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"Bridging the Gaps"

Final Report

Independent Evaluation of the Nuclear Waste Management Organization's *Draft Study Report: Choosing a Way Forward*

Prepared for

The Town of Ajax

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By

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1.0 Executive Summary

The Nuclear Waste Management Organization (NWMO) was established in 2002 by an Act of Parliament with a mandate to make a recommendation to the federal government regarding options for long term management of used nuclear fuel. As specified in the *Nuclear Fuel Waste Act* (*NFWA*), the NWMO is required to review a minimum of three technical options (deep geological disposal, storage at nuclear reactor sites and centralized storage) and to recommend the preferred management approach to the Canadian government by November 15, 2005. The NWMO will then be responsible to implement the approach selected by the Canadian government.

In May 2005, the NWMO issued its *Draft Study Report: Choosing a Way Forward*. This is the third NWMO document in a series of reports addressing "The Future Management of Canada's Used Nuclear Fuel."

- Discussion Document 1: *Asking the Right Questions*
- Discussion Document 2: *Understanding the Choices*
- Draft Study Report: *Choosing a Way Forward*

The NWMO intends to provide opportunities for comments on the Draft Study Report over the summer, in order to improve its recommendations before the report is finalized and submitted to the Canadian government.

The Town of Ajax has reviewed the previous NWMO reports (Discussion Document 1 and Discussion Document 2) and submitted its comments and recommendations to the NWMO. For the recent Draft Study Report, the Town of Ajax has engaged a consultant, Robert D. Gadsby, to assist with the review. In addition, the Town of Ajax has asked for an assessment to see whether its comments on the previous NWMO reports have been addressed in the Draft Study Report. This report covers the comments and recommendations from this review.

In the Draft Study Report, the NWMO recommends a fourth option "Adaptive Phased Management" as the preferred approach for the long term management of Canada's used nuclear fuel. This approach builds upon the strengths of the three main technical options and provides flexibility for future inputs to the decision-making process. In summary, the Adaptive Phased Management approach would entail:

- Phase 1: Preparing for Central Used Fuel Management (~ the first 30 years)
- Phase 2: Central Storage and Technology Demonstration (~ the next 30 years)
- Phase 3: Long-term Containment, Isolation and Monitoring (beyond ~ 60 years)

Of particular interest to the Town of Ajax, this approach would leave the used nuclear fuel at the Pickering Nuclear Power Plant for the next 30 to 60 years, depending upon when a decision is made to proceed to a Centralized Site. The approach identifies the technology associated with a deep geologic repository as the appropriate long-term end point for used fuel management.

The review of the comments and recommendations provided by the Town of Ajax on previous NWMO reports (Discussion Documents 1 and 2) reveals that these comments and recommendations are still generally valid. In particular, the questions raised by the Town of Ajax regarding the future of the Pickering Nuclear Power Plant have not been addressed specifically in the Draft Study Report.

In addition, the Town of Ajax has the following recommendations for the NWMO:

1. That the Town of Ajax (as one of the "communities of interest") continue to be engaged in the ongoing decision-making process for the implementation of the Adaptive Phased Management approach – particularly for the initial phase of existing reactor storage and transportation to the central site;

2. That the NWMO be encouraged to seek ways to expedite the safe removal of used nuclear fuel from existing reactor sites, during the implementation of the Adaptive Phased Management approach;

3. That the NWMO provide additional information on scenarios related to potential delays (for example, difficulties in finding a willing host community in a timely manner) in the process of selecting a central site for the Adaptive Phased Management approach, and assess the impact of any delays on the capacity for used nuclear fuel storage at existing reactor sites;

4. That the Town of Ajax should be part of the process that establishes a strategy to determine the question of financial compensation for host communities and affected communities;

5. That the Town of Ajax be advised of assessments on the potential impact of scenarios related to the future of the Pickering Nuclear Power Plant reactors (when changes such as life extension, new reactor fuels, etc. are contemplated) which could affect the capacity of existing reactor site storage and future transportation requirements;

6. That the NWMO continue to monitor the used fuel management approaches in other countries, as outlined in the Draft Study Report;

7. That the NWMO provide funding during the implementation phase, so that affected communities (such as the Town of Ajax) can continue to engage independent consulting advice on the potential impacts of the program; and

8. That the Canadian government be encouraged to make a timely decision – in selecting the appropriate option for the future management of Canada's used nuclear fuel – so that the NWMO can begin the implementation phase, find a willing host community and maintain the momentum established over the past 2½ years.

2.0 Introduction

In May 2005, the Nuclear Waste Management Organization (NWMO) issued its *Draft Study Report: Choosing a Way Forward*. This is the third NWMO document in a series of reports addressing "The Future Management of Canada's Used Nuclear Fuel."

- Discussion Document 1: *Asking the Right Questions*
- Discussion Document 2: *Understanding the Choices*
- Draft Study Report: *Choosing a Way Forward*

The NWMO intends to provide opportunities for comments on the Draft Study Report over the summer in order to improve its recommendations before the report is finalized and submitted to the Canadian government.

The Town of Ajax is interested in providing comments and recommendations on the management approach for the long-term care of Canada's used nuclear fuel – as described in the NWMO's Draft Study Report – particularly from the perspective of the local community. Ajax is a municipality that abuts the Pickering Nuclear Power Plant and many of the Town's residents are situated in closer proximity to the Pickering Nuclear Power Plant than residents in the City of Pickering. Therefore, the Town of Ajax has a keen interest in ensuring that it has a voice in any decisions which may have an impact on its residents.

The Town of Ajax has engaged Robert D. Gadsby to act as a consultant to undertake an independent review of the Draft Study Report. Robert D. Gadsby has extensive experience in nuclear waste management, both in Canada and internationally. He is familiar with the options that the NWMO is considering and he has been involved in previous third-party assessments to assist the NWMO in conducting its peer review of these options. This background has helped to provide the Town of Ajax with timely and cost-effective advice regarding the potential impact of the NWMO's proposed approach.

3.0 Methodology

The 300-page *Draft Study Report: Choosing a Way Forward* presents the deliberations and recommendations of the NWMO in 18 Chapters (and 15 Appendices) under five main parts:

- A Responsible Path
- What Canadians Said
- Assessment of Management Options
- Response to Legislated Study Requirements Analysis
- NWMO Advisory Council Statement

An independent review of the NWMO's Draft Study Report has been undertaken by Robert D. Gadsby acting in the role of consultant to the Town of Ajax. In order to conduct a suitable assessment and review of the Draft Study Report – with particular attention to issues which could have a potential impact on the Town of Ajax – the following major headings have been identified for this report:

- Options Considered
- Citizen Engagement
- Assessment of Management Options
- Implementation Plans and Timetables
- Transportation Considerations
- Social, Economic and Cultural Effects
- Technical and Research Considerations
- Financial Aspects

In each section of this independent review, "Findings and Observations" are presented that address the key issues and interests of the Town of Ajax. All of the various Chapters and Appendices from the Draft Study Report have been covered in this review. (Appendix 1 of this review presents a cross-reference to key Chapters and Appendices in the Draft Study Report.)

In addition, Section 5 of this independent review highlights the comments and recommendations from the Town of Ajax on previous NWMO reports to see whether these have been addressed in the Draft Study Report, including:

- Reviewing and updating the conclusions and recommendations prepared by ADH Technologies Inc. in the document *"Independent Evaluation of Nuclear Waste Management Organization (NWMO) Discussion Document #2"*
- Review of the following Town of Ajax documents:
    - Staff report on Discussion Document 1: Asking the Right Questions
    - Staff report on Discussion Document 2: Understanding the Choices
    - Letter to NWMO including Ajax Town Council's Resolution on Discussion Document 2.

During the process of this independent review, the President of the NWMO sent a letter to the Mayor of the Town of Ajax (dated July 11, 2005) which conveyed the NWMO's response to some of the previous comments and recommendations. This letter has also been included as part of this review.

As a result, this independent review consolidates past comments and addresses present concerns and recommendations, as part of the feedback to the NWMO on behalf of the Town of Ajax.

4.0 Review of NWMO Draft Study Report: Choosing a Way Forward

The *Draft Study Report: Choosing a Way Forward* is the consolidation of knowledge and ideas that have been developed and debated by the experts and advisors to the Nuclear Waste Management Organization over the past two and half years.

The NWMO has defined its mission:

> *to develop collaboratively with Canadians a management approach for the long-term care of Canada's used nuclear fuel that is*
>
> - *socially acceptable,*
> - *technically sound,*
> - *environmentally responsible and*
> - *economically feasible.*

As part of the assessment of technical possibilities the NWMO initially reviewed three options:

Option 1: Deep Geological Disposal in the Canadian Shield
Option 2: Storage at Nuclear Reactor Sites
Option 3: Centralized Storage, Above or Below Ground

Previous peer reviews have indicated that while there are advantages and limitations to each of these approaches, all three concepts are technically credible and could be developed into safe near-term solutions (the next 175 years).

The Draft Study Report proposes a fourth option "Adaptive Phased Management" as the recommended approach. This approach builds upon the positive features of the three concepts above in a series of stages (or phases):

Phase 1: Preparing for Central Used Fuel Management
(approximately the first 30 years)

Phase 2: Central Storage and Technology Demonstration
(approximately the next 30 years)

Phase 3: Long-term Containment, Isolation and Monitoring
(beyond approximately 60 years)

(Appendix 2 of this report provides illustrations from the Draft Study Report of these three phases.) This approach recognizes that while centralized storage or continued storage at the nuclear reactor sites may be acceptable for the near-term, the technology associated with a deep geologic repository is a more appropriate long-term end point for used nuclear fuel.

The Nuclear Waste Management Organization will implement this comprehensive approach, in compliance with the Nuclear Fuel Waste Act (NFWA) of 2002, and will:

- *Meet or exceed all applicable regulatory standards and requirements for protecting the health, safety and security of humans and the environment;*

- *Provide financial surety through funding by the nuclear energy corporations (currently Ontario Power Generation Inc., Hydro-Québec and NB Power Nuclear) and Atomic Energy of Canada Limited, according to a financial formula as required by the NFWA;*

- *Seek a willing community to host the central facilities. The site must meet the scientific and technical criteria chosen to ensure that multiple engineered and natural barriers will protect human beings, other life forms and the biosphere. Implementation of the approach will respect the social, cultural and economic aspirations of the affected communities;*

- *Focus site selection for the facilities on those provinces that are directly involved in the nuclear fuel cycle;*

- *Sustain the engagement of people and communities throughout the phased process of decision and implementation; and*

- *Be responsive to advances in technology, natural and social science research, Traditional Aboriginal Knowledge, and societal values and expectations.*

Findings and Observations:

- The NWMO's recommendation and its commitments for the implementation phase reflect the comments from Canadians and some of the previous comments from the Town of Ajax.

- From the perspective of the Town of Ajax, the NWMO should continue to engage "communities of interest" so that they have input to decision-making process throughout the implementation phase. [This is also consistent with the NWMO's commitments above.]

- The NWMO's recommended approach refers to "flexibility in the pace and manner of implementation" as one advantage of "Adaptive Phased Management." This advantage should be balanced against the need for a firm schedule of timely action, to ensure that this flexibility does not result in inordinate delays to the program.

4.1 Options Considered

4.1.1 Option 1: Deep Geological Disposal in the Canadian Shield

The management approach for Deep Geological Disposal in the Canadian Shield can be described as:

- *Long-term management of used nuclear fuel through containment and isolation in a deep geologic repository in the crystalline rock of the Canadian Shield;*
- *Used nuclear fuel is transported from the nuclear reactor sites to a central location for long-term management;*
- *The deep geologic repository is based on the concept described by Atomic Energy of Canada Limited in the Environmental Impact Statement on the Concept for Disposal of Canada's Nuclear Fuel Waste, and modified to take into account the views of the environmental assessment panel as reported in February 1998; and*
- *Following an interim period of monitoring, the repository is closed, without the intent to retrieve the used fuel.*

Findings and Observations:

- From the perspective of the Town of Ajax, Deep Geological Disposal in the Canadian Shield is a technically acceptable management option, with the following advantages:
  - Facility can be located in remote location far from people
  - Enhances security as a result of facility design in deep rock
  - All material can be located in one facility
  - Provides for dedicated staff on a continuing basis
- As one of the "communities of interest" near the Pickering reactor site, the Town of Ajax would expect to be involved in the decision-making process during the implementation phase (including the impact of transportation of the used nuclear fuel from the existing site).

4.1.2 Option 2: Storage at Nuclear Reactor Sites

The management approach for Storage at Nuclear Reactor Sites can be described as:

- *Long-term management of used nuclear fuel in storage facilities, at or just below surface, at each nuclear reactor site in Canada; and*

- *Storage facilities are maintained, rebuilt and operated in perpetuity at each reactor site.*

Findings and Observations:

- The Town of Ajax has previously advised the NWMO that *"long-term storage of used nuclear fuel at existing reactor sites in the Durham Region is not an acceptable solution."*

- As one of the "communities of interest" near the Pickering reactor site, the Town of Ajax would expect to be engaged in any discussions which might alter the amount, type or duration of used nuclear fuel storage at the Pickering reactor site (life extension, new reactor types, etc.).

4.1.3 Option 3: Centralized Storage, Above or Below Ground

The management approach for Centralized Storage (Above or Below Ground) can be described as:

- *Long-term management of used nuclear fuel in a storage facility, above or just below ground, at a central site in Canada;*

- *Used nuclear fuel is transported from the nuclear reactor sites to this central location for long-term management; and*

- *The storage facility is maintained, rebuilt and operated in perpetuity at this central site.*

Findings and Observations:

- From the perspective of the Town of Ajax, Centralized Storage (Above or Below Ground) is a technically acceptable management option, with the following advantages:
    - Site can be chosen as best suited for used fuel management
    - Site can be located in remote location thereby reducing risk to environment, health and safety
    - Enable dedicated trained staff on continuing basis
    - Required technology is well established

- As one of the "communities of interest" near the Pickering reactor site, the Town of Ajax would expect to be involved in the decision-making process during the implementation phase (including the impact of transportation of the used nuclear fuel from the existing site).

4.1.4 Option 4: Adaptive Phased Management

The Draft Study Report proposes a fourth option "Adaptive Phased Management" as the recommended approach. The approach builds upon the positive features of the previous three concepts in a series of stages (or phases):

Phase 1: Preparing for Central Used Fuel Management
(approximately the first 30 years) During this phase, the used fuel would remain at the nuclear reactor sites, while a suitable centralized site is found. Safety analysis and environmental assessments would be conducted to obtain the required licenses and approvals to construct the central facilities and to transport used fuel.

Phase 2: Central Storage and Technology Demonstration
(approximately the next 30 years) During this phase, the used fuel would start to be transported to the centralized facility and placed into shallow underground storage. The final design and safety analysis would be completed for the deep geologic repository.

Phase 3: Long-term Containment, Isolation and Monitoring
(beyond approximately 60 years) During this phase, the used fuel would be retrieved from the shallow underground storage, repackaged into long-lived containers and transferred to a deep geologic repository at the central site. The timing of a decision to close the repository (in about 300 years) would be left to future generations.

(Appendix 2 of this report provides illustrations from the Draft Study Report of these three phases.) This approach recognizes that while centralized storage or continued storage at the nuclear reactor sites may be acceptable for the near-term, the technology associated with a deep geologic repository is a more appropriate long-term end point for used nuclear fuel.

This "Adaptive Phased Management" approach can be described as:

- *Long-term management of used nuclear fuel through an adaptive path which provides for:*
  - *centralized containment and isolation of the used fuel in a deep geologic repository in a suitable rock formation, such as the crystalline rock of the Canadian Shield or Ordovician sedimentary rock;*
  - *flexibility in the pace and manner of implementation through a phased decision-making process supported by a program of continuous learning, research and development;*
  - *provision for an interim step in the implementation process in the form of shallow underground storage of used fuel at the central site, prior to final placement in a deep repository;*

- *continuous monitoring of the used fuel to support data collection and confirmation of the safety and performance of the repository; and*
- *potential for retrievability of the used fuel for an extended period, until such time as a future society makes a determination on the final closure and the appropriate form and duration of postclosure monitoring.*

- *Used nuclear fuel is transported from the nuclear reactor sites to this central location for long-term management.*

- *The repository would be monitored to support data collection and confirmation of the safety and performance of the repository.*

During the NWMO's review of the strengths and weaknesses of the previous three options, a hybrid approach emerged with the following characteristics:

- *A period of extended storage of used fuel at the reactor sites, for a definite period of time. The waste is currently safely stored in these facilities, and would continue to be so for some time to come;*

- *Consolidating the used fuel at one central location, on the surface or in shallow underground storage as a preliminary step;*

- *A period of learning. Emerging technologies may offer potential to either neutralize the radionuclides in the used fuel or allow for the safe and cost-effective reuse of the waste. It would also allow us to learn from the experience of other countries that are in the process of implementing long-term used fuel management approaches. In addition, there may be greater certainty about the future of nuclear power in Canada;*

- *Development of a deep geologic repository either to be used for deep underground centralized storage or as final disposal, if needed;*

- *A period of relatively easy access and retrievability; and*

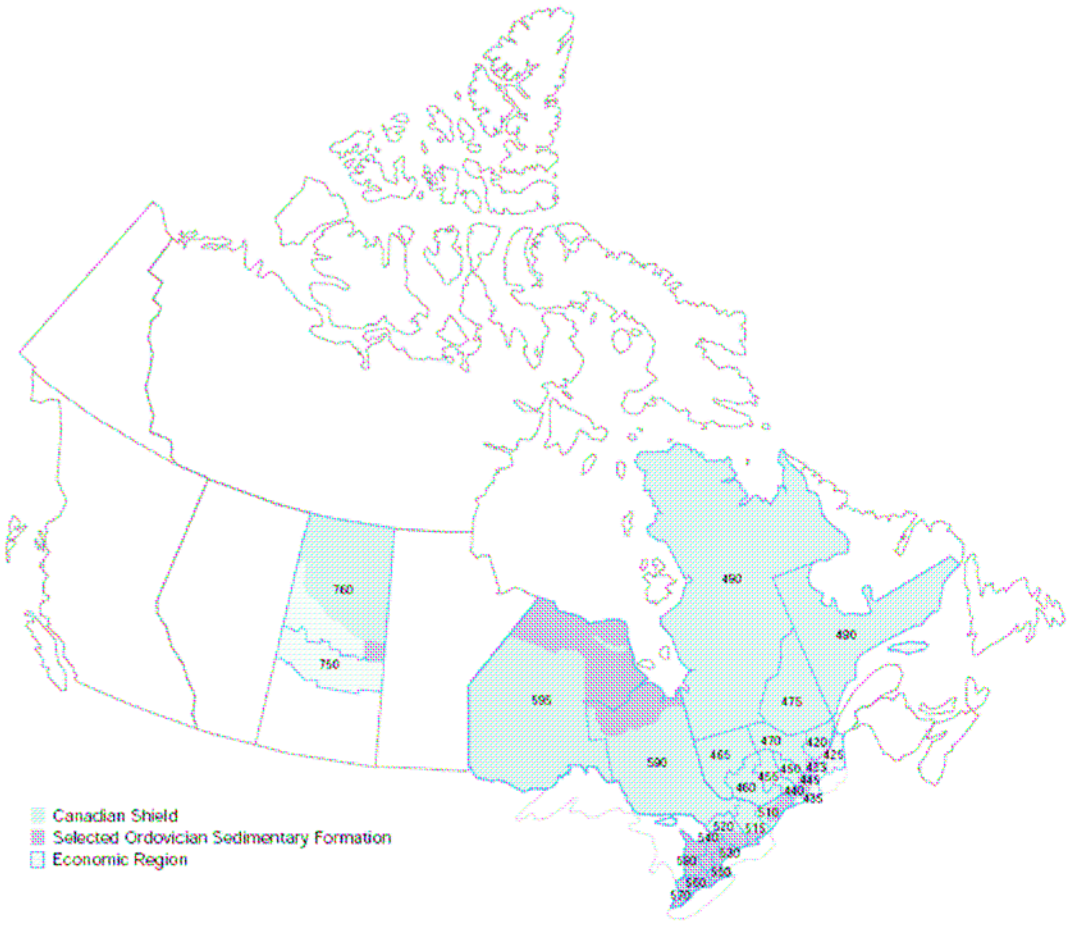
- *Staged decision-making. After a definite period of time, decide whether to continue to store the used fuel at the surface or shallow underground, or whether and when to place it in a deep geological storage or disposal facility.*

Chapter 3.5 of the Draft Study Report highlights the feedback from Canadians which led to the creation of a fourth option – the Adaptive Phased Management approach. Chapters 8.2 and 13 provide more details about the concept and the timing of various activities (a technical description is also included in Appendix 3 of the Draft Study Report).

Findings and Observations:

- The basis for the inclusion of "Ordovician sedimentary rock" as a possible host rock for a long-term repository is not clearly explained in the Draft Study Report. [Figure 4-12 of the Draft Study Report (page 161) shows regions of potentially suitable Ordovician sedimentary rock formations in mid-Saskatchewan, northern Ontario, south-western Ontario and southern Québec.]

Figure 4-12 Option 4: Adaptive Phased Management-Map



- It is not clear whether centralized storage in shallow rock caverns provides a significant advantage when compared to a secure above-ground "staging area" for a deep geologic repository.

- The NWMO's recommended approach refers to "flexibility in the pace and manner of implementation" as one advantage of "Adaptive Phased Management." This advantage should be balanced against the need for a firm schedule of timely action, to ensure that this flexibility does not result in inordinate delays to the program.

- From the perspective of the Town of Ajax, "Adaptive Phased Management" is a technically acceptable management option – in principle, it provides for the timely and safe removal of used nuclear fuel from the Pickering Nuclear Power Plant.

- As one of the "communities of interest" near the Pickering reactor site, the Town of Ajax would expect to be involved in the decision-making process during the implementation phase (including the impact of transportation of the used nuclear fuel from the existing site).

The Town of Ajax also has the following comments and questions related to the Adaptive Phased Management approach:

- Once a decision is made by Natural Resources Canada, the Town should be kept informed of any decisions and continue to have an opportunity to provide input to the preparation of an implementation plan. When will a specific implementation plan be developed, in this process?

- If a decision is made to skip Phase 2 (centralized site storage) and go straight to Phase 3 (deep geological repository), do the reactor sites have the capacity to store the used nuclear fuel for an additional 30 to 60 years? If the Pickering Nuclear Power Plant runs out of storage capacity for used nuclear fuel, where will the used fuel go? What happens if a suitable willing host community cannot be found? Will the interim storage become the long-term solution?

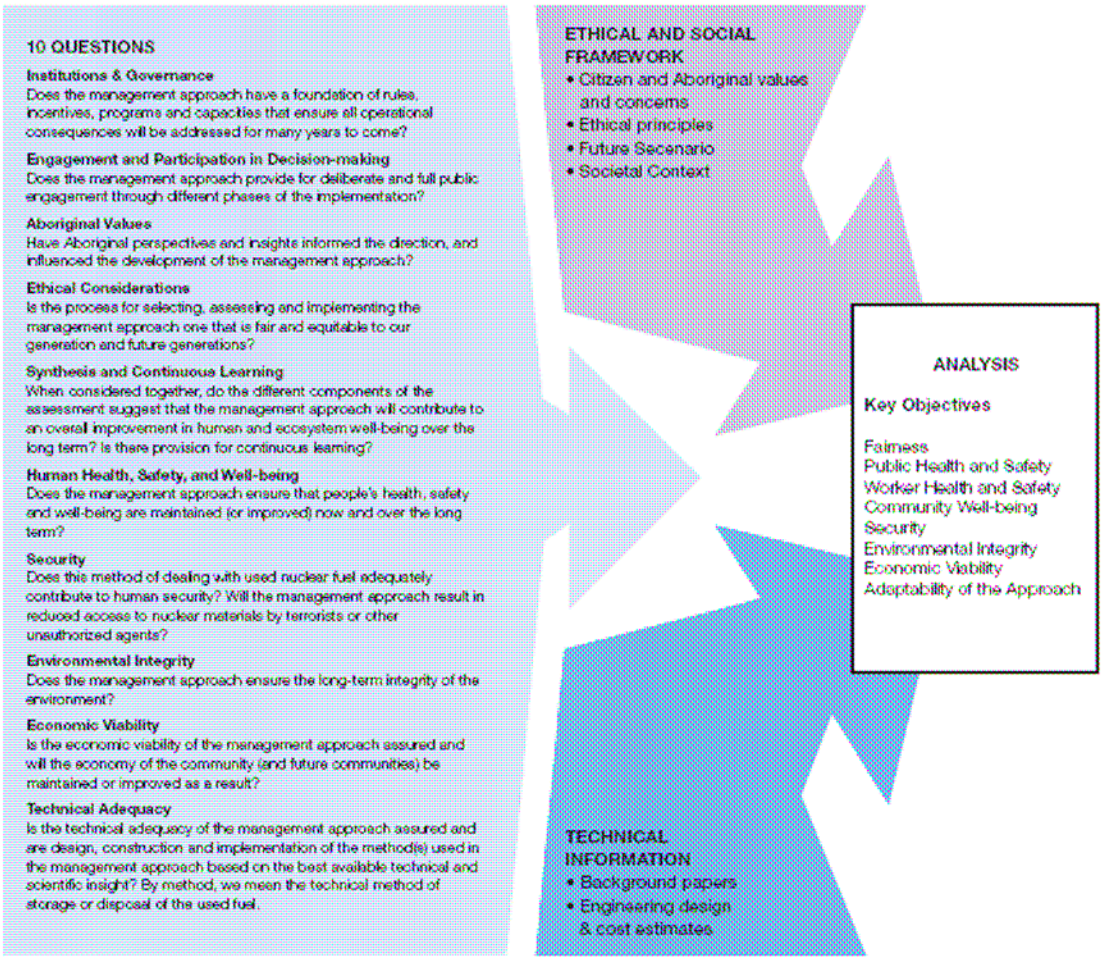
- If used nuclear fuel is temporarily stored in the shallow rock caverns, how will the used fuel be lowered to the repository?

- Who will be responsible for making the final decision to permanently close the deep geologic repository? What criteria will be used to determine whether the deep geologic repository will remain open or closed?

4.2 Citizen Engagement

The NWMO has undertaken an extensive process of discussions and dialogues in order to engage Canadians in developing the management approach for the long-term care of Canada's used nuclear fuel. The process and feedback are described in Chapters 2 and 3 of the Draft Study Report. The inputs from this engagement are highlighted in the following figure from the Draft Study Report:

Figure 2-3 Inputs for the Assessment



Source: NWMO Draft Study Report, Figure 2-3, page 47

The development of the 10 Questions (above) was based upon feedback from Canadians and helped (together with the Ethical and Social Framework and the Technical Information) structure the eight key objectives for analysis of used fuel management options.

Chapter 6 of the Draft Study Report provides the legislative background for the NWMO's process of public engagement and consultation in developing the proposed management approach.

In Chapter 15 of the Draft Study Report, the NWMO emphasizes that it plans to establish an engagement strategy for public consultation during the implementation phase, which builds upon recent engagement activities. In particular, the NWMO plans to achieve the following three objectives:

- *To continue the exchange of information and enhancement of knowledge between communities of interest and the NWMO;*
- *To collaboratively build and implement processes that provide opportunities for various interests to participate in the decisions that affect them; and*
- *To confirm the alignment of our implementation with the needs and concerns of Canadians.*

As noted above, the post-study NWMO engagement strategy indicates that there should be continued involvement of "communities of interest" (such as the Town of Ajax) in the process.

Appendix 5 of the Draft Study Report provides further details of the NWMO's engagement activities to date. The NWMO has recognized the special role of the reactor site communities (such as the Town of Ajax) in this process. The Draft Study Report makes specific reference to the Ajax Town Council and the Ajax Rotary Club, under "Dialogues with Reactor Site Communities."

Findings and Observations:

- The NWMO has undertaken an extensive process of discussions and dialogues in order to engage Canadians in developing the approach for the long-term management of Canada's used nuclear fuel.

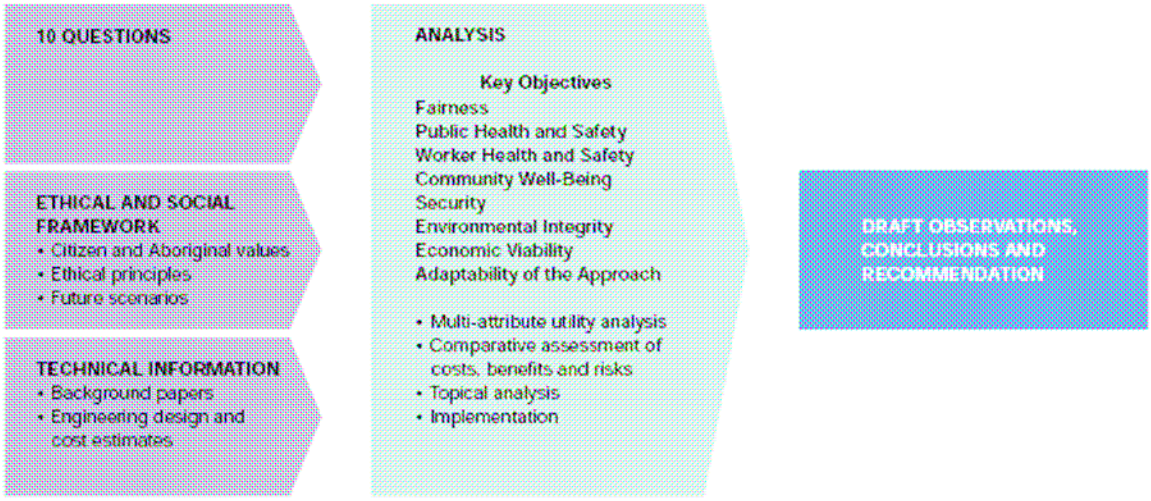
- The NWMO should be encouraged to continue this process of public engagement throughout the implementation phase.

- As one of the "communities of interest" due to its proximity to the Pickering Nuclear Power Plant, the Town of Ajax will want to ensure:
  - that it continues to be engaged in the consultation process;
  - that it has a voice in the decision-making and implementation phases;
  - that there is a process for appropriate financial consideration to compensate nuclear host communities and affected area municipalities;
  - that appropriate consulting support and resources are provided to assist the Town of Ajax in its review of future implementation plans.

4.3 Assessment of Management Options

The NWMO process for assessment of management approaches is described in detail in Chapter 4 of the Draft Study Report and summarized in the following figure from the document:

Figure 3-1 NWMO Assessment of Management Approaches



Source: NWMO Draft Study Report, Figure 3-1, page 64

The NWMO has built upon the feedback from Canadians to develop the eight key objectives (above). The used fuel management options were then reviewed in terms of benefits, risks and uncertainty against each of these objectives.

The NWMO analysis found that no single option on its own perfectly met the objectives that Canadians said were important. As a result, the NWMO has recommended a fourth option – Adaptive Phased Management – to address the need to:

- take responsible action now for planning the long-term management of used nuclear fuel
- recommend a management approach which has the necessary flexibility to accommodate changes in information and decision-making related to the implementation. (The NWMO document notes that the most desirable end point can be recommended, but not the detailed timing or specific steps required.)
- provide future generations with the opportunity to shape decisions (by avoiding irreversible approaches and setting aside sufficient resources to ensure flexibility).

The comparative assessment considered two time periods reflecting the "near term" (the next 175 years) and the "long term" (beyond 175 years).

Appendix 12 of the Draft Study Report addresses a variety of used fuel scenarios, (in addition to the reference scenario of 3.6 million bundles of used CANDU fuel). These scenarios envision alternative used fuel types (such as slightly enriched uranium fuel for the Advanced CANDU reactor and/or used fuel from pressurized water reactors). The used fuel scenarios discussed in Appendix 12 include the following:

- Existing Reactor Refurbishment and Life Extension
- Continuing CANDU Nuclear Program
- Mixture of Continuing Nuclear Reactor Generation

Findings and Observations:

- The NWMO has engaged in a very thorough review and assessment process.
- The assessment results presented in the Draft Study Report tend to be "qualitative" rather than "quantitative."
- It is not clear how the "Influence Diagrams" (for each of the eight key objectives) have been used to develop the charts of "Benefits" vs. "Risks & Uncertainties" for each option.
- It is reassuring to see that alternative used fuel scenarios have been considered.
- The potential impacts of these alternative used fuel scenarios are not specifically addressed in the Draft Study Report.
- Some of the alternative future scenarios could result in increased quantities of used nuclear fuel being stored for extended periods at the Pickering Nuclear Power Plant site.
- From the perspective of the Town of Ajax, there is a risk that the "Adaptive Phased Management" approach may lead to a slow decision-making process which could result in the used nuclear fuel remaining at the Pickering reactor site for longer periods than would be the case for some other options.
- The Town of Ajax is concerned that interim storage of used nuclear fuel at existing reactor sites may become the long-term decision, by default. In particular, what happens if a willing host community cannot be found? Will interim storage become the long-term solution? What are the safeguards in the process to ensure that an appropriate centralized site will be selected and developed?

4.4 Implementation Plans and Timetables

In Chapter 1.6 of the Draft Study Report, the NWMO notes that:

> *Implementation plans **cannot** be designed by the NWMO in detail at this time. Nor should they.*
>
> - *Plans must be specified with the many communities of interest who will have important roles to play in overseeing and participating in implementation following a government decision on an approach. We expect to hear a diversity of voices as we seek advice and receive direction on the design of the process and the issues to be explored;*
>
> - *Implementation plans will not be static. They must continue to evolve. The unprecedented time horizon brings with it a need for continuous learning, and a commitment to collaboratively define and periodically assess indicators of progress as a means of facilitating adaptation to evolving conditions; and*
>
> - *Similarly, timetables for implementation cannot be proposed in specific terms at this time. They must be discussed and defined as part of the necessary collaboration and dialogue that will take place as the NWMO prepares to implement government's decision.*

The basis for the above conclusion by the NWMO is explained further in Chapter 3.6, which describes the feedback from Canadians on the key characteristics of any management approach:

- *Begin the initial steps toward implementation now;*
- *Ensure that safety for people and the environment is the primary consideration, including security and safeguards performance;*
- *Ensure implementation in as fair a way as possible;*
- *Accommodate new learning;*
- *Provide for a staged approach that provides for ongoing reviews and adjustments to decisions;*
- *Provide opportunities for future generations to influence the implementation;*
- *Prepare future generations for their responsibilities;*

- *Monitor emerging research and technical developments in Canada and internationally, including opportunities to reduce the inherent hazard associated with used nuclear fuel;*

- *Communicate clearly the decision-making process and authorities;*

- *Ensure that the system of governance combined with the capacity to deliver is trustworthy, accountable and inclusive;*

- *Involve democratic and accountable institutions, accessible to citizens;*

- *Ensure that citizens are informed, and have a voice at each stage in the process;*

- *Engage and understand concerns of regions and communities that are affected directly and indirectly;*

- *Build a good understanding of potential risks and the means to manage them, including those related to transportation;*

- *Include a "community commitments" plan that would include monitoring, economic benefits and property value protection agreements for any host community. This should be established before beginning siting of any facility;*

- *Develop contingency plans including those for emergencies. In addition to ensuring that all communities have trained personnel, ensure equipment and financial resources to support all emergency response in the host community and along transportation routes;*

- *Provide surety that sufficient funds will be secured and protected, available to fund the long-term management approach selected by government;*

- *Ensure that the amount of money spent is commensurate with the risk this material poses vis-à-vis other problems our society needs to address;*

- *Develop a monitoring program, which encompasses quality control and quality assurance standards in collaboration with impacted communities; and*

- *Be sensitive to the broader and dynamic policy context.*

Some of the above points are of particular interest to the Town of Ajax and have been highlighted in previous correspondence with the NWMO.

Implementation details (for all options, but especially for Option 4) are discussed extensively in Chapters 11 – 18 of the Draft Study Report. Specific descriptions of activities and timetables are included in Chapter 13 for each of the options.

As defined by the NWMO, the Adaptive Phased Management approach leaves the used nuclear fuel at the reactor sites for the next 30 years, while a suitable location is sought for a centralized storage facility, an underground research laboratory and a deep geological repository. (The amount of used nuclear fuel at each reactor site will depend upon reactor life extension programs and/or new reactor construction at that site.)

Transportation from the reactor sites does not begin until the centralized storage facility has an operating licence and is able to receive used nuclear fuel. (Transportation of the used nuclear fuel is expected to take an additional 30 years.) However, if there is a decision **not** to proceed with a centralized storage facility, transportation could be delayed until the deep geologic repository has an operating licence and is able to receive used nuclear fuel. The used fuel from the reactor sites would be repackaged into containers that are suitable for placement in the underground repository. It is assumed that the used fuel containers will be placed into the repository over an additional 30-year period. Decisions on decommissioning of the repository and post closure monitoring are assumed to be made by "future generations" in about 300 years.

Findings and Observations:

- The NWMO has developed credible activity flow charts and descriptions for each of the management approaches.

- As part of the overall schedule, the Canadian government should be encouraged to make a timely decision, so that the NWMO can begin the implementation phase and maintain the momentum established over the past 2½ years.

- The Adaptive Phased Management approach leaves the used nuclear fuel at the reactor sites for the next 30 years – but there is the potential for this period being extended to 60 years (or more), depending upon the progress towards finding a suitable centralized facility.

- The Town of Ajax has already advised the NWMO that:
  - The long term storage of used nuclear fuel at existing reactor sites in the Durham Region is not an acceptable solution.

- From the perspective of the Town of Ajax, the NWMO should be encouraged to:
  - Seek ways to improve the schedule for safely removing used nuclear fuel from existing reactor sites and transporting it to the central facility during the project implementation phase;
  - Continue monitoring international developments that may permit improvements in Canada's plans for used fuel management.

4.5 Transportation Considerations

The Town of Ajax has a number of questions related to transportation considerations:

- *What are the advantages and risks associated with the various modes of transportation? Are trucks the most likely form of transportation that will be used?*

- *If trucks are used, how frequently would trucks carrying the used nuclear fuel be leaving the power plant and transporting the material through the community to its destination? What are the anticipated transportation routes?*

- *Will transportation of the used nuclear fuel be in the dry storage containers that they are currently in?*

- *What are the safety, security, and risks of transporting the used nuclear fuel and the related procedures and impacts on the community?*

In Chapter 3.4 of the Draft Study Report, the NWMO summarizes the challenges which the Canadians have identified in *Striking the Right Balance*:

- *Balancing Security with Accessibility* – e.g. the desire for security in deep geological disposal vs. the desire for retrievability of the fuel
- *Balancing the Minimization of Transportation with the Removal of Used Fuel from Population Centres* – e.g. the desire to minimize the risks associated with transportation vs. the desire to remove the risks associated with the used fuel being kept at reactor sites near cities (and major water resources)
- *Balancing the Taking of a Decision Today with Providing Flexibility for Future Generations* – e.g. the desire to implement a solution which does not transfer problems to future generations vs. the desire to keep the options flexible so that future generations can make their own decision
- *Balancing Fairness to Current Host Communities with Fairness to Future Host Communities* – e.g. the desire to ensure that current host communities are not pressured into becoming the long-term solution vs. the desire to ensure that the future host communities are not pressured into an inappropriate solution.

The Town of Ajax is a "community of interest" since many of the Town's residents are situated in closer proximity to the Pickering Nuclear Power Plant than residents in the City of Pickering. In this context, several of the above topics – including transportation of the used nuclear fuel from the current reactor site – could have an impact on the Town of Ajax.

In the assessment of management options included in Chapter 4 of the Draft Study Report, transportation risks are addressed under several (of the eight) key objectives:

- Fairness
- Public Health and Safety
- Worker Health and Safety
- Security
- Environmental Integrity
- Economic Viability

In Chapters 14 and 15 of the Draft Study Report, the NWMO emphasizes the importance of engaging "communities of interest" in the implementation plans.

In this regard, the Town of Ajax can experience impacts:

- from a decision to proceed with transportation of the used nuclear fuel from the reactor site; and/or
- from a decision to leave the used nuclear fuel at the reactors for a longer period of time.

Findings and Observations:

- The NWMO has addressed the key transportation aspects in a manner which seems appropriate for this stage of the Draft Study Report. Further details will need to be developed during the implementation phase.

- It is reassuring to see that alternative used fuel scenarios have been considered.

- As one of the "communities of interest" the Town of Ajax should be engaged in the ongoing decision-making process regarding transportation considerations as part of the project implementation.

- Decisions about the future of the Pickering Nuclear Power Plant (life extension, new reactor types, etc.) could have an impact on reactor site storage and transportation considerations that may affect the Town of Ajax.

- From the perspective of the Town of Ajax, there is a risk that the "Adaptive Phased Management" approach could result in the used nuclear fuel remaining at the Pickering reactor site for longer periods, depending on the timing of the centralized storage facility.

- Some of the alternative future scenarios could result in increased quantities (or different forms) of used nuclear fuel being stored for extended periods at the Pickering Nuclear Power Plant.

4.6 Social, Economic and Cultural Effects

As referenced in the *Nuclear Fuel Waste Act* (*NFWA*):

> *12. (3) The study must include a detailed technical description of each proposed approach and must specify an economic region for its implementation.*
>
> *12. (4) Each proposed approach must include a comparison of the benefits, risks and costs of that approach with those of the other approaches, taking into account the economic region in which that approach would be implemented, as well as ethical, social and economic considerations associated with that approach.*

In Chapter 9 of the Draft Study Report, the NWMO has **not** defined a specific economic region for implementing each management approach. Instead, a number of potential economic regions are identified for each option. This seems appropriate considering the status of the options, siting principles and other factors at this time, and recognizing the importance of not unduly restricting communities that might otherwise wish to be considered as a potential host location.

In Chapter 14 of the Draft Study Report, the NWMO has described the means of addressing social, economic and cultural effects. The Draft Study Report notes that:

> S*ocio-economic effects (or changes to the socio-economic conditions) are determined by many factors including:*
>
> - *Existing or baseline conditions in an area such as the stability of the size of the local population;*
> - *Key project or program factors that may create effects including estimated workforce requirements, infrastructure needs, and approach to decision-making;*
> - *Changes to traffic patterns and economic flows within a region;*
> - *The nature of the changes, including whether they are direct or indirect, of great or small magnitude, short or long duration, their significance and reversibility; and*
> - *The community's own goals and aspirations and the degree that those affected have the opportunity and ability to participate in, and have some measure of control over, the outcome of decisions that will affect their lives and livelihood.*

These are similar to some of the issues and concerns that have been raised by the Town of Ajax in previous correspondence with the NWMO.

Appendix 6 of the Draft Study Report describes the ethical and social framework which has been developed for the NWMO.

Findings and Observations:

- The NWMO has **not** defined a specific economic region for implementing each management approach. Instead, a number of potential economic regions are identified for each option. This seems appropriate considering the status of the options, siting principles and other factors at this time, and recognizing the importance of not unduly restricting communities that might otherwise wish to be considered as a potential host location.

- The topics covered in the Draft Study Report regarding socio-economic effects and mitigation measures are similar to the issues and concerns that have been raised by the Town of Ajax in previous correspondence with the NWMO. While the assessment of socio-economic impact in the Draft Study Report focuses on new host communities, there is no separate assessment of the specific impact upon current host communities (such as the Town of Ajax).

- Although the NWMO has not defined a specific plan for addressing socio-economic effects at this time, the Town of Ajax would expect to be engaged in the process during the implementation phase (while the used nuclear fuel is at the reactor sites, and during the transportation to the centralized facility).

4.7 Technical and Research Considerations

In Chapter 1.6 of the Draft Study Report, the NWMO highlights the role of research and development to help guide the program direction, including:

- *Enhanced scientific understanding to improve confidence in predictions, reduce uncertainties, and to evaluate potential program improvements;*
- *The ability to confirm performance during and after program operations;*
- *The obligation to citizens to clearly demonstrate an ongoing capability to manage the enterprise and to respond to their concerns and desires;*
- *The ability to make mid-course corrections in response to new information or societal decisions;*
- *Preparation for facility siting, design, licensing, development, and operations; and*
- *Assurance of adequate human capacity to manage the program throughout its existence.*

The NWMO has arranged for third-party reviews of its key engineering design concepts and assumptions, for all of the technical options. This provides added assurance that the technology is appropriate for the various design concepts. In Chapter 9.3 of the Draft Study Report, the NWMO reviews siting principles and other factors, which can impact the management approach (such as ensuring that *"groups most likely to be affected by the facility, including the transportation required, are given full opportunity to have their views heard and taken into account, and are provided with the forms of assistance they require to present their case effectively"*).

Chapter 16 of the Draft Study Report highlights the importance of ongoing research and promotes the continued linkage of the Canadian used fuel management approach to international activities (described further in Appendix 10 of the Draft Study Report).

The NWMO has provided additional technical information in the following Appendices:

- Appendix 2: Nature of the Hazard
- Appendix 3: Adaptive Phased Management Technical Description
- Appendix 7: Status of Used Nuclear Fuel in Canada
- Appendix 8: Reprocessing, Partitioning and Transmutation
- Appendix 10: Nuclear Waste Management in Other Countries
- Appendix 11: Regulatory Framework
- Appendix 12: Used Fuel Scenarios

Findings and Observations:

- The NWMO's recommended Adaptive Phased Management approach is particularly well-suited to advances in technology and new research information.

- The NWMO has arranged for third-party reviews of its key engineering design concepts and assumptions, for all of the technical options.

- The NWMO will need to balance the need to proceed with implementation now, against the perception that future research information may lead to better decision-making.

- It is not clear whether centralized storage in shallow rock caverns provides a significant advantage when compared to a secure above-ground "staging area" for a deep geologic repository.

- From the perspective of the Town of Ajax, the NWMO should be encouraged to seek ways to improve the schedule for safely removing used nuclear fuel from existing reactor sites (including ongoing international research cooperation).

4.8 Financial Aspects

The NWMO cost comparison of the various management approaches is provided in the Economic Viability Analysis Section of Chapter 4 in the Draft Study Report, which includes the following table:

Table 3-7 Costs Estimates for Management Approaches

Management Approach	Total Cost (2002B$) (out to 350 years)	Total Cost (2002B$) (out to 1,000 years)	Present Value (Jan 2004 B$)
Option 1: Deep Geological Disposal in the Canadian Shield	16.2	16.3	6.2*
Option 2: Storage at Nuclear Reactor Sites			
Current Technology	17.6		2.3
New Above Ground Technology	25.7	68.4	4.4
New Below Ground Technology	21.6		3.6
Option 3: Centralized Storage			
Casks/Vaults in Storage Buildings	15.7		3.1
Surface Modular Vaults	20.0	46.9	3.8*
Cask/Vaults in Shallow Trenches	18.7		3.6
Casks in Rock Caverns	17.1	40.6	3.4*
Option 4: Adaptive Phased Management			
With Shallow Underground Storage	24.4	24.4	6.1*
Without Shallow Underground Storage	22.6	22.6	5.1*

JWO estimates are based on 3.7 million fuel bundles and an average reactor life of 40 years. Golder estimates are based on 3.6 million fuel bundles.
Estimates for Options 1, 2 and 3 out to 350 years were prepared by consultants for the Joint Waste Owners (www.nwmo.ca/costsummaries).
Estimates for Options 1, 2 and 3 out to 1,000 years were prepared by Golder Associates Ltd. and Gartner Lee Ltd. (www.nwmo.ca/assessments).
Estimates for Option 4 were prepared by Golder Associates Ltd. and Gartner Lee Ltd. (www.nwmo.ca/assessments).
* Present value calculations performed by Golder Associates Ltd. and Gartner Lee Ltd., are for 1000 year total estimates.
All remaining present value figures were taken from Joint Waste Owners cost estimates using 350 year total cost estimates.
Note: 1000 year cost estimates were produced from an illustrative sample of all possible management approaches, for comparative purposes only.

Source: NWMO Draft Study Report, Table 3-7, page 106

Third-party review of the cost estimates for Options 1, 2 and 3 concluded that the estimates have been prepared with an appropriate estimating methodology and are suitable for the options review and directional decision-making requirements of the NWMO. (Option 4 has been developed by extracting the costs of similar activities from Options 1, 2 and 3.)

As required by the *Nuclear Fuel Waste Act* (*NFWA*):

> *12. (4) Each proposed approach must include a comparison of the benefits, risks and costs of that approach with those of the other approaches, taking into account the economic region in which that approach would be implemented, as well as ethical, social and economic considerations associated with that approach.*

The NWMO has also addressed a comparison of the benefits, risks and costs of the various management approaches in Chapters 4 and 10 of the Draft Study Report.

Chapter 18 of the Draft Study Report covers the Funding Formula and Financial Surety of the management approaches as required by the *Nuclear Fuel Waste Act* (*NFWA*). The life expectancy of the CANDU nuclear reactors operating in Canada has not yet been finalized, but the NWMO intends to use a conservative basis for purposes of the government decision.

Findings and Observations:

- The NWMO has conducted an appropriate cost comparison of the options.

- Options 2 and 3 require a significant cash flow in the longer term; whereas, Option 1 is complete within 154 years, and Option 4 within 325 years (providing greater financial surety).

- From the perspective of the Town of Ajax, it is reassuring to see that transportation cost estimates have been included for all options (see page 107 of the Draft Study Report).

- It appears that further confirmation of some financial aspects (taking into account natural or other events; life expectancy estimates; financial surety; etc.) will be necessary prior to a government decision.

5.0 Review of Comments on Previous NWMO Reports

Section 5 of this independent evaluation reviews the comments and recommendations from the Town of Ajax on previous NWMO reports to see whether these have been addressed in the Draft Study Report, including:

- Reviewing and updating the conclusions and recommendations prepared by ADH Technologies Inc. in the document *"Independent Evaluation of Nuclear Waste Management Organization (NWMO) Discussion Document #2"*
- Review of the following Town of Ajax documents:
    - Staff report on Discussion Document 1: Asking the Right Questions
    - Staff report on Discussion Document 2: Understanding the Choices
    - Letter to NWMO including Ajax Town Council's Resolution on Discussion Document 2

During the process of this independent evaluation, the President of the NWMO sent a letter to the Mayor of the Town of Ajax (dated July 11, 2005) which conveyed the NWMO's response to the previous comments and recommendations. The letter provides an item-by-item cross reference to portions of the Draft Study Report (and other NWMO reports), which help to address the concerns and issues raised. This letter has also been included as part of this review.

5.1 Discussion Document 1: "Asking the Right Questions"

In December 2003, the NWMO issued its first discussion document entitled "Asking the Right Questions." The Town of Ajax staff reviewed this NWMO document together with *"The Commissioner's Report No. 2004-P-51: Regional Municipality of Durham's Response to NWMO's Discussion Document #1."* The following "Independent Evaluation" reviews the previous comments to determine whether they have been addressed in the Draft Study Report (and/or the NWMO response of July 11, 2005).

Findings and Observations:

- Several points from the Ajax Town Council's resolution (September 27, 2004) have been addressed in the Draft Study Report, as described in Table 5.1A:

Table 5.1A: Summary of Comments and Responses on Discussion Document 1

On September 27, 2004, Ajax Town Council passed the following resolution:		
Town of Ajax Comment	*NWMO Response*	**Independent Evaluation**
1. That the Town of Ajax supports the comments provided by the Regional Municipality of Durham in their response to the discussion document;	*[See Durham Region comments and NWMO responses in Table 5.1B below]*	Most of the points raised by the Regional Municipality of Durham are now included as part of "What Canadians Said" (Chapters 2 and 3 in the Draft Study Report). In addition, many of the previous points are reflected within the eight key objectives which form part of the assessment criteria in Chapter 4 of the Draft Study Report.
2. That the Nuclear Waste Management Organization (NWMO) provide case studies and analysis of the long-term management approaches other countries are using to store their used nuclear fuel; and	*[See NWMO response to item # 6 in Table 5.2]*	The NWMO has provided information on the long-term management approaches in other countries in Appendix 10 of the Draft Study Report. In Chapter 15 of the Draft Study Report, the NWMO emphasizes the importance of continuing to draw upon international experience during the implementation phase. **This NWMO commitment, to continue to seek international experience and information during the implementation phase, adequately addresses this concern.**

3. That NWMO be requested to provide peer review funding to the Town of Ajax to conduct an independent evaluation of the NWMO's Study.	*[See NWMO response to item (xiv) Table 5.1B below]*	The NWMO has addressed this request for funding of a peer review for Discussion Document 2.

- Several comments from the Durham Region (referenced in point # 1 above) have been addressed in the Draft Study Report, as described in Table 5.1B. The following "Independent Evaluation" highlights points that are of particular interest to the Town of Ajax.

Table 5.1B: Durham Region Comments and Responses on Discussion Document 1

Regional Municipality of Durham Comments on Discussion Document 1: *Asking the Right Questions*		
Durham Region Comment	*NWMO Response*	**Independent Evaluation**
i. give paramount consideration to the health and safety of humans, societal well-being and the environment, for now and in the future, in the selection of the long-term management approach for nuclear fuel waste;	*Our recommendation of Adaptive Phased Management for the long-term management of used nuclear fuel in Canada has as its primary objectives safety – the protection of humans and the environment – and fairness to this and future generations. In studying the management options, we assessed each against eight objectives. Three of the eights objectives pertained to public and worker health, safety and security. The other objectives included:* • *Community well-being* • *Environmental integrity* • *Fairness* • *Economic viability* • *Adaptability* *The NWMO assessment is further elaborated in Chapter 4.*	**This is an acceptable response for this item.**
ii. be advised that, given the long-term element of risk associated with the radioactive and toxic nature of nuclear waste, the long-term retention of nuclear waste at existing reactor sites in the Durham Region is not an acceptable solution;	*This perspective was among those considered in the study, and reflected in the NWMO assessment of reactor site storage as a risk "creating obligations for existing reactor site communities for the ongoing, long-term management of used nuclear fuel, a function not envisioned when the reactor sites were chosen, nor was it understood by the communities and businesses that have since chosen to locate in the vicinity of these facilities"; and a benefit of the Adaptive Phased Management (i.e. involves the creation of a long-term facility that could be located away from existing communities). Further elaborated in Chapter 4.*	The NWMO is **not** recommending long-term storage of used nuclear fuel at existing reactor sites in the Durham Region. The assessment in the Draft Study Report recognizes that reactor site storage presents a risk "*creating obligations for existing reactor site communities for the ongoing, long-term management of used nuclear fuel, a function not envisioned when the reactor sites were chosen, nor was it understood by the communities and businesses that have since chosen to locate in the*

		vicinity of these facilities." **In principle, this acknowledgement and commitment by the NWMO adequately addresses this concern.**
iii. focus on a long-term management approach for nuclear waste that is in a location as far away from populated areas and water supplies as is possible;	*This perspective was among those considered in the study, and reflected in the assessment of the environmental integrity of reactor site storage as a risk "adverse effects of off-normal scenarios that may be most severe are in those locations adjacent to large continuous bodies of water, as the impacts on the water resources could be far ranging and could have international consequences" and in the assessment of public health and safety of reactor site storage as a risk "Storage at seven sites, rather than one central site, introduces possible risk to a greater number of people. The fact that several of these sites are located near larger population centres further increases the potential risk to the public."* *In the NWMO Assessment this was considered as a benefit of deep geological disposal "may be sited away from population centres and so fewer people would be potentially at risk". Further elaborated in Chapter 4.*	**This is an acceptable response for this item.**
iv. broaden its scope in considering security aspects in the development of long-term management approaches for nuclear waste to ensure public safety;	*Our recommendation for the long-term management of used nuclear fuel in Canada has as its primary objectives safety – the protection of humans and the environment – and fairness to this and future generations. Safety and security considerations are further elaborated in Chapter 4.*	**This is an acceptable response for this item.**
v. focus on long-term storage methods that allow retrieval of the waste, as opposed to disposal methods that do not allow for taking advantage of future opportunities for the application of emerging technologies;	*The recommended approach of Adaptive Phased Management provides the potential for retrievability of the used fuel for an extended period, until such time as a future society makes a determination on the final closure, and the appropriate form and duration of postclosure monitoring.*	**This is an acceptable response for this item.**
vi. address the physical capacity of existing reactor sites, in the event long-term storage of nuclear waste at existing reactor sites is pursued;	*NWMO is not recommending Option 2: Storage at Nuclear Reactor Sites as the preferred management approach. This option was among those assessed in our study. You will find details regarding long-term storage at existing reactor sites in our report, including expected refurbishments, frequency of refurbishment and potential costs. Further elaborated in Chapter 8, specifically in Table 4-3 (Option 2: Storage at Reactor Sites).*	Although the NWMO is **not** recommending long-term storage at existing nuclear reactor sites as the preferred management approach, there is a risk that continued reactor site storage may become a "fallback" solution if there are difficulties in finding a

	Details of extended storage at each nuclear reactor site in Canada are provided at our web-site under NWMO Background Paper 6.9 'Conceptual Designs for Reactor-Site Extended Storage Facility Alternatives for Used Nuclear Fuel'. *The recommended approach provides for centralized containment and isolation of the used fuel deep in a deep geological repository in suitable rock formations; and an interim step in the implementation process in the form of shallow underground storage of used fuel at the central site, prior to final placement in a deep repository. In selecting a central site, full consideration will be given to the physical capacity as well as many other social, cultural, scientific and technical factors.*	suitable centralized storage (and eventual disposal) site. **The potential consequences of this scenario are not adequately addressed in the Draft Study Report.** **What happens if a suitable willing host community is not found?**
vii. ensure that the public feels confident about the dependability of the producers/owners of nuclear fuel waste to guarantee and deliver a safe, long-term management solution;	*There is an extensive governance framework in place that will oversee the long-term management of Canada's used nuclear fuel, including regulatory processes that will ensure a safe system for people and the environment. Under the NFWA, the producers and owners of nuclear fuel waste have two responsibilities: establish and maintaining trust funds to finance implementation; and establish and maintain the NWMO. The NWMO is required by legislation to implement the approach selected by the government and to assume the ongoing operational and managerial responsibilities associated with the implementation. Further elaborated in Chapter 12.*	**This is an acceptable response for this item.**
viii. ensure that the radiation hazard from nuclear waste and resulting potential health risks are communicated in terms that are clear, understandable and relevant to the public, so that the public can have an accurate understanding of risk, and can make informed comments on long-term management approaches;	*Appendix 2 of the DSR includes a discussion of the Nature of the Hazard. The NWMO convened a workshop with 16 experts and persons knowledgeable on various technical, environmental, health, social, and ethical aspects of used nuclear fuel. They addressed the question "what is the nature of the hazard from used nuclear fuel?" A statement from a workshop on the nature of the hazard is also included in Appendix 2. In all of NWMO's communications, it will be important to strive to communicate clearly the nature of the hazard as context for our ongoing dialogue with Canadians.*	**This is an acceptable response for this item.**
ix. "build-in" mechanisms for the continuous review of the long-term management approach that is ultimately selected, to allow consideration of emerging technologies, and ensure that	*An important feature of the recommended approach of Adaptive Phased Management is the provision for flexibility in the pace and manner of implementation through a phased decision-making process, supported by a program of continuous learning, research and development. It is also designed to be responsive to advances in technology, as well as advances in other areas of knowledge.*	**This is an acceptable response for this item.**

	knowledge is passed on from generation to generation;		
x.	ensure that the residents of Durham, the Region of Durham Region and area municipalities continue to be consulted throughout this Study and beyond, to allow for the identification of emerging issues;	*The recommended approach of Adaptive Phased Management provides for the sustained engagement of people and communities throughout the phased process of decision, and implementation. The DSR recognizes the ongoing interests of reactor site communities (until the fuel is relocated to a new central site), further elaborated in Chapter 15.*	The NWMO letter notes that "*Adaptive Phased Management provides for sustained engagement of people and communities throughout the phased process of decision and implementation. The Draft Study Report recognizes the ongoing interests of reactor site communities (until the fuel is relocated to a new central site)*." **Assuming that the NWMO will continue to "engage" the Town of Ajax in the future decision-making process during implementation phase, this is an adequate response.**
xi.	acknowledge that financial considerations for the impact of the selected long-term management approach, must be made to address the unique challenges that will be faced by nuclear host communities;	*The recommended approach of Adaptive Phased Management is designed to seek a willing community to host the central facilities. The implementation process must seek ways to assist citizens in the host community to manage the resulting change caused by the project so they can pursue their economic, social and cultural aspirations. Implementation will be designed to seek positive sustained contributions to the community consistent with the values and priorities of the community. Those potentially affected by the development of the management facility must be involved in the discussions and be provided in advance with information that enables them to participate effectively. The DSR recognizes that communities must be informed and equipped to participate in discussions and decision-making. Effects management measures will need to be used to avoid or reduce the severity of negative socio-economic impacts of hosting the facility while nourishing those that enhance desirable socio-economic and cultural characteristics. Further elaborated in Chapter 14.* *As we move toward implementation, we want to ensure that all parties with significant interests participate in our process, so that we can understand the views and concerns, and incorporate this information into the design and timing of key implementation decisions. Existing reactor sites will very much be important stakeholders in the periods in which*	The NWMO letter says, "*As we move toward implementation, we want to ensure that all parties with significant interests participate in our process, so that we can understand the views and concerns, and incorporate this information into the design and timing of key implementation decisions. Existing reactor sites will very much be important stakeholders in the periods in which used fuel is stored at reactor sites, and as decisions are taken on the schedule to transport the fuel to a central site.*" **Assuming that the NWMO will continue to "engage" the Town of Ajax in the future decision-making process during implementation phase, this is an adequate response.**

	used fuel is stored at reactor sites, and as decisions are taken on the schedule to transport the fuel to a central site.	
xii. ensure the availability of financial resources for the long-term, by addressing matters such as financial risk factors. As a starting point, to keep pace with inflation, annually calculate the payments that are to be made by the producers of nuclear waste to the trust fund for the long-term management of nuclear waste;	*The recommended approach of Adaptive Phased Management provides for financial surety through funding by the nuclear energy corporations, according to a proposed financial formula. The annual amount required to finance the management of nuclear fuel waste has two components the annual amount required to be contributed to the Trust Funds for post cost construction license activities; and the annual amount required to fund NWMO activities prior to receipt of a construction license. Further elaborated in Chapter 18.*	**This is an acceptable response for this item.**
xiii. ensure continued responsibility for financial and legal liability is addressed, in the event that responsibility for nuclear waste is transferred from the NWMO to another agency; and	*There is an extensive governance framework in place that will oversee the long-term management of Canada's used nuclear fuel. Under the NFWA, the producers and owners of nuclear fuel waste have two responsibilities: establish and maintaining trust funds to finance implementation; and establish and maintain the NWMO. The NWMO is responsible for implementing the management approach, including the full range of activities related to the long-term management of used nuclear fuel. Further elaborated in Chapter 12.*	**This is an acceptable response for this item.**
xiv. provide peer review funding for a collective approach to consulting services for municipalities, to enable independent assessment of the NWMO's Study, which will contain complex issues related to the long-tem management of nuclear waste.	*The NWMO has provided funding to the Canadian Association of Nuclear Host Communities (CANHC) to undertake a peer review of the Draft Study Report, earlier funding was provided to undertake a peer review of the NWMO's 2nd discussion document (Understanding the Choices). The result of the earlier work is posted on our web-site in the Submissions Library.* *In addition, the NWMO has provided funding to the Town of Ajax to undertake an independent evaluation of the Draft Study Report, earlier funding was provided to undertake an independent evaluation of the NWMO's 2nd discussion document (Understanding the Choices). The result of the earlier work is posted on our web-site in the Submissions Library.*	The NWMO has provided funding for the Town of Ajax to undertake an independent evaluation of both the NWMO's Discussion Document 2 and the Draft Study Report. **Assuming that the NWMO will continue to provide funding to the Town of Ajax for future independent evaluations during the implementation phase, this is an adequate response.**

5.2 Discussion Document 2: "Understanding the Choices"

In September 2004, the NWMO issued its second discussion document entitled "Understanding the Choices." The Town of Ajax engaged ADH Technologies Inc. to review this document. The resulting review, entitled *"Independent Evaluation of Nuclear Waste Management Organization (NWMO) Discussion Document #2"* was issued in December 2004. On January 24, 2005, the Ajax Town Council passed a number of resolutions based upon this document. The following "Independent Evaluation" reviews the previous comments to determine whether they have been addressed in the Draft Study Report (and/or the NWMO response of July 11, 2005).

Findings and Observations:

- Several points from the Ajax Town Council's resolution (January 24, 2005) have been addressed in the Draft Study Report, as described in Table 5.2. The following "Independent Evaluation" highlights points that are of particular interest to the Town of Ajax:

Table 5.2: Summary of Comments and Responses on Discussion Document 2

On January 24, 2005, Ajax Town Council passed the following resolution:		
Town of Ajax Comment	*NWMO Response*	**Independent Evaluation**
1. That the Town be given an opportunity to provide input to the preparation of an implementation plan for the long term management of used nuclear fuel;	*NWMO chose to develop collaboratively with Canadians a management approach for the long-term care of Canada's used nuclear fuel that is among other things, socially acceptable. That is one which has emerged from a process of collaborative development with citizens, taking into account the best available knowledge and expertise, and that is responsive to the values and objectives which are most important to citizens.* *You will see from Part Two of the Draft Study Report (and detailed in Appendix Five) that thousands have helped us in the search for societal direction and common ground. Throughout this dialogue, a number of areas of common ground emerged including very specific direction on the way in which we should assess the management approaches; the strengths and limitation of each, and the requirements of an appropriate implementation plan. We have incorporated that direction in our assessment and in the design of the fourth option.* *We are now providing the opportunity for all Canadians to review and comment on the draft study report, including our recommendation of Adaptive Phased Management and the proposed implementation plans, prior to*	The Draft Study Report does **not** define an explicit "implementation plan" so **it is still appropriate for the Town of Ajax to continue its participation in the ongoing process.** The NWMO letter notes that "*the detailed implementation plans should be developed in collaboration with those potentially affected.*"

	submission to the Minister of Natural Resources in November 2005. The NWMO welcomes the comments and views of the Town of Ajax on the recommendation and proposed implementation plans. *The NWMO has proposed that the detailed implementation plans should be developed in collaboration with those potentially affected. The implementation process must seek ways to assist citizens in the host community to manage the resulting change caused by the project. Those potentially affected must be involved in discussions and be provided in advance with information that enables them to participate effectively. This is further elaborated in Chapters 14 and 15 of the Draft Study Report (DSR).*	
2. That a process be established to determine appropriate financial compensation and institutional support arising from the long term management of used nuclear fuel for host and affected communities;	*The Draft Study Report describes the NWMO's initial thoughts on an approach to socio-economic effects management. It includes a general framework to guide implementation and outlines the roles and responsibilities of communities. It identifies some potential socio-economic effects that may occur. The DSR suggests a strategic direction with three major elements to minimize negative and optimize positive socio-economic effects:* • *Initially, adopt the principle of voluntarism and seek a willing host;* • *Develop, with the host community, a community-oriented strategy for long-term sustainability; and* • *Ensure citizen involvement in the decisions that affect their way of life.* *Specifically it calls for the NWMO to work collaboratively with the host community to identify the most appropriate ways of addressing socio-economic effects. This is further elaborated in Chapter 14 of the DSR.*	**<u>This point remains valid.</u>** The Draft Study Report describes only initial thoughts and a general framework to guide implementation, so **<u>it is appropriate for the Town of Ajax (as an "affected community") to seek information on appropriate financial compensation when considering storage at existing reactor sites and future transportation requirements.</u>**
3. That should consideration be given to extending the life of the Pickering Nuclear Power Plant reactors, appropriate studies should be prepared to identify the potential impacts on the Town of Ajax and the increase in used nuclear fuel that may result;	*The NWMO has been established under the Nuclear Fuel Waste Act (NWFA) to investigate approaches for managing Canada's used nuclear fuel. This mandate does not include responsibility for the determination of nuclear power plant operations. The NWMO has however, considered alternative used fuel scenarios including existing reactor refurbishment and life extensions to test the robustness of the NWMO analysis of approaches for the long-term management of used nuclear fuel. This is further elaborated in the Draft Study Report, Appendix 12, Used Fuel Scenarios.*	As noted in the discussion of the Town of Ajax questions related to the future of the Pickering Nuclear Power Plant, these topics (life extension and/or new reactor designs) **<u>are not specifically addressed in the Draft Study Report</u>**.
4. That should consideration be given to constructing new	*The NWMO has been established under the Nuclear Fuel Waste Act (NWFA) to investigate approaches for managing Canada's used*	As noted in the discussion of the Town of Ajax questions related to the

	reactors at the Pickering Power Plant, appropriate studies should be prepared to assess the potential impact, in particular, what impacts other reactor technologies might have on the used nuclear fuel management option, technology, and timing;	*nuclear fuel. This mandate does not include responsibility for the determination of whether or where, new nuclear reactors should be developed. The NWMO has however, considered alternative used fuel scenarios including continuing nuclear reactor generation with a mixture of reactor technologies to test the robustness of the NWMO analysis of approaches for the long-term management of used nuclear fuel. This is further elaborated in the Draft Study Report, Appendix 12, Used Fuel Scenarios.*	future of the Pickering Nuclear Power Plant, these topics (life extension and/or new reactor designs) **are not specifically addressed in the Draft Study Report**.
5.	That studies be prepared to determine the impact of transportation of the used nuclear fuel on affected communities in the event that an option requiring transportation is selected, and address the transportation impacts of transporting other types of used nuclear fuel in the future;	*Risks associated with transportation are addressed for all centralized management approaches (Options 1, 3, and 4) under the following objectives:* • *Public Health and Safety* • *Worker Health and Safety* • *Community Well-Being* • *Security* • *Environmental Integrity* • *Economic Viability* *Transportation risks are also discussed under Fairness for Option 4. A further discussion of transportation is provided at our web-site under NWMO Background Paper 6.9 Conceptual Designs for Transportation of Used Nuclear Fuel to a Centralized Facility.* *The NWMO has proposed that the implementation process be developed in collaboration with those potentially affected. The implementation process must seek ways to assist citizens in the host community to manage the resulting change caused by the project. Those potentially affected must be involved in discussion and be provided in advance with information that enables them to participate effectively. This is further elaborated in Chapters 14 and 15.*	The NWMO letter notes that "*risks associated with transportation are addressed for all centralized management approaches* [in Chapter 4 of the Draft Study Report] … *The NWMO has proposed that the implementation process be developed in collaboration with those potentially affected.*" Based upon these NWMO commitments, **the Town of Ajax expects to be involved in transportation aspects of the implementation plan.**
6.	That NWMO continue to monitor the used nuclear fuel management approaches in other countries;	*NWMO has proposed (in Chapter 16) that in addition to commissioning its own research, Canada will benefit from monitoring the findings from the vast amount of research under way in other countries to further the understanding of the long term management of used nuclear fuel.* *Over 30 countries have radioactive waste management programs and several (United States, Finland and Sweden) are close to implementing repositories for used nuclear fuel or high level radioactive waste (HLW). The level of funding for research and development activities varies from country to country. The Swedish (SKB) annual used fuel research and development budget is approximately $10 million while the United States (DOE) annual budget at Yucca Mountain Is over $500 million*	The NWMO has provided information on the long-term management approaches in other countries in Appendix 10 of the Draft Study Report. In Chapter 15, the NWMO emphasizes the importance of continuing to draw upon international experience during implementation phase. **In principle, this addresses the concern.**

	($US). In addition, there are large international research programs such as the European Commission Sixth Framework Programme 2002 – 2006, with a radioactive waste management budget of 90 million Euros over the five-year period. *The research areas under this program cover improvements of fundamental knowledge, development and testing of geologic repository technologies, study of natural analogues and new and improved tools to model the performance and safety of geologic repositories. Also, there is further work addressing partitioning and transmutation technology as well as concepts to produce less waste.* *France is particularly active in advancing the research and development program for partitioning and transmutation of used nuclear fuel wastes.* *The NWMO has proposed to keep a "watching brief" on a number of approaches and technical (and non-technical) developments in other countries which, if successful, might lead to eventual improvement or modification of the Canadian program. These may include, but are not limited to:* • *Partitioning and transmutation;* • *Deep borehole disposal;* • *International/regional initiatives regarding the fuel cycle, including spent fuel storage and disposition;* • *Reprocessing and associated waste management;* • *Engineered materials and barrier development;* • *New instrumentation, particularly for performance confirmation; and* • *Modeling, simulation, and analytical techniques to evaluate long-term performance.*	
7. That the long term storage of used nuclear fuel at existing reactor sites in the Durham Region is not an acceptable solution; and	*This perspective was among those considered in the study, and reflected in the NWMO assessment of the fairness of reactor site storage as a risk – creating obligations for existing reactor site communities for the ongoing, long-term management of used nuclear fuel, a function not envisioned when the reactor sites were chosen, nor was it understood by the communities and businesses that have since chosen to locate in the vicinity of these facilities. It was also reflected in the assessment of community well-being of reactor site storage as a risk "reactors sites were selected for their suitability for reactor operation, not for very long-term*	The NWMO is **not** recommending long-term storage of used nuclear fuel at existing reactor sites in the Durham Region. The assessment in the Draft Study Report recognizes that reactor site storage presents a risk "*creating obligations for existing reactor site communities for the ongoing, long-term management of used nuclear fuel, a function not envisioned when the*

	storage of used nuclear fuel and therefore may not be ideal for this (reactor site storage) purpose"; "changing the role of the reactor storage sites from temporary to long term would involve significant facility upgrades – there is potential to polarize the more immediate community because some people may feel betrayed by the change in status of the facility from interim to long-term waste management. As well the proximity of a facility that is acknowledged to involve risks may be a target for citizen legal action." *It was also reflected in the assessment of the environmental integrity of reactor site storage as a risk "adverse effects of off-normal scenarios that may be most severe are in those locations adjacent to large continuous bodies of water, as the impacts on the water resources could be far ranging and could have international consequences" and in the assessment of public health and safety of reactor site storage as a risk "Storage at seven sites, rather than one central site, introduces possible risk to a greater number of people. As well, reactor sites were selected for their suitability for reactor operation, not for very long term safer storage of used nuclear fuel. The fact that several of these sites are located near larger population centres further increases the potential risk to the public."* *This is further elaborated in Chapter 4 of the DSR.*	*reactor sites were chosen, nor was it understood by the communities and businesses that have since chosen to locate in the vicinity of these facilities."* **In principle, this acknowledgement and commitment by the NWMO adequately addresses this concern.**
8. That NWMO provide funding for the Town of Ajax to retain a consultant to conduct an independent evaluation for the NWMO's Draft Study Report.	*The NWMO was asked and provided funding for the Town of Ajax to retain a consultant to conduct an independent evaluation of the NWMO's second discussion document "Understanding the Choices". The report was received and has been posted on our web-site in the Submissions Library. Subsequently the NWMO was asked and again has provided funding to the Town of Ajax to retain a consultant to conduct and independent evaluation of the NWMO's Draft Study Report.*	The NWMO addressed the request for funding of a consultant to conduct an independent evaluation for the NWMO's Draft Study Report. **Note: There will be ongoing activities as part of the implementation plan that may require further independent evaluations on behalf of the Town of Ajax.**

- In addition to the above resolutions, the recommendations and conclusions contained in the *"Independent Evaluation of Nuclear Waste Management Organization (NWMO) Discussion Document #2"* by ADH Technologies Inc. generally remain valid – in particular the following key recommendations:

- Since the Town of Ajax is not a host community for used nuclear fuel but is in close proximity to the Pickering Nuclear Power Plant, it will be very important for the Town to engage the NWMO and other authorities, in comprehensive discussions concerning implementation of the recommended management approach.

- NWMO should continue to monitor developments in other countries and, if applicable, use the best practices and experiences of other countries to support the recommended approach that the NWMO will provide to Natural Resources Canada on the long term management of used nuclear fuel.

- NWMO should continue to keep individuals, communities, and organizations informed of their work and plans as well as continue to seek input from communities that are likely to be most impacted by the used nuclear fuel management option selected.

- The Town of Ajax questions related to the future of the Pickering Nuclear Power Plant (life extension and/or new reactor designs) are **not** specifically addressed in the Draft Study Report. The July 11th letter from the NWMO notes: *"This [NWMO] mandate does not include responsibility for determination of nuclear power plant operations. The NWMO has however, considered alternative used fuel scenarios including existing reactor refurbishment and life extensions to test the robustness of the NWMO analysis of approaches ... "*:

  In light of the above comment, the Town of Ajax recommends that the NWMO should clarify its role and responsibilities versus the role and responsibilities of the current used fuel owners. (For example, are the current used fuel owners only responsible for the interim storage of used fuel and the NWMO is responsible for the used fuel after it leaves the sites?)

  - Appendix 7 of the Draft Study Report covers the status of used nuclear fuel in Canada and Appendix 12 discusses possible alternative used fuel scenarios in the future; however, the specific details of the situation for the Pickering Nuclear Power Plant are not covered.

  - From the perspective of the Town of Ajax, it is important to be aware of the potential impact of scenarios (life extension, new reactor fuels, etc.) which could affect the capacity of existing reactor storage and future transportation requirements.

6.0 Observations and Recommendations

The following sections provide a summary of key observations and recommendations.

6.1 Observations

The following are observations based upon the review of the Draft Study Report:

- In the Draft Study Report, the NWMO has done an excellent job of addressing the key issues raised by Canadians in developing its recommended "Adaptive Phased Management" approach. The approach builds upon the positive features of the three mandated options to provide a flexible solution to the future management of Canada's used nuclear fuel.

Some aspects of the Draft Study Report could be made clearer, in particular:

- the rationale for including Ordovician sedimentary rock;
- explanation of how the "Influence Diagrams" have been used in the Assessment of Management Options;
- whether centralized storage in shallow rock caverns provides a significant advantage when compared to a secure above-ground "staging area" for a deep geologic repository;
- a specific assessment of the impact of various options on current host communities;
- alternative scenarios for slower (or faster) site selection processes, and their impact on used nuclear fuel storage at existing reactors sites;
- more details on "near term" next steps (after a government decision); and
- definition of the roles and responsibilities of NWMO and current used fuel owners.

The Town of Ajax has the following comments and questions related to the Adaptive Phased Management approach:

- Once a decision is made by Natural Resources Canada, the Town should be kept informed of any decisions and continue to have an opportunity to provide input to the preparation of an implementation plan. When will a specific implementation plan be developed, in this process?

- If a decision is made to skip Phase 2 (centralized site storage) and go straight to Phase 3 (deep geological repository), do the reactor sites have the capacity to store the used nuclear fuel for an additional 30 to 60 years? If the Pickering Nuclear Power Plant runs out of storage capacity for used nuclear fuel, where will the used fuel go? What happens if a suitable willing host community cannot be found? Will the interim storage become the long-term solution?

- If used nuclear fuel is temporarily stored in the shallow rock caverns, how will the used fuel be lowered to the repository?

- Who will be responsible for making the final decision to permanently close the deep geologic repository? What criteria will be used to determine whether the deep geologic repository will remain open or closed?

- As one of the "communities of interest," there may be an opportunity for the Town of Ajax to assist the NWMO in future activities by providing input to future host communities based upon its experience and confidence in the management of used nuclear fuel at existing reactor sites.

6.2 Recommendations

The following are recommendations for the NWMO to consider:

- **Continued Engagement** – That the Town of Ajax (as one of the "communities of interest") continue to be engaged in the ongoing decision-making process for the implementation of the Adaptive Phased Management approach – particularly for the initial phase of existing reactor storage and transportation to the central site;

- **Implementation Schedule** – That the NWMO be encouraged to seek ways to improve the schedule for safely removing used nuclear fuel from existing reactor sites, during the implementation of the Adaptive Phased Management approach;

- **Alternative Scenarios** – That the NWMO provide additional information on scenarios related to potential delays (for example, difficulties in finding a willing host community in a timely manner) in the process of selecting a central site for the Adaptive Phased Management approach, and assess the impact of any delays on the capacity for used nuclear fuel storage at existing reactor sites;

- **Financial Compensation** – That the Town of Ajax should be part of the process that establishes a strategy to determine appropriate financial compensation for host communities and affected communities;

- **Future of Pickering Nuclear Power Plant** – That the Town of Ajax be advised of assessments on the potential impact of scenarios related to the future of the Pickering Nuclear Power Plant reactors (when changes such as life extension, new reactor fuels, etc. are contemplated) which could affect the capacity of existing reactor site storage and future transportation requirements;

- **International Cooperation** – That the NWMO continue to monitor the used fuel management approaches in other countries, as outlined in the Draft Study Report;

- **Independent Consulting Support** – That the NWMO provide funding during the implementation phase, so that affected communities (such as the Town of Ajax) can continue to engage independent consulting advice on the potential impacts of the program; and

- **Timely Decision** – That the Canadian government be encouraged to make a timely decision – in selecting the appropriate option for the future management of Canada's used nuclear fuel – so that the NWMO can begin the implementation phase, find a willing host community and maintain the momentum established over the past 2½ years.

7.0 Conclusions

In reviewing the Draft Study Report and previous NWMO study activities, it is obvious that the NWMO has done a very thorough job of addressing the key issues raised by Canadians in developing its recommended "Adaptive Phased Management" approach. The approach builds upon the positive features of the three mandated options to provide a flexible solution to the future management of Canada's used nuclear fuel. This approach:

- identifies the technology associated with a deep geologic repository as the appropriate long-term end point;
- allows for options to be evaluated at each stage of the management process; and
- provides opportunities for interested and affected citizens to be engaged and to participate in the decision-making process.

It is reassuring to see that the NWMO has considered aspects such as life extension and new reactor types, which could have an impact on the future management of Canada's used nuclear fuel. However, specific decisions about the future of the Pickering Nuclear Power Plant (life extension, new reactor types, etc.) could also have an impact on the existing reactor storage and transportation considerations that may affect the Town of Ajax (and the NWMO's strategy for used nuclear fuel management) and therefore, these aspects should be addressed in more detail during the implementation phase.

Ajax is a municipality that abuts the Pickering Nuclear Power Plant and many of the Town's residents are situated in closer proximity to the Pickering Nuclear Power Plant than residents in the City of Pickering. Therefore, the Town of Ajax has a keen interest in ensuring that it has a continuing voice in any decisions which may have an impact on its residents.

As one of the "communities of interest," the Town of Ajax expects to be engaged in the ongoing decision-making process as part of the project implementation – particularly for the initial phase of existing reactor storage and transportation to the central site. This requirement for "continued engagement" is acknowledged in the NWMO commitments described in the Draft Study Report, and in the comments from the President of the NWMO in her letter of July 11, 2005 responding to the input from the Town of Ajax on previous NWMO Discussion Documents *"Asking the Right Questions"* and *"Understanding the Choices."*

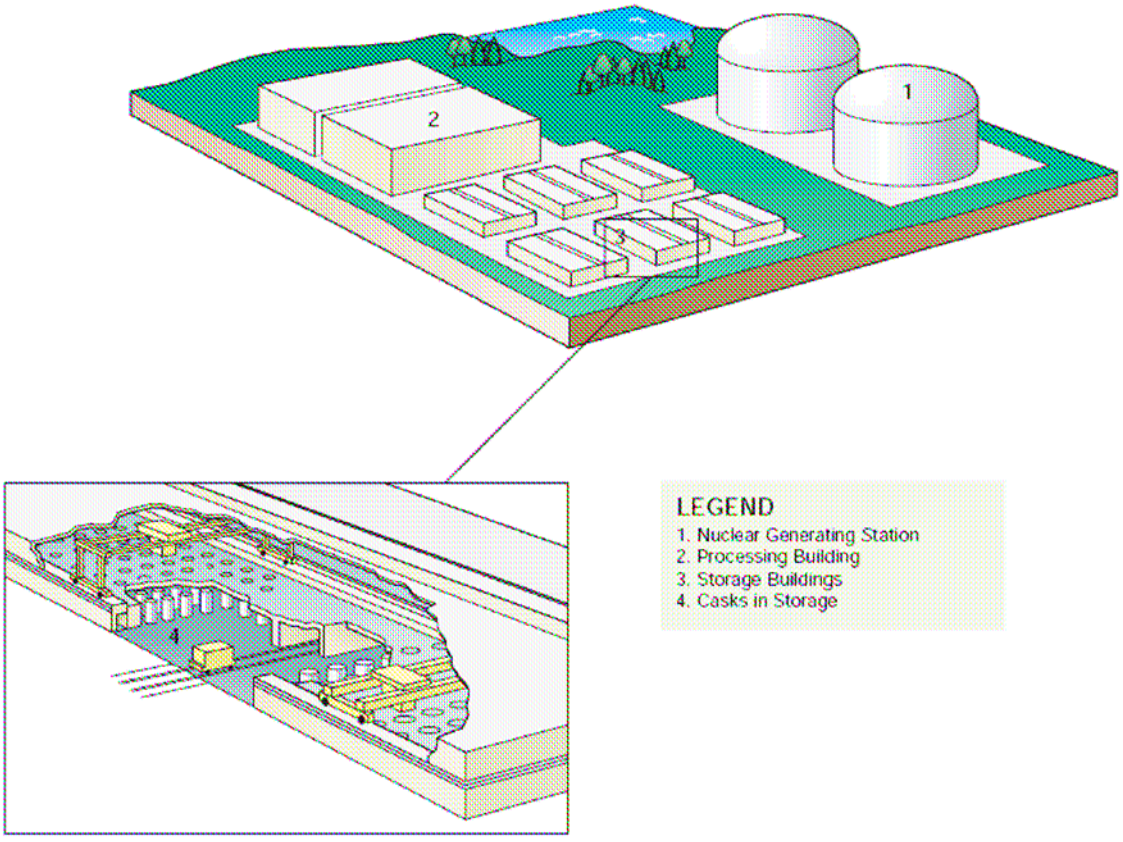
Appendix 1: *Cross-Reference to Key Chapters in the Draft Study Report*

Appendix 2: Illustrations of "Adaptive Phased Management"

Phase 1

Preparing for Central Used Fuel Management (Year 01 to Year 29):

Maintain storage and monitoring of used fuel at nuclear reactor sites while locating a site for a central management facility which has rock formations suitable for shallow underground storage, an underground research laboratory and a deep geologic repository. Continue research for used fuel management and incorporate citizen input, new learning and technology improvements. Complete safety analyses and environmental assessment to obtain the required licences and approvals to construct the central facilities at the preferred site and to transport used fuel.

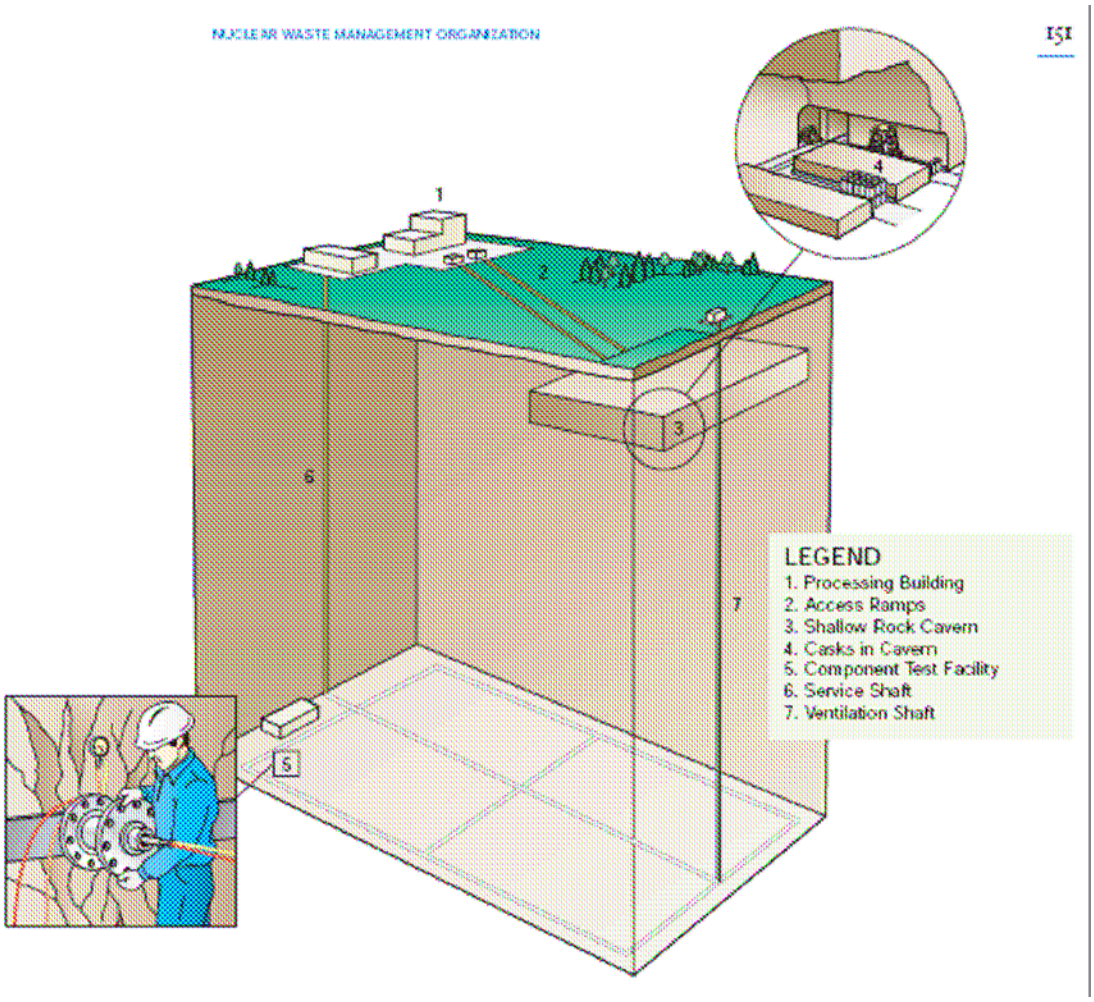


Source: NWMO Draft Study Report, Figure 4-6, page 149

Phase 2

Central Storage and Technology Demonstration (Year 30 to Year 59):

Begin transport of used fuel from the reactor sites to the central facility and place used fuel in shallow underground storage, as required. Continue monitoring used fuel. Further develop and demonstrate long-term isolation technology at the underground research laboratory to confirm the suitability of the site and method. Prepare the final design, safety analyses and facilities to obtain the required operating licence for the deep repository.

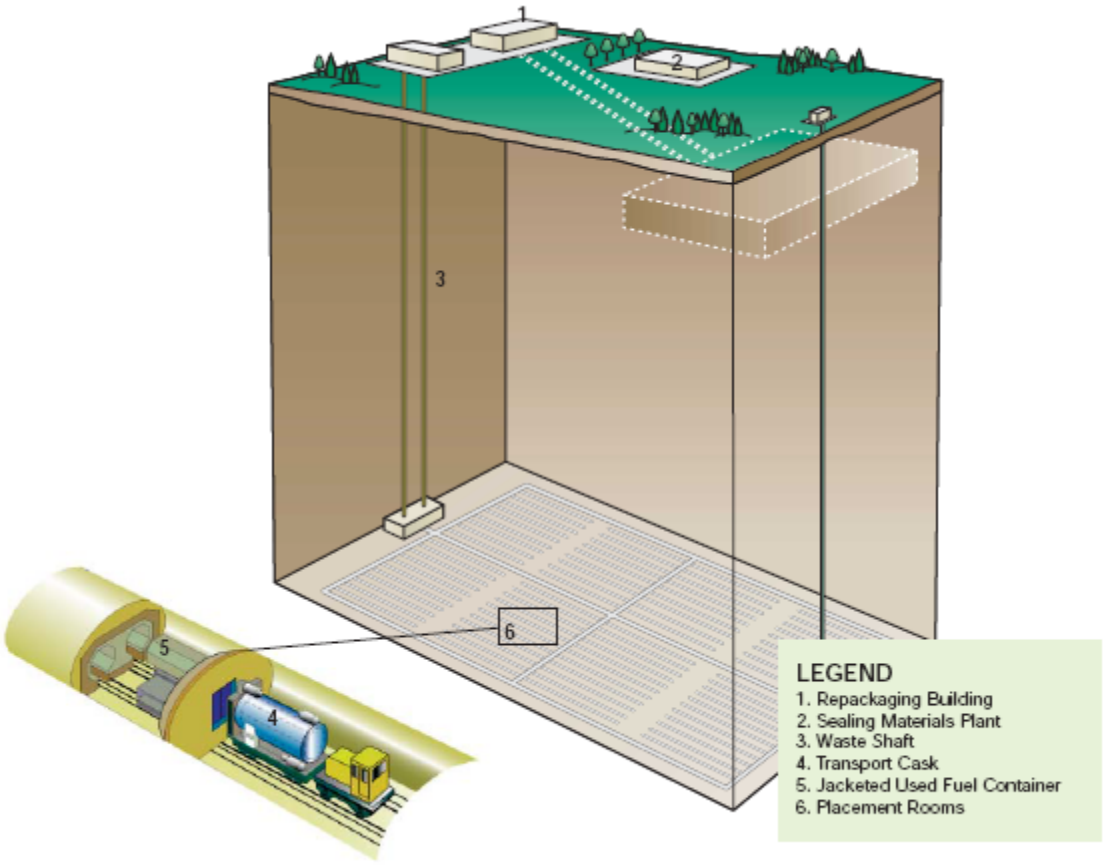


Source: NWMO Draft Study Report, Figure 4-7, page 151

Phase 3

Long-term Containment, Isolation and Monitoring (Year 60 to Y???)

Retrieve used fuel from shallow underground storage, repackage it into long-lived containers and transfer the containers to a deep geologic repository at the central site. Maintain access to the deep repository, continue monitoring and allow retrieval of used fuel, if required. Provide the option for a future society to close the repository, decommission the facility and continue monitoring of the system while ensuring long-term passive safety and security for humans and the environment.



Source: NWMO Draft Study Report, Figure 4-8, page 153