations of each management approach. The objectives were developed to incorporate and reflect the values and principles. The objectives developed by the Assessment Team are presented in *Table 3.3*.

Table 3.3

Objectives

Fairness

Public Health and Safety

Worker Health and Safety

Community Well-Being

Security

Environmental Integrity

Economic Viability

Adaptability

(For more information on the origin of the ethical principles, refer to the Assessment Team Report, available on the NWMO website: www.nwmo.ca/assessmentteamreport)

NWMO Discussion Document #2: "Understanding The Choices" – continues the dialogue with Canadians. In the document the NWMO presents the evolution of the Assessment Framework and seeks the views of Canadians on the components of the Framework.

The Assessment Framework, as defined in Discussion Document #2, consists of the citizen values, ethical principles and objectives.

The question posed by the NWMO to Canadians in "Understanding the Choices" was:

> *Is the Assessment Framework comprehensive and balanced? Are there gaps, and if so, what do we need to add?*

The following summarizes comments and responses to this question as provided by Canadians at the information and discussion sessions and through other submissions.

Comments On The Assessment Framework

A synthesis of the comments provided by Canadians on the Assessment Framework is presented in the following parts:

- Key Observations on the Framework
- Specific Comments on the Values
- Specific Comments on the Ethical Principles
- Specific Comments on the Objectives

Key Observations On The Framework

This section provides a synthesis of the key observations made by participants throughout the information and discussion sessions. Five observations are provided:

(1) Comprehensiveness of the Framework
(2) Role and Application of the Framework
(3) Determining Significance
(4) Understanding the Linkages
(5) Making a Selection.

(1) Comprehensiveness

In general, participants from across the country felt comfortable with the breadth and depth of the values, ethical principles and objectives that currently comprise the Assessment Framework. Participants found that the Framework is balanced and did a good job of reflecting what Canadians view as the important considerations for selecting a long-term approach for the management of used fuel.

Most participants indicated that the values and ethical principles subsequently embedded in the Framework objectives closely align with their personal values and ethics. A participant in Pembroke best captured this feeling: "both the values and ethical principles made good sense, if properly applied they will help to identify a good solution".

Many participants and respondents were pleased to see that the societal values and ethical considerations were being applied alongside the more conventional technical and financial considerations. For many this was viewed as a positive step forward and begins to address one of the key findings of the Seaborn Panel's report that, the long-term management solution must also be socially acceptable. There also appeared to be wide spread recognition among the participants that finding a long-term solution for the management of used fuel was both controversial and difficult. As a public policy issue this is a complex and multi-dimensional challenge and the development of an Assessment Framework that incorporates all considerations will provide a foundation for a more complete and more objective assessment of options. Several participants noted that the inclusion of societal values and ethical considerations was a significant improvement over other past efforts to manage used nuclear fuel.

(2) Role and Application of the Framework

Although most participants were comfortable, and for the most part in agreement with the components that make up the Assessment Framework, not all were clear as to how the Framework will be used to select a management approach. Specifically, many raised comments or posed questions as to the role and application of the Assessment Framework within the NWMO decision-making process.

It was suggested by some that NWMO more clearly define how each of the values, ethical principles and objectives will be applied. Some characterized the Assessment Framework as being full of general or motherhood statements and as stated by one

participant, it is difficult to argue against motherhood. For those holding this view, the societal values and ethical principles were viewed as being so broad that they might be viewed as meaningless. It was not clear to these participants how one could actually operationalize the values and principles within the assessment of options. As one participant noted "how do you demonstrate 'respect for life' in future management approaches when we don't know future conditions?" For a few participants, the definitions were described as being vague terms with multiple interpretations. Terms such as "as possible", "reasonable" and "achievable" were seen as too open-ended; many participants would prefer that "absolute" terms be used instead.

(3) Determining Significance

Participants also wondered and wanted to know if the values, principles and objectives are intended to be weighted in any way? Are they considered to be of equal importance or are some more significant than others? Questions about relative importance and a "hierarchy" within each set of values, principles and objectives were raised. For several participants it was clear that some of the values, principles and objectives were more important than others and this importance must be reflected in the NWMO Assessment of options. For example, it was heard overwhelmingly that 'safety from harm' for both present and future generations was of overarching significance to Canadians. For many participants, this sense of weighing of significance needs to be reflected in the Assessment Framework and it must be made clear how this influences the selection of a management approach.

(4) Understanding The Linkages

Comments were provided regarding the relationship between and among the values, principles and objectives. Several participants expressed that they were uncertain about the nature of the relationship between values and ethics; many viewed the two as the same. Likewise, some indicated that it was not clear how the objectives reflect or embrace the values and ethics. Some suggested that the objectives, as presented, appear to stand alone, independent of the two other components. Some participants wondered whether each set of values, principles and objectives are separate and distinct or do they in some way inform or support each other? Participants asked if each set was to be applied separately to each management approach assessed; if not, what is the role of each and what is the relationship between each? If applied separately or collectively, the management approach must clearly demonstrate how each option satisfies or addresses each of the values, principles and objectives. Many participants felt strongly that this explanation needs to be presented so that all can understand how the Framework is to be applied.

(5) Making A Selection

Finally, several participants wanted to understand how the NWMO would use this Framework to select the preferred approach among the management options being considered. In particular, participants wanted to know whether the NWMO would rely on the work of the Assessment Team or would the NWMO itself conduct the assessment and develop the rationale for its recommendation to the Federal Government? Added to this were a series of questions regarding the extent to which input from these discussion

sessions would be used by both the Assessment Team and the NWMO in finalizing the Assessment Framework and in particular the weighing of significance of values, principles and objectives.

Specific Comments on Citizen's Values

Throughout the information and discussion sessions, participants provided suggestions and advice on the core values. Comments on each of the values are summarized below.

(1) Safety From Harm

It was clear from the discussions across Canada that safety from harm was identified by participants as being the most important value. Regardless of which management approach is selected, participants felt that the approach must, to the extent possible, ensure that no harm is done. Participants had various definitions for this value, but most expressed very clearly and strongly that safety must be assured for all people (residents and workers), and our environment, and safety must be assured for both today and for the future.

Several participants expressed concern that given the long time period over which the used fuel remains a potential hazard, that the selected management approach must possess appropriate safeguards to ensure that people and the environment will never be at risk.

Some felt that the best way to ensure safety was not to produce used nuclear fuel in the first place – eliminate the hazard by eliminating nuclear generation.

Others felt that not enough was known about the risk associated with the management of used fuel and strongly suggested that additional safety assessments and risk assessments of all potential events (accidents, human error, breaches of materials, breakdown of institutional control, etc.) need to be conducted so that we can better understand what could go wrong and identify the measures needed to prevent these events from occurring.

A significant number of comments were directed to the need for security features within the management approach. At virtually each discussion session, participants expressed concern over the prospect of terrorist action to either obtain or use the used fuel for hostile purposes or the targeting of used fuel management facilities for sabotage.

There were sharp differences of opinions as to the ability of institutions to provide the oversight and care to assure safety from harm. A few participants expressed a lack of confidence in both the nuclear industry and the government to establish and maintain operating procedures and standards to ensure the safety of the management approach over the long term.

Others spoke passionately of the excellent track record of the nuclear industry with no accidents resulting in risk to people and the environment. Those holding this perspective

expressed strong confidence that a used fuel management approach can be selected and developed that will be safe and secure.

Last, there were different interpretations regarding the safety of the management options being assessed. Several participants felt that the used fuel should remain at the reactor sites above ground and easily accessible. In this way there would be a constant reminder of the used fuel and monitoring and safeguards would be maintained thus ensuring a high level of safety to people and the environment. Others felt that because of uncertainty regarding the stability of future society and the potential lack of commitment to properly manage the used fuel, that the best way to ensure safety would be to dispose of the used fuel below ground and to seal it for all time.

While interpretation of what would best ensure safety differed, it was absolutely clear that participants placed the greatest significance on safety from harm as perhaps the key requirement for a management approach.

(2) Responsibility

In the discussion sessions, it became evident that participants agreed that responsibility was an important value to guide the selection of a management approach. There appeared to be common ground among participants that we have an obligation to take action now to properly care for and manage the used fuel. However, there was no consensus as to the nature of the type of action that Canada needs to take.

The perspective of the nature of the action to be taken and thus our responsibility, varied considerably among the participants. For some participants, taking responsibility did not mean that this generation will need to make a final decision on the management of the used fuel. What needs to be done is to ensure that we fully understand the nature of the used fuel management challenge, assess a full range of options, ensure that the necessary studies, procedures and protocols are in place, confirm that the current storage of used fuel is safe and reliable and to ensure that the funds are in place to accommodate any future action for the long-term management of the used fuel. For those participants sharing this view, this does not include taking responsibility for a final decision as to the final solution for long-term management of the used fuel. This, it was suggested, should be left to future generations to determine. It was further suggested that our responsibility is to ensure that the conditions are in place to accommodate any future decision without placing future generations at risk from a safety or a financial perspective.

Others felt very strongly that it is our generation's responsibility to make a final decision that will ensure the long-term management of used fuel. This includes selecting a management approach that completely addresses the final management of used fuel and within a relatively short period of time. From this perspective, our responsibility is to ensure that we resolve this matter and not leave this as a burden for future generations.

(3) Adaptability

There was strong support for this value from the participants. One of the significant themes that emerged from the discussion sessions is that people generally have faith and are optimistic that society will continue to learn and discover new ways to do things. Of particular importance for the policy issue of used fuel is that the selected management approach anticipates and is able to accommodate the potential for new information and technological advancement. No management approach should preclude consideration of new information and it must allow for a change in approach if any new information means that the used fuel can be better managed.

Several participants indicated that technological advancement might mean that the used fuel can efficiently and effectively be re-used as a future energy source. In anticipation of this, the selected management approach must allow for the used fuel to be accessible and retrievable, we should not make a decision today that would preclude this possibility of applying new knowledge for managing this material. Several suggested that part of our responsibility was to investigate and research emerging technologies and to assess their potential for the future management of used fuel.

As a result there was a widely held and strong suggestion that the selected management approach needs to be adaptable and embrace flexibility in its implementation. This flexibility suggests consideration of a phased management approach over time.

(4) Stewardship

A few participants felt that this value was important but that it needed some modification. Some participants supported the concept of wisely using our resources to ensure that they will be available for possible future use. However, many participants questioned whether the use of nuclear energy is consistent with good stewardship. Some participants viewed nuclear generation and the resulting used nuclear fuel to be unsustainable in that resources are being consumed and a hazardous by product produced. These participants argued that the full cost of nuclear power must be considered and, when considered, the inevitable conclusion is that nuclear power and its by-product may fail to meet the tests of stewardship and sustainability. In addition to the potential risk for people and environment, the direct financial costs to properly manage the used fuel for a very long period of time was viewed as being a poor use of financial resources.

For others, stewardship meant that Canadians had a responsibility to manage used nuclear fuel found in other countries that have been produced by Canadian nuclear technology. A few participants suggested that full stewardship would imply that Canada should consider whether or not to gather used fuel and return it to Canada for proper management or to assist less fortunate countries by providing support and assistance for the proper management of the used fuel.

(5) Accountability and Transparency

This value generated considerable comment from participants. Some participants expressed skepticism about the NWMO and government's ability to develop and implement a management approach that would fulfil the expectation of the Assessment

Framework. Some felt that for the NWMO to be truly accountable, the NWMO should be reconstituted as an organization completely divorced from the current owners of used nuclear fuel. To be accountable, the NWMO needs to be independent and unfettered in its actions. The fact that the NWMO is currently governed by a Board of Directors made up of representatives of the nuclear industry meant for some participants that the NWMO lacks credibility in objectively selecting and implementing a management approach.

Many others felt that the NWMO was an appropriate body to manage the used fuel and suggested that the NWMO needed to demonstrate through its actions that it would be an objective body that would manage the used fuel in a way that meets the needs and expectation of Canadians. As stated by one participant, "the credibility of the NWMO can only be demonstrated by listening to what Canadians have to say and diligently applying the values and principles as presented. NWMO must be open and transparent in all of its actions and must provide full and honest information in support of its actions".

(6) Knowledge

Participants suggested this value was also of great importance. In order for Canada to make a wise decision on the future management of used fuel, Canadians need to be aware and informed. Several participants identified the need to build awareness and public understanding of the challenges associated with used nuclear fuel management. In particular, as decisions are made regarding the form of the management approach, the public should be provided with information to assess how an approach might affect them and to determine whether or not the approach is acceptable.

Several participants suggested that there is much uncertainty regarding the nature of the hazards and risk associated with used nuclear fuel and that complete and balanced information and research be provided. The potential for new knowledge and learning from the experiences of other countries should influence the ultimate form of Canada's used fuel management approach. The role of new knowledge needs to be recognized and accommodated in the NWMO recommendation to government.

(7) Inclusion

Participants identified the active involvement by all interested parties in the development and selection of a management approach as a fundamental requirement. Many felt that the selection of a management approach for used fuel should not be made in isolation or by experts and politicians. The development of the approach must allow for all Canadians to provide views and opinions. Some participants suggested that people most likely to be directly affected by an approach must be willing to accept the approach. A facility should only be developed if it has acceptance by the members of the community and those communities that might be affected by the transportation of used fuel. Some participants viewed this acceptance as a necessary and non-negotiable requirement for the selection and implementation of any management approach.

Comments On The Ethical Principles

In general, participants accepted and endorsed the ethical principles as presented in "Understanding The Choices". Some of the participants expressed a desire for the principles to be more fully described. A few suggested that the principles lacked passion and as presented did not convey in a strong enough way the bond between humans and nature. Some suggested that the principles imply the superiority of humankind to nature and felt that the principles failed to describe how deep the human relationship is with the earth. Several participants struggled to understand the difference between the values and the ethical principles, feeling that several overlapped.

(1) Respect For Life

Participants supported this principle as the most significant principle. Many equated *Respect For Life* with the *Safety From Harm* value. Both suggest that whatever action is taken to manage the used fuel, it must respect all forms of life, ensuring that no form of life is harmed. Many suggested that the value and principle were the same.

There was discussion regarding the definition of this principle. Many suggested that there was no need to distinguish between human beings and other sentient creatures. All life forms were viewed as being of equal importance by some participants and it was proposed at some of the sessions that the definitions be simplified to read – *Respect For Life* in all forms, including minimization of all harm.

(2) Respect For Future Generations

No ethical principle generated more discussion among participants than the principle – *Respect for Future Generations.* Again participants urged that the definition not distinguish between human beings and other species – the focus of the principle should be on future generations of all life forms. Many participants struggled with the intent of this principle and offered different interpretations. Some suggested that respect in the context of future generations meant that we should not pre-judge the needs and capabilities of the future. Rather than acting in a paternalistic way, we should leave the choice of what to do with the used fuel for them to determine. There was a strong sense among several of the participants that the used fuel may represent a potential resource for future generations and the decisions and actions taken by this generation should not foreclose future opportunities. In this context, our generation would show respect for the future by ensuring that the used fuel is properly cared for but made available to the future for possible use.

Others argued that *Respect For The Future* clearly meant that this generation must take all the necessary action to not leave to the future a burden or a problem that we created. In particular, because of uncertainty with respect to the stability of future societies and uncertainty regarding their technological and financial capabilities, we need to take action and make a final decision to ensure that the used fuel generated by this generation is fully and properly managed.

(3) Respect For People and Cultures

Many participants failed to see the value or relevance of this principle. Several suggested that the concept of respect for people is adequately covered or embedded in the principle *Respect For Life.* Similarly, the respect for cultures is also addressed through the Justice, Fairness and Sensitivity principles. While there was no strong preference to remove this principle, it was clear that many participants felt the principle was redundant and of little relevance on its own.

(4) Justice and Fairness

Most participants linked the principles of justice and fairness together. Many questions were raised regarding the definitions of the two principles. Those participants that did provide comment indicated that fuller definitions of the two principles are required and a clear statement as to their application is needed. Some of the participants suggested that fairness is difficult to define and is subject to multiple interpretations. How is fairness to be determined? Who determines it? What is geographic fairness? In this context some participants suggested that regardless of the selected management approach there would be some who will benefit and some who will bear the costs; a trade-off will be made. When making this trade-off, fairness cannot be assured.

Several participants also seemed to link fairness and justice with community involvement in the decision making process. If a community(ies) willingly accepts the trade-offs of a used fuel management approach, then one might suggest that fairness and justice has been served. Some participants felt that the NWMO has an obligation to not only define, but also to explain how fairness and justice will be applied. It was suggested that standards or tests for fairness and justice would need to be developed and agreed upon before a management approach is implemented.

Lastly, several participants suggested that the concept of equity needs to be reflected in the principles. Some argued that equity should be a specific principle, acknowledging the concept of providing benefits to individuals and communities to offset burdens and costs. Others felt that the fairness principle should be re-defined with equity included as part of the definition.

(5) Sensitivity

Few comments were provided on this principle. In the comments provided, there was recognition and support that NWMO should continue to engage a wide cross-section of Canadians in its study, and that it needs to understand the views, opinions and concerns that all people have regarding the future management of Canada's used fuel. Participants that did provide comments generally supported this as an important principle to help guide the development, selection and implementation of a management approach.

Comments On the Objectives

At the core of the Assessment Framework is a set of objectives developed by the Assessment Team to compare and distinguish between and among the management approaches under consideration. From the ten questions posed by Canadians, and the values and ethical principles, the Assessment Team developed eight specific objectives to guide their work and to help distinguish the advantages and limitations of each management approach under consideration. The following summarizes participants' comments on these eight objectives.

For the most part, participants were comfortable with the eight objectives as presented. The objectives were viewed as being representative of the important matters that need to be considered in assessing options. One participant summarized the majority sentiment regarding the objectives: "they just seem to make sense".

Some participants felt however that the list of values and ethics were not all clearly reflected in, or were not evident in, the objectives. Many did not understand how the values and principles linked to the objectives and wondered how they were intended to work together within the NWMO study process. Other participants wondered if the objectives would be formally ranked or weighed and whether their comments would be of value or influence in the weighing and ranking of objectives. Many participants felt that the eight objectives were not of equal importance and a weighting that reflected the views of Canadian needs to occur.

(1) Fairness

The comments on fairness as presented under the discussion of ethical principles apply equally to fairness as an objective. To summarize fairness was viewed as an important consideration within the Assessment Framework but several participants remained unclear as to the definition (multiple interpretations) and how the objective is to be applied within the Assessment Framework.

(2) Public Health and Safety
Worker Health and Safety
Community Well Being

Some participants felt that these objectives overlapped and felt that a potential existed to integrate the three into one objective. These participants failed to see a difference between *Public Health* and *Safety and Worker Health* and *Safety*. In this regard, participants felt that safety should be considered equally for all people.

Others supported the separation of the two noting that it is common practice to distinguish between the safety and well being of communities from that of workers. For these participants, it is accepted that workers willingly take on greater but acceptable risk as a result of their occupation. It was also noted that the different management approaches potentially represent different levels of risk to both workers and the general

population and that these objectives would be useful to distinguish between and among these different levels of risk.

With respect to risk and safety, there were some participants in both the reactor site communities and northern Ontario communities who felt strongly that these three objectives could not be properly operationalized without further development of a comprehensive safety assessment and risk assessment. The Assessment Team work to date, it was suggested, presents risk in a qualitative and subjective way. For these participants, it would be better to fully operationalize these objectives and to distinguish between and among the management approaches by conducting a comprehensive quantitative risk assessment of each proposed method, including transportation of the used fuel. Some felt that only with this risk assessment could NWMO determine, with confidence, how the objectives of public health and safety, worker health and safety and community well-being objectives can be satisfied.

Participants generally accepted the definition of the *Community Well Being* objective. However, a comment heard across the country was the need to more clearly define what is meant by the term "community". It was suggested that community is not defined as just the community that might host a management facility. The definition should include any community that might be affected either directly or indirectly by the management approach. This would include communities along potential transportation routes, the current reactor site communities and any community that may be affected from an ecological, economic and social perspective. Several suggestions were provided as to the definition of community, some included determining communities along: political boundaries, regional areas of influence, and all communities within a watershed or economic region. Some participants identified the need for the NWMO to define the term "community" before any management approach is implemented.

(3) Security

Participants felt that security was an important objective. Many saw security as being the objective that best responds to the citizen value of safety from harm and also relates to the ethical principle of *Respect For Life.* Many participants suggested that the security was one of the most important objectives within the Framework. As presented earlier, participants offered a range of opinions as to the significance of the application of the concept of security within the different management approaches.

(4) Environmental Integrity

A few participants suggested that the definition of this objective needs to be more specific and clear in its presentation. While the majority of participants felt comfortable with *Environmental Integrity* as an objective, a few participants noted difficulty understanding how this objective, as currently defined, would be applied in the assessment of the options. It was further suggested that in addition to a clearer definition of the objective, that the concept of *Environmental Integrity* should be more clearly or obviously reflected in the ethical principles and perhaps specifically presented as one of the ethical principles.

(5) Economic Viability

There was a wide range of opinion regarding this objective. Some participants sought clarification of what was meant by this objective. Several suggested that this should not be an objective since regardless of the management approach selected, we need to ensure that adequate funding be in place to implement the approach. For some participants, the objective, as presented, had little value and was not helpful in distinguishing among the options. Ensuring public health and safety and community well being are of greater significance and management costs should not be a consideration in selection of an approach.

Some suggested the part of the objective that addresses the economic benefits to local communities would be better addressed through the community well being objective.

(6) Adaptability

There was considerable support for adaptability as an objective within the Assessment Framework. As discussed under the summary of participants' comments on the values, adaptability within a selected management approach was viewed as being a fundamental requirement. On the one hand, participants expressed optimism that as a society we will continue to learn and develop new technology. As a result, the future may well hold the key to a better solution over the long term for the management of the used fuel. The approach that is selected must recognize and accommodate the potential for new knowledge to influence the final solution.

Similarly, adaptability is important in that it allows for contingencies within a management approach that can both anticipate and address changing conditions the significance of which are unknown to us today. The potential for climate change and future societal breakdown were often cited as two examples of changing conditions that need to be considered in the assessment of management approaches.

Proposed Additions To The Framework

Throughout the discussion sessions, participants identified several considerations to add to the Assessment Framework either as a value, ethical principles or objective.

(1) Public Acceptance

Many participants felt that there was a gap within the Framework pertaining to the concept of social or public acceptance. Several suggested that whatever the decision for the future management of the used fuel, it must be deemed to be acceptable to the communities affected and Canadians in general. Participants often referred to the findings of the Seaborn Panel regarding social acceptability. While most participants acknowledged that the intent of social or public acceptability was implied throughout the Framework, they felt given its importance this should be explicitly stated as either a principle or objective.

Additionally, some participants felt that public or social acceptance needs to be defined and the tests or standards that would determine acceptance need to also be made explicit. Advice was provided that public referenda, definition of community (including potential transportation routes) must be determined prior to implementation of an approach. A few participants suggested that consideration should be given to a national referendum on the selection of the management approach.

(2) Conservation and Phasing Out Nuclear

There were suggestions that for the Assessment Framework to be credible, there needs to be an extension of the ethical principles to include energy conservation as the preferred method to reduce the demand for nuclear energy. A few participants suggested that if society wishes to truly respect all life and respect future generations, then we ought not produce used fuel in the first place. As such, a commitment should be made to wisely use the energy that is produced, invest in sustainable energy sources and subsequently reduce or eliminate our use of nuclear energy.

(3) Commitment To Continuity

It was suggested that commitment to continuity of both the spirit and intent of the Assessment Framework should be added as an objective. The spirit and intent that makes up the Framework must continue past the selection and throughout the management approach implementation phase. It was proposed that the only way to ensure this commitment to continuity was to make this an explicit part of the Framework.

(4) Risk Assessment

There were several suggestions that the objectives be amended to reflect explicitly the assessment of risk to people and the environment. It was the preference of these individuals that all risk assessment be quantitative in nature and that risks as determined are placed into a context that is relevant for Canadians, building an understanding of the significance of the risk.

(5) The Precautionary Principle (What We Don't Know)

A few participants felt that the precautionary principle should be part of the Assessment Framework. In particular the Assessment Framework must acknowledge that there is much that we don't know and that in the absence of certainty, we can still anticipate what might go wrong and address this within the assessment.

This point is best illustrated in a comment by a participant in the Sudbury discussion session that society can no longer claim that it is not responsible for what we don't know. We must assume accountability for what's not known and anticipate and accommodate for our lack of knowledge in the action that we take. Some participants felt that both the precautionary principle and the concept of 'what we don't know' need to become part of the Assessment Framework.

Summary

This section reflects the views and opinions of participants on the Assessment Framework. Included in this section are general opinions of the comprehensiveness of the Assessment Framework and specific comments on each of the values, ethical principles and assessment objectives.

3.2 Preliminary Assessment of Management Approaches

The *Nuclear Fuel Waste Act* requires that the NWMO study include an assessment of three specific technical methods:

- Storage at nuclear reactor sites, referred to as extended on-site storage, or reactor site extended storage;
- Deep geological disposal in the Canadian Shield; and
- Centralized storage, either above or below ground

The NWMO may also identify additional methods to study.

One of the initial tasks of the Assessment Team was to determine which methods to include in its preliminary assessment, and, once determined, to describe the methods for the purpose of conducting an assessment.

The Assessment Team started by considering the range of methods presented in *Asking The Right Question?* This consisted of three categories of methods:

(1) Methods required for review under the *Nuclear Fuel Waste Act*;
(2) Methods receiving international attention; and
(3) Methods of limited interest.

The screening of these categories by the Assessment Team resulted in the **methods of limited interest** being removed from any further consideration since they offered little potential as effective management methods. The **methods receiving international attention** were also not included in the preliminary assessment since these methods did not at this point in time offer a solution for the long-term management of Canada's used nuclear fuel. The Assessment Team did however suggest that NWMO maintain a "watching brief" on these methods. It was suggested that Canada should assess all new developments associated with these methods and determine the potential for future application. The full rationale for the screening of these methods can be found in the Assessment Team report *Assessing The Options*, available on the NWMO web-site – www.nwmo.ca.

"Understanding The Choices" presents the preliminary findings of the Assessment Team study. During the information and discussion sessions, NWMO sought the opinion and advice of Canadians on each of the management approaches assessed. The question asked was:

"*What are your thoughts on the strengths and limitations of each management approach?*

- *Reactor site storage;*
- *Deep geological disposal; and*
- *Centralized storage"*

Participants were invited to discuss the strengths and limitations of each of the approaches and to advise whether the preliminary assessment accurately describes all of the important considerations of each management approach.

Long-Term Storage at Reactor Sites Management Approach

This management approach would leave the used nuclear fuel in purpose-built containers at approved storage facilities at each of the nuclear power sites. The facilities and containers would be replaced as needed and the used fuel would be stored at these sites in perpetuity.

Comments regarding this management approach fell into several broad themes. The following is a summary of comments on both the strengths and limitations of storage at reactor sites.

Strengths of the Approach

Long-term storage at reactor sites was the first of the three options to be discussed at information and discussion sessions. Many participants favoured this approach because the technology exists today and it involves minimal transportation and allows the used fuel to be easily accessed.

Several reasons were provided in support of this management approach. These comments have been grouped under the following general themes:

(1) Responsible Action – Keeping the Used Fuel Accessible
(2) Community Oversight and Care
(3) Transportation
(4) Community Support
(5) Management Capacity and Expertise

(1) Responsible Action – Keeping the Used Fuel Accessible

It appeared that a majority of the participants felt strongly that regardless of the management approach that is selected, the approach must allow the potential for future generations to access the used fuel. Some of these participants favoured easy accessibility so that future generations could use the used fuel as an energy source. Others expressed faith in technological advancement producing new technologies that will neutralize the used fuel and render it harmless. For those holding either view,

storage at the reactor sites offered an advantage over the two other management approaches.

This method is preferred over centralized storage and deep geologic disposal since there is no need to handle and transport used fuel in the near term. It is also preferred over deep geologic disposal because the used fuel would not be sealed, unlike that proposed for the geologic disposal concept, which is intended to be sealed, with no intent of future retrieval of the used fuel. Many suggested that since we don't know the solutions that may be developed in the future, there is still much to learn regarding nuclear energy technology and making a final decision as to the fate of the used fuel should be deferred for a reasonable period of time. If the used fuel is to be used in the future for either purpose, then storage of some type would be preferred to final disposal.

(2) Community Oversight and Care

Some participants felt that storing the used fuel at the reactor sites would be one of the most effective ways to keep the need to properly manage and care for the used fuel in the forefront of the public policy agenda. These participants felt that disposal would place the used fuel out of sight and therefore out of mind. On the other hand, having the used fuel stored within communities will maintain a sense of urgency for research and the development of new technologies to safely manage the used fuel. One participant at the Ottawa discussion session described the Nuclear Guardianship Vision (NGV). This vision is intended to ensure active community participation and oversight in the on-going management of used nuclear fuel. Each generation passes the responsibility of guardianship for the safe management of the used fuel on to next. This program, the participant suggested, should become part of this management approach.

For a few participants, a collateral benefit of storage at the reactor sites is that by keeping the used fuel "in sight", the potential exists to create an incentive to close nuclear reactors. With the used fuel being a constant reminder of a potential hazard to the community, there may be increasing pressure on the power producers to phase-out or close nuclear reactors.

(3) Transportation

A significant advantage cited by most participants is that there is no need to transport the used fuel to another location. Many participants especially those from outside the reactor communities expressed significant concern over the risks of transporting used fuel. For many participants, the potential for exposure to radiation from any transportation accident is a significant limitation of the other two management approaches. The fact that this approach would require no off-site transport is therefore viewed as a major advantage of this management method.

(4) Community Support

An advantage of this approach, as identified by participants, is that there is no need to determine a location for the establishment of management facilities. Some argued that existing storage facilities at the reactor sites have been proven to be safe with little potential to cause harm to people or the environment. Further, the reactor site

communities have considerable familiarity and experience with all aspects of the nuclear industry and as a result the community will likely be less concerned or fearful of the long-term storage of this material and therefore may be more likely or willing to accept this management approach.

Participants from locations outside the reactor communities also suggested that this management approach best meets the test of the ethical principle and the assessment objective of fairness. Several cited that the reactor communities have greatly benefited from the operation of the nuclear power plants through jobs and other economic and community benefits. It was suggested that, in terms of fairness, it would only be right that those communities that have benefited from nuclear energy also take on the burden of caring for and managing the used fuel.

(5) Management Capacity and Expertise

The last advantage relates to the capacity of the reactor site communities to properly manage the used fuel. Participants noted that these communities because of the presence of nuclear power plants possess knowledgeable and competent management, scientific and security expertise that will be available to provide the high levels of oversight necessary to ensure the safety of the used nuclear fuel.

Limitations of the Approach

Participants also provided their views and perspectives on what they saw as the limitations of this management approach. Many of the comments provided are in opposition to what other participants saw as advantages of this approach. The topics addressed are:

(1) Avoiding Responsibility
(2) Uncertainty for the Future
(3) Safety and Security
(4) Fairness

(1) Avoiding Responsibility

At many of the discussion sessions, there were participants who expressed the view that the long-term storage of used fuel at the reactor sites was impractical. While it was suggested that short-term storage for the next 50-100 years might be acceptable, committing to this management approach for a period of thousands of years did not make sense. For this management approach to succeed, one needs to assume that future generations would be willing to take on the responsibility for oversight, monitoring, maintenance and funding. For many participants, this was considered to be a highly questionable assumption with a high probability of being incorrect.

Some participants felt that the selection of this approach would be an abdication of our responsibility to take the necessary action to properly manage the used fuel. In their view, selecting this approach would be "not making a decision" since the final decision would be deferred to the future.

This management approach was characterized as being impractical since it was unlikely that an on-going societal commitment to maintain proper care of the used fuel could withstand the test of time; either future generations would need to take action to determine a final decision or the commitment to maintain the approach would evaporate either as a result of societal and institutional breakdown, absence of funding or a lack of interest.

Several participants felt that the costs for this management approach are too open-ended and therefore potentially excessive. In the event that future technological solutions do not materialize, the on-going costs to manage the used fuel may become too much for future society to bear. The pressure to reduce funding for the maintenance of this management approach or to redirect funding to other priorities were considered to be real possibilities, which in turn would undermine the long-term safety of the management approach.

(2) Uncertainty for the Future

Contrary to the optimistic views expressed by some participants that future societies will thrive and technology will offer potential for more acceptable used fuel management solutions, several participants offered a pessimistic view of the future. In particular, participants cited political and social instability and change as significant limitations of this approach. It was suggested that history is full of examples of civilizations (Greek, Roman, the British Empire, the Soviet Union) that have either disappeared or significantly changed over time. Our current form of government, economic and social institutions cannot be guaranteed to exist for several hundreds not to mention thousands of years. Some suggested that the only certainty about the future is that social and economic conditions will change and one cannot predict the form or nature of the change. Because of this uncertainty, many felt that it would be irresponsible to not determine a final solution for the management of the used fuel. Leaving used fuel in storage over the long-term could well place both people and the environment at risk.

(3) Safety and Security

Participants also identified several concerns with respect to the safety of long-term storage at reactor sites. It was felt by some that because this management approach would mean that there would be multiple storage sites, the potential exists for the uneven application of procedures and risk management measures across the sites. This might compromise the safety of storage facilities. In effect, participants were saying that the more sites that require management, the greater the potential for error or breach.

Participants offered several examples of their concerns over the safety of this approach. In particular, participants were concerned that since many of the nuclear reactor sites are near residential areas, the possibility of radiation leakage from the storage facility could adversely affect human health. In particular, the following was cited as being of potential concern:

- The potential for corrosion of fuel bundles in the cooling pools and/or the corrosion of dry fuel storage containers resulting in radiation leakage.
- Potential for breaches of the storage facility as a result of earthquake.

- Potential for accident, sabotage or terrorist attacks compromising the safety of the storage facility.
- The security of the storage facility not being maintained to the necessary standard after the decommissioning of the nuclear reactors.

Some participants also noted that the reactor sites are all located on bodies of water that serve as sources of drinking water, recreation and economic opportunities. The development of long-term storage facilities in close proximity to these water bodies represents a potential risk to people and the environment. In addition to accidents or spills at the storage facilities contaminating water bodies, participants expressed concern that changing climatic conditions might raise lake levels to the extent that safety of the storage facilities might become compromised. If so, action would be required to either secure the storage facilities or transfer the used fuel to another location. As a result, this management approach could become even more costly than currently anticipated.

(4) Fairness

Finally, several participants from the reactor communities noted that the initial siting decision for nuclear power plants and the acceptance by communities did not anticipate that these sites would be used as long-term storage for used nuclear fuel. Some participants felt that these locations did not offer the appropriate conditions for long-term management of used fuel.

These participants indicated that at no time were they advised that the long-term management of used nuclear fuel would occur at these sites, in fact, many claimed that they were told the opposite, that the used fuel would not be managed at these locations over the long term. Further, had they been aware that used fuel might be stored at these sites for the long term, individuals may not have been supportive of generating facilities and municipal planning decisions may have been different. Participants indicated that they have always been under the impression that the nuclear power plants had a finite life and once finished, the sites would be properly decommissioned with no enduring on-site activities.

Deep Geologic Disposal Management Approach

The second management approach considered by the Assessment Team a deep geological repository concept. This involves the encapsulation of used fuel in long-lived engineered containers that are then placed and sealed within excavated rooms in a naturally occurring geological formation at a design depth of 500 to 1000 metres below ground surface. After an extended monitoring period, the underground openings would be backfilled and sealed.

Strengths of the Approach

Many participants regarded this approach as the one that offers the greatest potential for a permanent or final resolution for the long-term management of Canada's Used Nuclear

Fuel. Several reasons were provided in the support of this management approach. These comments have been grouped under the following general themes:

(1) Safety From Harm
(2) Taking Responsible Action
(3) Cost-Effectiveness
(4) Transportation Risk

(1) Safety from Harm

Participants identified the potential of this management approach to provide high levels of safety to both people and the environment. Those that held this view indicated that the placement of the used fuel bundles at depths of 500m – 1,000m, in a highly stable and consistent geologic setting, provides the greatest certainty that the used fuel will not cause harm over the long term. Except for the future development of cost-effective and proven technologies that would completely neutralize the used fuel, this management approach would best isolate or remove the used fuel from human beings.

Many participants felt that through proper siting, site-specific studies, and appropriate engineering and construction, the used fuel could be placed and left for the long-term without contaminating ground or surface water. Additionally, the fact that the used fuel would be well underground in a secure and controlled repository greatly minimizes the potential for access by terrorists that are intended to either sabotage the repository or use the used fuel for undesirable purpose.

Participants suggested that this approach offers the following additional safety from harm advantages:

- In a worst-case scenario event (earthquake, meteor strikes, glaciations or sabotage), this management approach would be better able to contain or manage radiation leakage.
- The repository could be located in the Canadian Shield, which has the most stable geology in the world; therefore, deep geological disposal has a natural advantage over the other management approaches.
- The deep underground location of the repository will give people time to react to potential accidents before these accidents cause problems at the surface.
- It is isolated from the population.
- Even if something happens future societies, which stability we cannot guarantee, may not be able to take care or may not be interested in taking care of the used nuclear fuel. In such a scenario, the deep geologic repository will remain safe.

From safety and security perspectives, there was a clear preference by many participants for this management approach over the other two approaches.

(2) Taking Responsible Action

For some participants, this management approach allows for a permanent solution now as opposed to deferring a final solution to the future. Developing the repository whether it

is used immediately or at some time in the future would be a proactive and responsible action taken by this generation to resolve the issue surrounding the management of the used fuel. Those participants that promoted the advantages of deep geological disposal were often split over whether the repository should be used immediately or only at some future date. Some participants proposed that the used fuel be placed in the repository as soon as it is ready in order to minimize the potential risks to people and the environment associated with the other two management approaches. Others proposed that the repository be developed as soon as possible but the used fuel not be placed until it becomes necessary to do so. This could be tens or hundreds of years into the future once it's been determined that new technology is not likely to either neutralize the used fuel or it has been determined that the used fuel cannot be re-used in a cost-effective way. By including flexibility and adaptability in the implementation of the approach, two key considerations would be satisfied. First, this generation would fulfil its responsibility of developing and implementing a solution for the management of the used fuel that we produce. Second, by not immediately placing the used fuel in the developed repository, we would leave the final decision regarding the fate of the used fuel to future generations.

Another variation on the implementation of this management approach pertains to the matter of using this concept as either a storage or disposal method. Some participants disagreed with the deep geological disposal concept description strongly suggesting that the geologic repository could also be used as a storage method. By doing so, the potential to access and retrieve the used fuel for either neutralization or future use would be maintained while also providing higher levels of safety and isolation than that offered by the two storage methods. In this proposed modification to the deep geological disposal management approach, participants suggested that the design would be similar to the current disposal concept; the difference would be that there would be the intent to access the used fuel at some point in the future. If it is decided in the future that the used fuel bundles are no longer to be stored and should be finally disposed, this could be accomplished by permanently sealing the repository and backfilling the repository access. In this way, the deep geological disposal approach can allow for flexibility and adaptability within its implementation and continue to provide higher levels of safety and security.

(3) Cost-Effectiveness

Several participants noted that the deep geological disposal management approach appears to be more cost-effective than the other two management approaches. It was suggested that while the preliminary cost estimates for all three methods are generally similar, over the long-term deep geological disposal would appear to be more cost-effective than the two other approaches since it avoids the on-going maintenance, monitoring and administrative costs associated with the long-term storage options.

Specifically, participants noted that:

- The deep geological disposal approach would not require the establishment of trust funds for thousands of years, as would the other two approaches.
- It is the one option that has one-time costs, when compared to storage options with possible retrieval.

- This is the most cost-effective approach to used fuel management.
- It is cheaper in the long term (less security and supervision costs).
- Costs are relatively well-known and time limited.

From several participants' perspective, deep geological disposal is the most cost-effective approach to managing used nuclear fuel because its costs are relatively well known and finite in time. As one participant pointed, "with deep geological disposal there would be no need to worry about trust funds for 10,000 years".

(4) Transportation Risk

The risk of the transportation of the used nuclear fuel to a new location was not considered a strength of the management approach. However, several participants from the reactor site communities suggested that the Assessment Team's characterization of transportation as a limitation was overstated.

Some participants suggested that the risk of moving used fuel and its potential to cause harm in the event of an accident or sabotage, needed to be placed into context. It was suggested that a full and complete risk assessment on the transportation of used fuel needs to be completed and results presented to the public in terms that are meaningful and relevant to the average person. In particular, the risk associated with the transportation of used fuel must be placed into context with and compared to other dangerous goods that are transported daily across this country. Those advocating this felt strongly that the risk assessment would demonstrate that the transportation of this material, with appropriate equipment, procedures and emergency preparedness and response programs in place, offered minimal real risk and may well have less risk than the transport of other dangerous materials.

Limitations of the Approach

Many participants identified limitations with the deep geologic disposal management approach. These comments have been grouped into five broad themes:

(1) Transportation Risk
(2) Safety and Security
(3) Committing to a Final Fate – Being Irresponsible
(4) Increasing the Risk
(5) Geographic Fairness

(1) Transportation Risk

Throughout the information and discussion sessions, concerns over risk in relation to the transporting of the used nuclear fuel were raised.

For many participants, transportation of the used fuel whether by road, rail or ship was viewed as a very significant limitation of this management approach. For a few participants, this risk was considered to be so significant that this alone should make deep geological disposal (and centralized storage) unacceptable. This latter view was most strongly made by some participants at sessions in northern Ontario.

Participants identified the potential for radiation exposure directly affecting human health as a result of an accident or spill involving trucks as a primary concern. Others suggested that transportation accidents resulting in a spill could contaminate groundwater and surface water supplies and could cause significant economic costs through the loss of contaminated resources (drinking water and fisheries) and the costs associated with clean-up and restoration of contaminated property and transportation infrastructure.

Other participants noted that while the actual risk associated with transportation might be statistically acceptable from a risk assessment perspective, the real issue of concern is the public perception of transportation risk. In this regard, it was suggested that it would be incorrect to assume that communities along transportation routes for a deep geological disposal (or centralized storage) location would necessarily be supportive. Perceived risks could manifest themselves in the form of fear, resulting in widespread public protest and municipal opposition ultimately precluding the development and implementation of either a deep geological disposal or centralized storage management approach.

Concern regarding the adequacy of the available transportation infrastructure was cited as an additional limitation of this approach. Many participants suggested that maintenance of road and rail facilities in rural and northern areas would be a concern; if roads weren't maintained, this could increase the potential for accidents while transporting the used fuel into or through these areas. Further, many of the rural and northern areas that might be considered for either deep geological disposal or centralized storage currently lack the emergency preparedness and response personnel and equipment that would be needed to quickly and effectively respond to any accident and spill event.

Last, at many of the discussion sessions, participants expressed concern that the transportation of used nuclear fuel would offer an easy target for terrorists to either sabotage or attempt to acquire the used fuel and to use this material for some undesirable purpose.

(2) Safety and Security

In addition to the risk and safety concern expressed with respect to the transportation of the used fuel to a deep geological disposal location, participants highlighted several other safety and security concerns with this management approach.

First, some participants were concerned in that there has been no proof of the concept of deep geologic disposal. At no location has this method been implemented and demonstrated to work. For some participants, even the current deep geologic initiatives in Sweden and Finland were not considered as sufficient proof of concept. As such, there is no guarantee the repository will be secure and will not adversely impact humans and the environment. Specifically, participants identified the following as areas of uncertainty:

- We have no knowledge of how the nuclear wastes, when placed underground, will react with the surrounding rock and water – will the radiation and heat break the engineered and natural barriers and enter the environment?

- There is no assurance that the geologic setting will remain stable over the long term – earthquake and rock shifts may occur which could destroy the repository or at a minimum cause breaches in both the engineered and natural barriers.
- There is no way to predict the potential effects of glaciation on the stability and integrity of the repository.
- There is uncertainty as to the durability of the used nuclear fuel containers and the potential for radioactive leakage over the long-term.
- If an accident or breach does occur, it will be difficult, perhaps impossible, to take the necessary action to contain radioactivity.
- Monitoring of the performance of the method will be difficult and unreliable. It may not be possible to detect and correct any problems within the repository in time.
- It is impossible to fully understand and predict the connection and movement of water within the rock. If the repository is breached in some way, the radioactivity may very quickly move to aquifers and surface waters.

Some participants suggested that there is much that remains unknown regarding the long-term safety of the deep geological disposal management approach and since one cannot guarantee the long-term safety, committing to this management approach as the final fate for the used fuel would be an irresponsible action. The unknown regarding long-term safety may not only place future generations at risk but may also leave a significant financial and management burden for future generations.

(3) Committing to a Final Fate – Being Irresponsible

Several participants took issue with the deep geological disposal management approach since it calls for the final disposal of the used fuel. Since the current deep geological disposal description eventually calls for no access to the used fuel after facility closure, some participants felt that making such a decision might deprive future generations from using the remaining energy within the fuel rods; or taking advantage of new technologies to make the used fuel safe and secure. Additionally, while a future society might have the ability to access the sealed used fuel for future use, the retrieval of this material could be costly and potentially risky from a health and safety perspective. Some also felt that this method is irresponsible because it represents and "out of sight, out of mind" attitude, but that storing the waste on the surface, on the other hand, symbolizes our explicit duty to take care of the waste we have created.

As a result, there were several suggestions that the deep geological disposal approach be modified to be both adaptable and flexible in its implementation. In this regard, it was suggested that the repository be developed and either used as a method of storage allowing for controlled access and retrievability should future conditions warrant. Likewise, the developed repository could be considered as a future contingency measure available but to be used only in the event that storage of the used fuel (at reactor site storage or centralized storage) is no longer desirable.

(4) Increasing the Risk

One perspective presented suggested that the findings of the Assessment Team were misleading in suggesting that deep geological disposal (or centralized storage) reduces the number of sites required to manage used nuclear fuel. The point was made that with deep geological disposal (or centralized storage), there would be an additional, or seventh, site possessing used fuel at least for the time period prior to completion of the used fuel transportation to the central facility. Since the used fuel will still need to be stored at the seven reactor sites for a period of time before it can be moved, the development of deep geological disposal or centralized storage will mean that Canada would have eight locations containing used fuel, one more than the seven that make up the storage at the reactor sites approach. This additional seventh site was viewed as extending potential risk to another community. This was suggested as another limitation of the deep geological disposal (or centralized storage) management approach.

(5) Geographic Fairness

Participants in locations removed from the reactor sites, particularly some of the participants attending discussion sessions in northern Ontario, opposed the deep geological disposal management approach on the basis of fairness. Those holding this view stated that the reactor communities, which have received the economic benefits of nuclear power generation, should now bear the responsibility for the care and management of the used fuel. To manage the used fuel in northern Ontario, which many viewed as having received no benefits from the use of nuclear power, was considered to be unfair and it would be unreasonable to expect that any community that has not benefited from the use of nuclear power to willingly accept the risks of managing the used fuel. The deep geological disposal management approach highlights the Canadian Shield as a potential location for a management approach. In the view of some of the participants, this was unacceptable and the Canadian Shield should not be considered further.

Centralized Storage Management Approach

The centralized storage management approach, in many respects, is a combination of the approach characteristics of both the reactor site storage approach and deep geologic disposal. With this management approach, all the used fuel would be transported to one location and placed into purpose built storage facilities. The facilities can be aboveground or placed belowground but not necessarily to the depth of that proposed for the deep geological disposal approach.

Many of the strengths and limitations of the centralized storage approach are similar to that for either reactor site storage or deep geological disposal. As an illustration, most of the comments provided earlier in this report regarding the transportation of used fuel to a deep geological disposal location would also apply to centralized storage. Likewise, the identified advantage of the ease of retrievability of the used fuel associated with reactor site storage would equally apply to centralized storage.

Because of this, this section does not report in detail the synthesis of common comments on the strengths and limitations inherent in this approach and one of the other two approaches. This section will start with the presentation of the unique strengths of the centralized storage approach followed by summary statements of all described strengths with reference to the appropriate discussions found elsewhere in this report. The same presentation is used for the discussion of limitations.

Strengths of the Approach

The four themes used to summarize the strengths of this management approach are:

(1) Siting Choice
(2) Economic Benefits
(3) Adaptability and Flexibility
(4) Community Oversight and Monitoring

(1) Siting Choice

One of the significant advantages identified with this approach is that it allows for potentially greater choice in finding a location for the storage facility. While siting requirements would need to be determined, the range of conditions that might define a suitable site is potentially very broad. When compared to deep geologic disposal, which would require highly specific siting requirements, centralized storage can conceptually be established in any number of different settings. Since there is a commitment within this approach to provide continuous oversight, management care and monitoring, the conditions for sitting can be less than that for final disposal. Because of this potential siting flexibility, some participants felt that the chances of there being a willing host community for the centralized storage facility might be increased. It was recognized by participants that even though centralized storage would be managed and monitored, acceptable siting criteria would still need to be established.

(2) Economic Benefits

As with the deep geological disposal management approach, the development of a centralized storage facility offers the potential for jobs, investments, purchasing of goods and supplies, and other economic benefits to residents, businesses and municipal government. This, it was suggested, represents an advantage of this approach and potentially facilitates acceptance of a facility by communities.

(3) Adaptability and Flexibility

As with storage at the reactor sites, centralized storage would meet the preference of several of the participants for a management approach that can adapt to new knowledge and events. With this approach, there would be no final fate decision; the stored used fuel may be accessible and retrievable either for neutralization or future use as an energy source.

(4) Community Oversight and Monitoring

This management approach also meets the suggestion of some participants that the used fuel remains in sight and requires on-going attention and care thus showing community responsibility. Secondly, the continued presence and the visibility of the used fuel within a community will help to ensure high standards of management and monitoring and may serve as an incentive to spur research into emerging technologies for the future management of the used fuel.

Limitations of the Approach

The limitations of this management approach also include some of those related to both deep geological disposal and reactor site storage. The one unique limitation concerns security and safety. The themes in this section are:

(1) Safety and Security
(2) Community Support
(3) Transportation
(4) Responsibility
(5) On-going Commitment

(1) Safety and Security

Several participants felt that this management approach might represent the greatest potential for risk to people and the environment. By bringing all the used fuel to one central location, the potential impact from a catastrophic event (terrorism, sabotage, meteor strike) would be much greater than any comparable event at a facility managing less used fuel or with deep geological disposal. In this regard, if centralized storage was selected, most participants would favour shallow burial of the storage facility over surface storage.

(2) Community Support

As discussed under the presentation of the limitations of deep geological disposal, participants wondered whether a willing community would be available to accept a centralized storage facility. Even if a community did express a willingness to accept a facility, surrounding areas and communities along transportation routes could raise objections.

(3) Transportation

Participants presented the same concerns over the transportation of the used fuel to a deep geological disposal location. For either option, public anxiety over real and perceived risks of transportation was considered to be a major limitation of both approaches.

(4) Responsibility

For those participants who felt that there is an urgent need to develop a final solution for the management of the used fuel, this management approach possessed the same drawbacks as the reactor site storage approach. Considering the long time period over which the used fuel would remain a hazard to people and the environment, this

management approach did not provide a satisfactory solution, in that the final decision to resolve the problem is deferred to the future. Those holding this view expressed that this lack of action by our generation would be irresponsible.

(5) On-going Commitment

This approach like reactor site storage requires future generations to maintain the commitment to manage, and care for the used fuel. Participants repeated the view that this is unlikely and they were skeptical that future generations would continue to fund and manage the used fuel. Further, the on-going commitment to the approach cannot be guaranteed over time, the future stability of future society, government institutions, and changing values and priorities are highly questionable.

A Phased Approach to Managing The Used Fuel

At most of the discussion sessions, the potential to use the various management approaches in a phased or step-wise manner was suggested. A phased approach has several different meanings for participants. For several participants, a phased approach meant the following:

- Continue to store the used fuel at the reactor sites for a definite period of time (i.e. a maximum of 30-50 years.)
- During this period, continue to research, investigate and learn from the actions of others as to the success of long term used fuel management approaches.
- Invest in and maintain a watching brief on emerging technology that may offer potential to either neutralize the radionuclides in the used fuel or allow for the safe and cost-effective re-use of it.
- After a definite period of time, decide whether to continue to store the used fuel at the reactor sites or decide to place it in centralized storage or deep geological disposal.

Some participants advocated during this interim period that government phase out the use of nuclear power and stop producing the used fuel.

Other participants suggested a continuation or a variation of the phased approach be considered as follows:

- Within the interim period, continue to conduct research and assess technology and develop in parallel either the centralized storage or deep geological disposal. The proposal would see the movement of the used fuel from the reactors to centralized storage or deep geological disposal by a fixed date.

Other participants felt that if no new technological solutions emerged during this period, then Canada has a responsibility to ensure the safe and secure management of the used fuel for the long term. After the interim period, the used fuel would be placed in the deep geological disposal and stored for a period of time allowing for future access and

retrieval. It would be up to a future generation to make a final decision as to whether the deep geological disposal would be sealed and made relatively inaccessible.

For many participants, a phased approach made good sense. It provides the benefit of time to learn and determine whether or not a new solution might be possible while ensuring the used fuel bundles are safely managed. With the development of deep geological disposal, first as a storage facility and if necessary finally as a disposal facility, our generation would keep the used fuel safe and secure but also potentially available for other use and still provide a final solution. In this way, our generation fulfils its responsibility by taking action, but maintaining flexibility and not leaving an unwanted financial or environmental burden for the future.

As one participant in Ottawa said, the phased approach is the reality we face. Regardless of the approach selected by the government, used fuel will be stored at the reactor sites for many years until either a centralized storage or deep geological disposal facility is in place. With deep geological disposal, used fuel storage can be safely and securely continued well into the future before a final decision needs to be made to backfill and seal the repository.

3.3 Implementation Plan Considerations

As part of the information and discussion sessions, NWMO sought the advice of Canadians on the important considerations for guiding the implementation of any selected management approach. The manner in which an approach is implemented could affect the effectiveness and the extent to which it is responsive to societal needs and concerns for the management of Canada's used fuel.

Canadians were asked to suggest any specific actions that should be built into an Implementation Plan. They recognized that the way in which an approach is implemented was just as important as the approach selected. It was suggested that a safe and secure Implementation Plan must be developed and agreed to before proceeding with the approach.

As part of the Implementation Plan, many participants indicated that there should be a clear commitment by the NWMO that regardless of the method, the Implementation Plan must be flexible to adapt to changing social, political and technological conditions.

There were several key themes that emerge from the information and discussion sessions that relate to specific elements that should be built into an Implementation Plan. The themes are:

- Commitment to the spirit and intent of the Assessment Framework
- Community acceptance
- Community commitments
- Governance

- Monitoring
- Research and a phased approach
- Safety and security
- Contingency and emergency plans
- Transportation and other risks
- International agreements
- Funding
- Public engagement and continuous learning

Commitment to the Spirit and Intent of the Assessment Framework

As noted in Section 3.1, many participants were supportive of the sentiments included in the ethical principles, values and objectives of the draft Assessment Framework. Many of the themes resonated strongly with Canadians, including Safety From Harm, Fairness and Adaptability. Participants told the NMWO that the Assessment Framework was an important consideration in the choice of management approach. However, there was also a strong sense that these values, principles and objectives also need to be applied to any decision or action taken during the implementation stage.

Throughout the national engagement program, there was a widespread recognition that the decision-making and implementation process for Canada's used nuclear fuel will be long-term in nature. As such, participants were clear that a consistent set of values, principles and objectives need to be applied at all stages in the process. There was a desire to continue to apply the spirit and intent of the Assessment Framework throughout the implementation process.

Community Acceptance

Participants raised many interesting and insightful ideas about social acceptability and siting. Some of these ideas were referenced to the outcomes of the Seaborn Panel recommendations in the late 1990's regarding public acceptance. Several participants would like to see measures for determining public participation in decision-making and a description of determining social acceptability built into the implementation plan.

Therefore, several participants wondered what is the test for acceptability? How will we know if a community accepts the choice to manage nuclear fuel in their communities? To resolve ambiguities, and to prevent future indecision, some participants recommended that a social and technical siting process be pre-determined and shared as far in advance as possible. Participants were clear that there should be no surprises and a clear process for siting should be established early in the process.

As mentioned above, ideas for a community acceptance test were raised. These included local (or national) referenda, asking for volunteer host communities and surveying communities along transport access routes. Canadians recounted stories of past attempts

to site waste (hazardous and non-hazardous) and noted that based on lessons learned from other jurisdictions, proponents should not impose their will on communities.

Some participants also raised the idea of money transfers and the potential economic benefits associated with being a willing host community. There was a sense that the economic details of the siting process would be a key factor in securing support in potential host communities. Therefore, the economic opportunities associated with siting would have to be clearly defined before the process begins.

Participants were also curious about the sites under consideration for siting. Although participants understood that this engagement process was not about finding a suitable site for used nuclear fuel, many wondered if certain areas of Canada were currently under consideration (e.g. the Canadian Shield) and if others were "off the table." Some participants made specific suggestions about communities or land areas that they believed would be technically suitable sites for the long-term management of Canada's used nuclear fuel.

Community Commitments

The Implementation Plan should include a "community commitments" plan that would include monitoring, economic benefits and insurance and property value protection agreements for any host community. There was support by participants for commitments and guarantees being established prior to the establishment of any facility.

A few suggested that a cumulative health and risk study of all affected communities should be included in the Implementation Plan. This would include the collection of baseline data prior to the development of facilities that can be built upon over the years to establish health trends. This health data should be available to any interested resident upon request.

Governance

Some participants suggested that the governance structure for the implementation of the future management approach for used nuclear fuel should be an independent body with no direct linkages to the nuclear industry. Several participants expressed that the nuclear industry has a vested interest in the continued production of nuclear energy, and therefore, an independent organization objective in all its actions would be desirable to manage Canada's used nuclear fuel. The governance of the management approach should include an organization that has a balance of representations from the affected communities and government, public interests, technical experts, ethical and social scientists.

The Implementation Plan must facilitate ongoing communication among and between government departments, politicians, stakeholders and the general public. The governing body must ensure that public involvement, a regulatory Framework and institutions are in

place over the long term so that the management Framework helps rather than hinders the decision-making process.

There were some concerns expressed about the potential ownership and responsibility of any established long-term storage facility. There must be a clear understanding and commitment from the government to clarify, during the implementation stage, a long-term commitment for the establishment and ownership of the facility.

Some participants strongly felt that long-term ownership of the management facility should be stipulated in the Implementation Plan. There were contrasting comments with respect to private verses public ownership of a management facility and the ultimate ownership of the used fuel. Participants felt that over a long time period there will be many changes in government, nuclear producers and public interest in the used fuel management facility. During this long time frame, there must be a guaranteed protection for the safe management of the facilities. Some felt that the management facility must be managed and monitored by a separate entity with ownership of the used fuel.

Some participants were fearful of the past record of private companies and for that reason tended to support a public sector or non-government organization as the management structure for implementation. Participants were concerned that there was a possibility that private firms could walk away from their obligations for used fuel management. For that reason, participants suggested creating a segregated and dedicated trust fund with several controls over the funds to finance the long-term management of used nuclear fuel.

Other participants were skeptical about the ability of government to manage Canada's used nuclear fuel. Some participants felt that the choice of an approach and the ultimate implementation program would be more efficient if a private company was responsible for this.

Many participants saw a role for the NWMO as the body with responsibility to properly manage the used fuel and implement the management approach as required by the Nuclear Fuel Waste Act. It was felt by some that it was important for the NWMO to continue to be objective in its work and to develop a management approach that is responsive to the need and expectations of Canadians.

Those in attendance at information and discussion sessions understood that the decision-making process was long and recognized that over time, governance structures may change. With that in mind, participants suggested creating a set of clear laws that would assure the future implementation of the selected approach.

Monitoring

Many participants suggested that a monitoring system must be established to ensure proper management of the used nuclear fuel. The monitoring system should include quality control and quality assurance standards. A full monitoring program for all aspects of the management approach should be developed. The draft monitoring plan that would

identify the scope of monitoring, should be presented to the public for review and comment.

It was suggested by some that the monitoring should be the responsibility of an independent body. Several participants expressed that the nuclear industry has a vested interest in the continued production of nuclear energy and some felt that industry control of monitoring could not be trusted. Therefore, an independent monitoring organization would have greater public credibility. The independent monitoring body should consist of members of the affected communities as well as technical experts, ethical and social scientists and environmentalists. The affected communities should determine the composition of the monitoring body. The monitoring body must make all information public – it must be honest, open and transparent in its work. Not only should the results of the monitoring program be made available, all accidents or breaches of materials must be immediately reported to the community and regulators.

Research Supporting a Phased Approach

Participants at information and discussion sessions were clear that the Implementation Plan needs to commit to research two key things: (1) alternative technical approaches; and (2) international developments.

Participants understood that the NWMO's mandate was to evaluate three (or more) management approaches as the sole basis for implementation. However, many participants felt that during the implementation stage, and as part of a potential phased management approach, technological advances may lead the NMWO to a safer and more sustainable management method than the three currently suggested. Therefore, many participants felt that as part of implementation, there should be a commitment to continuing research into other technical methods. Suggestions for further research topics included: possible retrieval and reuse reprocessing of the fuel, better nuclear reactor efficiency to reduce the amount of used fuel and transmutation.

Some participants felt that the Implementation Plan should include further research about reactor site storage and centralized storage methods. Participants at some of the sessions expressed that there have been many years of research into deep geological disposal methods and less research on on-site or centralized storage technologies. Generally, it was felt that if a phased approach were implemented, it would provide Canada with more time to assess and learn from the research and may identify better ways to manage the used fuel for the long term.

Many participants also told the NWMO that there was a need to commit to on-going research regarding international developments in the management of used nuclear fuel. The Implementation Plan should contain a commitment to reviewing and assessing the work of other countries.

Safety and Security

Overall, participants thought that no matter which of the three proposed management approaches is recommended, measures that will provide safety and security for the public must be included in the Implementation Plan. Suggestions were made to develop monitoring, mitigation and contingency plans with broad stakeholder support. Further, in the event that an accident occurs or any person or community suffers a loss in any way related to the management approach, compensation for this loss must be made available.

A common fear expressed by participants at most information and discussion sessions was the possibility of terrorists acquiring used nuclear fuel or targeting existing stored fuel at reactor sites. Participants were also concerned with the used nuclear fuel being used in a military context (e.g. reprocessing and extracting plutonium for nuclear weapons.) The management approach must ensure that all management and regulators maintain high levels of oversight, security and safeguards to prevent this from occurring.

Emergency Plans

The Implementation Plan must incorporate emergency preparedness and response, equipment and training for all host communities and those along any transportation route. It was suggested that plan must commit to:

- Trained personnel along the transportation routes to quickly respond and react to any accidents
- The required equipment
- Emergency Response Plans distributed to all households that could be affected by an accident en-route or at the facility
- Development of emergency access routes and evacuation plans for communities

Transportation and Other Risks

The Implementation Plan must take into consideration the real fears and concerns expressed by citizens at the information and discussion sessions with regards to transportation.

Several participants noted that while the actual risk associated with used fuel transportation may be acceptable, the real issue of concern is public perception of the risks associated with transporting used nuclear fuel. Some participants felt that rail transport may lessen public anxiety but may result in a greater risk due to possible infrastructure sabotage. There were a few divergent views regarding transporting the used fuel to a remote location. Some participants felt there would be less risk associated with transporting the used fuel to a remote location than there would be leaving the used fuel in a populated area. Other participants felt that transporting used fuel to remote locations poses greater risk. Participants also commented that the risks associated with an increase in traffic volume on local roads as a concern.

It was noted that even with a voluntary host community in place, communities along transportation corridors may be concerned and may, as a result, oppose any proposal. Some participants expressed that the public would have to learn to accept risks associated with transporting used nuclear fuel. It was thought that the risk associated with the transportation and management of used fuel is minimal compared to everyday risks the public is exposed to through the daily transport of dangerous goods on our highways. In regard to this, three suggestions were given: include a recognition of risk perception into an Implementation Plan to increase public knowledge and lessen fears associated with used nuclear fuel; put nuclear waste management into context with other public programs in order to ensure public understanding; and provide reassurance that communities along the transport route are not an unacceptable risk. Given that other countries have successfully and safely transported hazardous materials including radioactive materials, it was felt that Canada must more clearly demonstrate that transporting used fuel can be accomplished safely.

Many participants expressed that the safety and security issues associated with each stage of implementation need to be better communicated to the public because people are unaware of the nature of risk associated with the transportation and management of used fuel. Many participants suggested that when compared to other materials, the risk associated with the transport of used fuel is minimal. An example was provided: Ontario Power Generation has a good safety record transporting nuclear material such as low and intermediate radioactive waste, however it is not very well known. It was recommended that the NWMO be clear and up-front about the level of risk associated with transportation. It was also suggested that NWMO work hard to develop the trust of Canadians and commit to openly share information on all activities and events – good or bad – with Canadians.

Contrary to this opinion, there was a discussion about the appropriateness of making information on transportation of nuclear fuel available to public since doing so might pose a potential risk to a national security. This point focused on whether, when used nuclear fuel is transported, the details of the route, timing, etc., should be made public as a matter of transparency, or whether these details should be kept confidential as a matter of security.

It was suggested that the Implementation Plan stipulate the establishment of a transportation route that is the shortest and safest route to minimize risk and to protect communities and the environment.

International Agreements

There was discussion regarding the influence of various international agreements like NAFTA and the potential for Canada to receive used fuel from other countries. For some participants, the Implementation Plan should include a clause that guarantees that there will not be any attempt to import and manage any used fuel from other countries. It was felt that if Canada has a management facility and the USA does not, then American used fuel might enter Canada under NAFTA. Others argued that this was not the case and

Canada would not be obliged to accept radioactive waste from other countries under NAFTA. Some participants also expressed concern that countries that currently own CANDU reactors may want to return the used material back to Canada for long-term management. Some participants were strongly opposed to repatriating the used fuel and feared that existing trade agreement may encourage or mandate such action. Other participants suggested that used fuel management could become a lucrative industry for Canada and felt that if there was a market for the used fuel, then it would be advantageous for CANDU materials to be returned to Canada for management. A few participants suggested that Canada had an ethical obligation to take back the CANDU used fuel and guarantee proper management. Other participants thought otherwise.

Some participants expressed fear that the used fuel could be used for nuclear weapons. It was suggested that the Implementation Plan include an assurance that Canada will not sell our used fuel to other countries for use in nuclear weapons.

Funding

As mentioned in an earlier section, most participants supported the establishment of a trust fund. The trust fund must be properly managed and continue to be monitored, and nuclear power producers must continue to make contributions according to all requirements of the Nuclear Fuel Waste Act. The Implementation Plan must include a long-term financial plan, which will assure that money will be in place for future generations to continue to manage the selected approach. Clear commitment of ownership and establishment of a sustainable trust fund will assure that future generations will not be financially burdened. There must be an agreement, supported by legislation that the funds in the trust fund will not be allocated for other uses by future governments.

Public Engagement and Continuous Learning

Throughout the information and discussion sessions, many participants emphasized the importance of keeping Canadians informed of the NWMO's actions and new information about used fuel management. Citizens want the nuclear industry and the governing institutions to be more transparent about what they are doing, and more inclusive of citizens both in how decisions are made and in the on-going management of the used fuel.

Some participants, particularly those from the reactor communities, suggested that there should be additional risk and safety assessment on the selected management approach during implementation. The public must fully understand the relative risks to society and comprehend the reasons for the NWMO recommendation and the subsequent federal government decision. Participants understood that the perception of risks may change over time due to new knowledge and new technologies – this new information must be shared with Canadians.

The Implementation Plan must include a commitment to keep citizens informed throughout the process. This should include all plans for site selection (if required) and

any changes to the selected management approach. Some participants suggested sending out annual reports to the public updating them on NWMO activities and events. Some residents in reactor communities suggested additional consultation with those living near to reactor sites. They felt that they could provide relevant input into the form of community benefits and commitment agreement that could be established in the host communities. As well, they could share personal opinions on the perceived risks associated with nuclear facilities.

Accountability to citizens and a clear and transparent path for decision-making are requirements of any management approach. Some felt that during the implementation phase, the ethics that currently guide the NWMO process might be lost. It is important to establish a system, which continues to focus on ethics to ensure that management approach is properly implemented.

3.4 Other Participant Comments

During the engagement process related to Discussion Document #2, the NWMO sought feedback from Canadians on three key questions. Participants' responses to those three questions have been encapsulated in the prior three sections (3.1 to 3.3). In addition to answers to the three questions, Canadians expressed a number of other thoughts on issues ranging from the nature of the nuclear hazard to international research and development. The NWMO has chosen to reflect these thoughts in this summary report to show the breadth and depth of Canadians' feelings about used nuclear fuel and its associated issues. This section is organized according to the following themes:

- Energy Policy
- International Issues
- The Nature of the Hazard and Risk Perception
- The NWMO Study Process

Energy Policy

A key issue discussed by many participants at information and discussion sessions was Canada's past and future energy policies. The NWMO's mandate is specific to the long-term future management of used nuclear fuel and does not touch on issues of national or provincial energy policy. However, a few participants felt that the NWMO's mandate should be broadened to include an examination of Canada's future energy policy. Some participants felt that there are strong linkages between energy policy and used fuel management and that the two concepts cannot be viewed separately when the NWMO makes a recommendation and the government makes a decision about the future management of Canada's used nuclear fuel.

A view expressed by some participants was the need for early phase-out of nuclear power generating plants. These participants expressed this desire based on the hazards associated with used nuclear fuel, future uncertainties and costs (financial and

environmental) involved in the management of used fuel. Some participants felt that nuclear power production should not have been initiated before a solution for the long-term management of used nuclear fuel was created. These participants made it clear that along-term management approach for the existing fuel bundles should be established before future nuclear power plants are created.

Some participants expressed that a comprehensive, long-term energy plan is needed. And as part of the plan, nuclear power plants should be phased-out, while increasing support for energy conservation and adoption of alternative energy technologies such as wind, water, biomass, and solar. Other participants suggested that nuclear power should remain as part of Canada's energy mix in the future. One participant also raised the possibility of nuclear fusion technology. Others suggested that more research and development should be directed towards adopting cleaner energy technologies and encouraging energy conservation initiatives. Some questioned the ability of Canadians to support their current lifestyles without the production of nuclear energy. These participants wondered if alternative energy sources would truly be able to meet Canada's energy needs.

According to a few participants, in the late 1990s, the government committed to implementing a study that would include assessing the future of nuclear energy within a wider energy policy Framework. This assessment has not yet occurred and the establishment of the NWMO and its work does not appear to meet this recommendation. It was felt that the governments are continuing to develop energy solutions, which still include nuclear energy. Some felt that the public had the right to participate in a broader, less scoped energy policy debate and assessment.

International Initiatives

Canadians that participated in the dialogue about Discussion Document #2 were curious about international initiatives and Canada's role on the international nuclear waste management scene. There were numerous enquiries about whether or not the NWMO or the Canadian government was in contact with the international community about used fuel management techniques and whether information was being shared. They were surprised to learn that Canada is an active participant in several international radioactive waste management programs and it has information sharing agreements with other waste management organizations. Many participants were curious to know how other countries: have reached decisions about used fuel management; have stored used fuel; and have gone about researching options. Participants were curious about alternative methods being researched and/or implemented in other countries.

Most participants were clear that the NWMO should look at lessons learned and best practices from other countries around the world. An example of this is questions asked about the lessons learned from the Chernobyl accident. Participants noted that managing used nuclear fuel is an international issue and Canada must work with other countries to find a solution. Canada needs to be open and inclusive since used fuel management is an international problem, not just a national issue. Participants were interested in research

and solutions from the US, Western Europe, Scandinavia and Japan. Some felt that the decisions made in the US (i.e., repository at Yucca mountain) would have an impact on what Canadians view as being an acceptable solution.

However, in addition to researching what other nations are doing, some participants told the NWMO that they were looking to Canadians to be leaders in this field – Canada should do more than just monitor other countries' research on emerging technologies that might provide options for the future – rather, Canada should actively lead or contribute to some of the research and decision-making.

Nature of the Hazard and Risk Perception

Several participants raised questions and made comments about the composition and toxicity of used nuclear fuel the hazard it poses to present and future generations. Some of these questions included:

- Does used nuclear fuel contain uranium or plutonium?
- What are the most radioactive isotopes found in used fuel bundles?
- How long is used nuclear fuel radioactive?
- What is a safe radiation level?
- What is the half-life of the radionuclides in a used fuel bundle? What is the current state of knowledge about fuel degradation over time?
- Do gamma rays cause the greatest harm?
- How long will the fuel bundles remain hazardous to human populations and the environment?
- What is the amount of time left until the storage containers of the current fuel bundles need to be replaced?
- If a nuclear waste "spill" occurred, what would the effects be to humans and other life forms?
- What are the ecological consequences of storing nuclear waste?
- How soluble are fuel bundles?
- What is the current (and predicted) tonnage of fuel bundles in Canada?

Many participants expressed that used nuclear fuel poses a significant hazard to human populations and the environment for a long period of time. Given the radioactivity associated with used nuclear fuel, many participants noted that any management option would require that necessary safety measures be in place. In contrast, a few participants commented that perceived risks of used fuel and misconceptions regarding the nuclear industry need to be addressed to reduce fears expressed by Canadians. The participants noted that the hazards of used nuclear fuel (i.e., the nature of radiation and its hazards), requires clarification and further education to ensure that the general public and Aboriginal communities fully understand the true risks. Understanding the risks involved with used nuclear fuel could help individuals make an informed decision about the preferred management approach and help to reduce fears associated with used nuclear fuel and the nuclear industry. One suggestion a participant had to help others understand

the nature of the hazard was to include a detailed description of the composition of used nuclear fuel in the NWMO study reports.

Another sentiment expressed was the need to include citizens' opinions from across Canada within a risk assessment. One participant noted that while there are diverging opinions on the relative risks to communities amongst experts and average citizens, it was felt that the relative risk of transporting used fuel should be measured against the relative risk of leaving the used fuel in reactor communities. A view expressed was the need to present the relative risks to communities in a well-structured and easily understood communication style.

NWMO Study Process

At information and discussion sessions and in written submissions received throughout the fall of 2004, the NWMO received comments and questions about its structure and the study process. Questions about the composition of the NWMO and the Assessment Team were common. Participants frequently questioned the relationship of the NWMO to nuclear producers and the government. For many Canadians, this dialogue process was their first exposure to the NWMO and they were curious about cost structures and the stages of the study process. Other comments related to the NWMO and the study process are included in this section and are summarized under key thematic headings:

- Communication, Engagement and Citizen Involvement
- Public Trust
- Consultation and Attendance

Communication, Engagement and Citizen Involvement

Many participants wondered how their input and comments would feed into the NWMO's decision about managing used nuclear fuel and questioned who would be assessing public comments. It was asked how the NWMO would ascertain what the Canadian population feels is the most preferred technical method for the long-term management of Canada's used nuclear fuel. A question was raised about how much influence Canadians will have on the Government's decision about nuclear waste management. Many acknowledged that it was important for them to be involved and engaged in the decision-making process and that the NWMO should continue this practice. Some participants felt that the sessions were an opportunity for various groups to participate in the decision making process for the long-term management of used nuclear fuel. Numerous participants viewed the study process and public sessions positively. It was felt that the process opens up discussion on the nuclear industry. A number of participants were impressed with the NWMO sessions, information and materials provided.

For many, an issue closely related to the decision-making process is the communication of an NWMO recommendation and a government decision. Several participants noted

that it would be important, in NWMO's recommendation, to present the trade-offs in a transparent way, clearly indicating the reasons for the recommendations.

There were many suggestions about additional ways to engage and inform other Canadians about the study process. These included: newsletters, additional newspaper and radio ads and a television ad or show. Some participants expressed frustration with the NWMO website; some participants found that finding documents was a challenge.

Public Trust

Some participants raised questions about trust and governance issues. Some felt that in the past, public engagement about nuclear energy and used fuel were not genuine. For example, it was felt that the public was not consulted on various decisions leading to the establishment of the nuclear reactor facility in Pickering. There was concern that a number of decisions were made behind closed doors. It was recommended that the study process continue to be open and transparent, and that NWMO continue to learn from the mistakes of the past.

Generally, participants approved of NWMO as being an independent organization mandated by the government. Many participants took comfort in this knowledge. However, some perceived a conflict of interest with the relationship between the NWMO, the federal government and the nuclear industry. They felt that the NWMO should be at an arms length from the nuclear industry, but that this is not the case because of the current NWMO management structure under the Nuclear Fuel Waste Act.

In a few cases, the legitimacy of the NWMO was questioned at sessions. It was felt that the NWMO mandate did not interpret the Nuclear Fuel Waste Act correctly. A few participants at the northern Ontario sessions felt that the NWMO interprets its mandate too narrowly; and therefore, it narrows the scope of the Act in terms of finding an appropriate solution.

Consultation and Attendance

Participants were curious about the consultation process leading up to the information and discussion sessions related to Discussion Document #2. They were interested in finding more about the process to-date and where the NWMO was headed in the future. Participants also had questions about where other NWMO sessions were held and what residents in other parts of the country told the NWMO. Participants were pleased to know that there was additional information and summary reports available on the NWMO website or in hard copy by mail. With respect to other materials, the public found the NWMO DVD (that was played at discussion sessions) very informative and helpful.

Participants at a number of sessions felt that public attendance was very low, which indicated to them that there was either a lack of general interest in the future management of used nuclear fuel or that the sessions were not adequately advertised. One participant

asked how concerned the NWMO was about getting an adequate national representation of thoughts on Discussion Document #2 if very few people attend. Suggestions were made about how to engage more Canadians in the process, but most attendees agreed that once a decision is made and the process moves into the siting stage, more Canadians will take an active interest in this issue.

3.5 Final Comments

This report attempted to summarize the key opinions, views and suggestions of those who participated in the nationwide engagement on Discussion Document #2: "Understanding the Choices". Comments on the contents of this summary report are welcomed and may be provided to the NWMO through its website – www.nwmo.ca