

**Year-End Report on the  
National Inuit Specific Consultation on the Long-Term  
Management of Nuclear Fuel Waste  
(March 31, 2003 – March 31, 2004)**



**Submitted to:**

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## Introduction

Inuit Tapiriit Kanatami (ITK) is a non-profit organization dedicated to the needs and aspirations of Canada's Inuit. Formed in 1971, ITK represents the more than 41,000 Inuit living in 55 communities within the Inuvialuit Settlement Region, Nunavut, Nunavik (northern Quebec) and Labrador. ITK is the national voice of the Inuit in Canada and addresses issues of vital importance to the preservation of Inuit identity, culture and way of life. Since its establishment, ITK has broadened its aims and objectives in response to the changing social, economic, environmental and political challenges facing Inuit. It has done so in a manner that reflects the emerging relationship between Inuit and the rest of Canada and between ITK and the four Inuit regional organizations. With the exception of Labrador, the four Canadian Inuit regions have now signed final comprehensive land claim agreements.<sup>1</sup>

ITK's Environment Department represents Canada's Inuit primarily on matters of regional and national interest and works directly with technical staffs of the regional organizations. ITK also works closely with the Inuit Circumpolar Conference-Canada, the organization representing Canadian Inuit in the larger international political system. This existing structure allows ITK to deal with difficult global scientific and policy issues, such as contaminants and climate change at a local level while ensuring its influence extends to regional, national and international community. ITK is able to speak as the national voice of Canadian Inuit because of the knowledge and participation of the member regions, and the expertise of the staff in the environment department who regularly deal in depth with community, national, and international matters affecting the environment.

In discussions with NWMO representatives, ITK staff members have underlined the fundamental importance of aboriginal, and specifically speaking, Inuit involvement in the development of management options that are required by the Nuclear Fuel Waste (NFW) Act. It is essential that comprehensive public consultations with Inuit will be conducted in order to develop long-term management approach options, which are to be submitted to the Minister of Natural Resources Canada on November 15, 2005. It is furthermore of great importance that this consultation process takes place in a relevant, meaningful, and culturally appropriate way that takes into account the remoteness, as well as language needs of Inuit communities that must be consulted throughout this process.

In the past, Inuit have been opposed to the Long-Term Management of Nuclear Fuel Waste in the Canadian Arctic. The need remains, however, to consult and educate Inuit

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<sup>1</sup> The Labrador Inuit Association (LIA) was established in 1975. It represents the 5,000 Inuit of Labrador. LIA currently has a signed Agreement-in-Principle with the federal government for a comprehensive land claims settlement. Makivik Corporation was established in 1978 after the signing of the James Bay Northern Quebec Agreement. It represents the 9,000 Inuit of Nunavik. Inuvialuit Regional Corporation (IRC) was established in 1984 as part of the Inuvialuit land claim agreement. It represents the 5,000 Inuit of the western Arctic. Nunavut Tunngavik Incorporated (NTI) was established in 1992 as part of the Nunavut Land Claims Agreement. It represents the 21,500 Inuit of Nunavut.

on this issue to back up/substantiate/explore Inuit views in a cohesive manner. Of particular interest to Inuit is, for example, the risk of trans-boundary problems associated with the Long-Term Management of Nuclear Fuel Waste.

In order to participate in an NRCan/NWMO initiated national consultation program, ITK proposed a three-year process to consult Canadian Inuit on the issue of Nuclear Fuel Waste Management and Disposal, as mandated in section 12(7) of Bill C-27.<sup>2</sup> This multi-year process is intended to culminate in a comprehensive report detailing Canadian Inuit ethical, social, environmental and economic considerations in regard to storing nuclear fuel waste, attempt to answer whether or not nuclear fuel waste storage on Inuit lands is acceptable, and if acceptable, what method of storage would be preferred.

This consultation model will allow Inuit to express their opinions in a culturally specific manner that will produce a comprehensive report that will accurately reflect the Canadian Inuit areas of concern on the questions surrounding section 12 of Bill C-27.

## **Outline of 2003-2004 Activities**

Throughout the past fiscal year, ITK has been actively engaged in setting up the above mentioned consultation model in the form of a National Inuit Consultation on the Long-Term Management of Nuclear Fuel Waste. The particulars of ITK's 2003-2004 activities will be addressed as follows:

1. Formation of the National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste;
2. Membership of the National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste;
3. Strategy (2004-2005);
4. Letter to the Presidents of the Inuit Land Claims Organizations;
5. Draft Terms of Reference (TORs) for the National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste;
6. Development of a 2004-2005 Workplan
7. Development of Educational Materials;
8. Next Steps.

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<sup>2</sup> Section 12.(7) of bill C-27, An Act respecting the long-term management of nuclear fuel waste, states, "The waste management organization shall consult the general public, and in particular aboriginal peoples, on each of the proposed approaches."

## **1. Formation of the National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste**

The *National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste* was formed at a multi-stakeholder conference titled the *National Inuit Conference on the Environment (NICE)*, which took place on February 23-27, 2004. The development of a National Inuit Consultation process on this subject was initiated at this time. Further activities at this meeting included presentations on the history of the Nuclear Fuel Waste Act, as well as on the possible future methods regarding the Long-Term Management of Nuclear Fuel Waste in Canada. These presentations were conducted by Peter Brown (Director, ES/ERB/URWD) of Natural Resources Canada and Donna Pawlowski from the Nuclear Waste Management Organization (NWMO).

For the materials obtained from these presentations, as well as materials from the specific workshop discussions that took place on the subject of the Long-Term Management of Nuclear Fuel Waste in Canada (which are part of an internal ITK report on this conference), please see Appendix C.

## **2. Membership of the National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste**

The membership of the newly established National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste consists of the nominated members (one per organization) of the following Inuit organizations.

- The four Regional Inuit Land Claims Organizations
  - ⇒ *Nunavut Tunngavik Incorporated (NTI)*
  - ⇒ *Labrador Inuit Association (LIA)*
  - ⇒ *Makivik Corporation*
  - ⇒ *Inuvialuit Regional Corporation (IRC)*
- Pauktuutit Inuit Women's Association
- Inuit Circumpolar Conference – Canada (ICC – Canada)
- National Inuit Youth Council (NIYC)
- Inuit Tapiriit Kanatami (ITK)

The manner in which this group will operate will be outlined in a Terms of Reference (TOR). Draft TORs are attached in Appendix A of this report. These TORs will be finalized early in the first quarter of the 2004-2005 Fiscal Year.

### **3. Strategy (2004-2005)**

The 2004-2005 strategy was developed by the newly formed Task Force at ITK's Multi-Stakeholder Meeting. This was done in accordance with the requirements outlined by the agreements signed with NRCan and the NWMO. According to the requirements outlined within these agreements, ITK's Environment department will conduct the following activities to undertake and complete the National Inuit Specific Consultation on the Long-Term Management of Nuclear Fuel Waste in Canada.

- The development of educational/communication materials for the purpose of informing the regions on the subject of the Long-Term Management of Nuclear Fuel Waste;
- The development of other information on alternative energy sources (solar/wind/water energy) for the purpose of distribution to the regions;
- The design and execution of a culturally specific consultation program (consisting of four 2-day regional dialogues) by ITK on the long-term management of nuclear fuel waste in Canada;
- To provide information, means and opportunity for Inuit people to conduct a dialogue amongst themselves and share their opinions and views with the Government of Canada;
- To provide a series of reports and in particular a final report to Natural Resources Canada. This report will then be transmitted to the minister and will outline the views and opinions of ITK's constituents concerning the long-term management of nuclear fuel waste in Canada. That is, to create a body of knowledge related to the views and opinions of Inuit peoples on nuclear fuel waste;
- To provide the Minister with the views and opinions of Inuit peoples in advance of the recommendation to the Governor-in-Council on the approach for the long-term management of nuclear fuel waste;
- To assist in the development of capacity for Inuit at an organizational level, as well as assisting Inuit to acquire knowledge on matters related to nuclear fuel waste management;
- To develop communications between Inuit and the Government of Canada on the issue of nuclear fuel waste management;
- Mention mining exploration, exploitation and development – incl. production, use and storage, and;
- With a complete understanding of the mandate of this national consultation or dialogue, focus will be placed on a number of related issues of broader scope that are of sufficient importance and therefore need to be included. These issues include the exploration and development of uranium, as well as the questioning of the proliferation of nuclear energy in Canada.

#### **4. Letter to the Presidents/Chairs of the Inuit Land Claims Organizations**

At ITK's multi-stakeholder meeting it was further decided by the participants of the workshop on the Long-Term Management of Nuclear Fuel Waste, that a letter would be sent by ITK's president Jose Kusugak, to the presidents of the Inuit Land Claims Organizations. This letter is intended to inform them of the creation of this Task Force, its purpose, as well as of the immediate steps that must be taken in order to initiate this National Inuit Consultation on the Long-Term Management of Nuclear Fuel Waste. This letter will be finalized and sent out early in the first quarter of the 2004-2005 Fiscal Year.

#### **5. Draft Terms of Reference (TORs) for the National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste**

A draft Terms of Reference, which was introduced and subjected to a preliminary review, are currently being reviewed by the attendees of the session on the Long-Term Management of Nuclear Fuel Waste that participated at ITK's multi-stakeholder meeting in February 2004 (please see Appendix A for the Draft TORs).

#### **6. Development of a 2004-2005 Workplan**

The 2004-2005 workplan was developed by ITK's National Coordinator on the Long-Term Management of Nuclear Fuel Waste, as well as by the attendees of the workshop on the same issue at ITK's multi-stakeholder meeting in February 2004. The specifics of this workplan are outlined below:

- (a) The National Task Force, facilitated by the National Coordinator, has set a plan of action and will finalize activities for 2004-2005.
- (b) The National Coordinator will initiate a national communication/education strategy to communicate information regarding Nuclear Fuel Waste, its storage and possible disposal methods to the Inuit Landclaim regions and communities. The National Coordinator will further aim to develop and produce some educational materials (in Inuktitut and English) regarding Nuclear Fuel Waste, its storage and possible disposal methods. This will include materials such as pamphlets, fact sheets, radio announcements, and posters with input from the director of ITK's Communications department, ITK staff, regional representatives and experts, as needed;
- (c) The National Coordinator will prepare quarterly activity reports to be disseminated to Natural Resources Canada, as well as the stakeholders;

- (d) The National Coordinator will coordinate with the National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste to:
- Compile a final list of names and develop a terms of reference for the National Task Force. This will be finalized early the first quarter of the 2004-2005 fiscal year;
  - The National Coordinator, with help from the National Task Force, will begin to prepare an interim draft document on Inuit specific aspects of the Nuclear Fuel Waste issue (re: status of issue and Inuit perceptions collected to date on the issue) to be circulated internally, which will be used in the iterative process. This process will eventually lead to the final document;
  - The National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste, facilitated by the National Coordinator, will engage in two face-to-face meetings, as well as in at least two teleconference calls, to discuss the issues of concern to Inuit on the subject of Nuclear Fuel Waste;
  - The National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste will choose the locations of the four 2-day regional dialogues, schedule the dates and assist the National Coordinator in the coordination of the event, and;
  - The members of the National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste will coordinate with the Land Claims Organization in the selection of participants for their respective regional dialogues.

## **7. Development of Educational/Information Materials:**

ITK's National Coordinator on the Long-Term Management of Nuclear Fuel Waste has begun the preparations for the National Inuit Consultation by designing a preliminary or draft Education/Information Kit.

Additional documentation in the form of presentations by Dr. Peter Brown (NRCan), Donna Pawlowski (NWMO) and Soha Kneen (ITK) from the multi-stakeholder meeting held by ITK's Environment Department in February 2004 has also been included (see Appendix B).

Further educational materials will be developed and disseminated by the National Coordinator, as well as, the members of the Task Force within the first quarter of the 2004-2005 Fiscal Year.



## **8. Next Steps:**

Action items regarding the coordination of the National Inuit Consultation on the Long-Term Management of Nuclear Fuel Waste, which require immediate attention, include the following items:

- Locations for the Inuit specific dialogues on the Long-Term Management of Nuclear Fuel Waste will be chosen by the members of the Task Force early in the first quarter of the 2004-2005 Fiscal Year.
- The coordination of meeting specific items (invitees, creation, production and dissemination of educational/information items, translation, general logistics for each location, invitation of experts to each of the meetings, etc.)

## **Appendix A (Draft Terms of Reference):**

### ***Mandate***

The National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste shall provide technical guidance and recommendations related to Inuit specific consultation process on the Management of Nuclear Fuel Waste in Canada. The Task Force shall ensure that the Inuit land claim regions (Nunavut, Nunavik, Inuvialuit, and Labrador), Pauktuutit and National Inuit Youth Council are informed and in a position to make knowledgeable decisions on behalf of their members.

### ***Roles and Responsibilities***

- Provide a forum that supports the process of consultation, informing, and advocating for Inuit on the Management of Nuclear Fuel Waste in Canada. This includes seeking input from Inuit communities in the form of four regional consultations.
- Provide a mechanism for Inuit regions and their organizations to share information on the Management of Nuclear Fuel Waste in Canada affecting Inuit, including providing relevant regional updates as required.
- Develop an Inuit specific position on the Management of Nuclear Fuel Waste in Canada
- Provide guidance and advice related to strategic planning, issue identification, to the ITK Environment Department
- Support and promote a holistic approach to the environment, which includes human health.

### ***National Inuit Task Force Membership***

The following Inuit organizations will each appoint one representative:

- Makivik or designate
- Inuvialuit Regional Corporation or designate
- Labrador Inuit Association or designate
- Nunavut Tunngavik Incorporated or designate
- Pauktuutit Inuit Women's Association
- National Inuit Youth Council
- National Coordinator on the Management of Nuclear Fuel Waste (ITK)

⇒ The Task Force may invite observers from organizations and agencies with a vested interest in Inuit environmentally and related issues.

- Observers will observe, provide updated information concerning their organization, and, when deemed necessary by the National Inuit Working Group on the Management of Nuclear Fuel Waste, and at the request of the Chairperson act as resource people during specific discussions. ITK Environment Department Staff will observe and be available during the meeting to act as resource people during specific discussions when deemed necessary by the Environment Committee membership and at the request of the Chairperson.

### ***National Inuit Task Force Chair***

The National Coordinator on the Management of Nuclear Fuel Waste will facilitate the meetings of the National Inuit Working Group on the Long-Term Management of Nuclear Fuel Waste.

### ***Meetings***

- The National Inuit Task Force, facilitated by the National Coordinator, will engage in two face-to-face meetings, as well as in at least two teleconference calls, to discuss the issues of concern to Inuit on the subject of Nuclear Fuel Waste and investigate them;
- Teleconferences will be arranged, as required, at the call of the Chairperson;
- Quorum will be defined as 50% plus one of the voting members of the National Inuit Task Force on the Management of Nuclear Fuel Waste;
- Task Force members may designate alternative representatives as required, and;
- The National Inuit Task Force, facilitated by the National Coordinator, will set a plan of action and finalize activities for 2004-2005.

### ***Accountability***

Task Force representatives shall advise their respective organizations of the deliberations of the group and obtain input/approval on specific issues under discussion as required.

### ***Decision Making***

- Decisions by the Task Force shall be made by consensus;
- Recommendations of this committee should be based on Inuit specific national perspectives.

### ***National Inuit Task Force Resources***

- Administrative expenses for National Inuit Task Force meetings and member-participation in other events, meetings, working groups, or steering committees on behalf of ITK will be provided as needed. This will include any translations required in accordance with the ITK policy;
- Secretariat support will be provided by the ITK Environment Department. The Director of the Environment Department in collaboration with the Chairperson will ensure that activities identified in the minutes are carried out and provide an update on activities at each meeting of the Task Force.

**Appendix B (Draft Educational/Information Materials):**

**NUCLEAR FUEL WASTE MANAGEMENT  
INFORMATION KIT**



COMPILED BY:

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FEBRUARY 23, 2004

SOURCE OF MATERIALS:

**ASKING THE RIGHT QUESTIONS? THE FUTURE MANAGEMENT OF CANADA'S USED  
NUCLEAR FUEL – DISCUSSION DOCUMENT 1 (NWMO)**

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## **1.0 Key Terms:**

### **1.1 Disposal:**

A method of isolating used nuclear fuel from humanity and the environment; the method must be conclusive and without the intention of retrieval or reuse. In principle, disposal can be achieved by placing the waste deep underground, at sea, in ice sheets, in space, or in deep boreholes. Internationally, the most commonly pursued disposal method is to place the used fuel deep in a geological repository which can involve horizontal placement in a mountain (as in the U.S.), or vertical emplacement deep underground in stable rock (as in Sweden and Finland). In addition to ‘engineered barriers’ offered by the containers and other design considerations, geological disposal methods rely on depth (at least a few hundred metres below the surface) and the geology of the area to provide additional natural barriers to slow the movement of radionuclides which may eventually be released from the used nuclear fuel. Geological disposal methods are also seen to provide protection to humanity and the environment, should institutional controls fail. Disposal methods may require transporting used nuclear fuel to a centralized location, whether in the home country, to an international repository or to an offshore location.

### **1.2 Storage:**

A method of maintaining used nuclear fuel in a manner that allows access, under controlled conditions, for retrieval or future activities. Most storage methods rely on engineered barriers for radiation protection. The used nuclear fuel is placed in engineered facilities (which can be concrete containers, silos or modules) at or below the surface (in vaults or caverns). Some countries, like Sweden, use underground wet fuel bays for storage. Storage methods can vary widely depending on the duration of time the used nuclear fuel is to be stored, the amount of used nuclear fuel to be stored, the number of storage locations, as well as the existing interim storage facility design (some may require repackaging). Storage methods require institutional controls; they may require repackaging of the fuel containers over time and will require transportation if the storage facilities are not located at the reactor site where the waste is created.

### **1.3 Treatment:**

Processes applied to used nuclear fuel that change its characteristics. Currently these include processes that reduce the volume of the used nuclear fuel and separate the components for individual treatment (reprocessing, partitioning and conditioning). Some countries have programs in place to further examine and optimize these treatment processes. Also included in this category are processes to reduce radiotoxicity of the used nuclear fuel (transmutation). A few countries are doing research in this area, but the process is still largely developmental. Treatment methods involve applying chemical and physical processes to the used nuclear fuel, recovering desirable components and separating and treating residual, radioactive and hazardous waste streams. Treatment

methods may require that the used nuclear fuel be transported to the treatment facility, and recovered components and residual waste streams may need to be transported back.

#### **1.4 Sustainable Development:**

Sustainable Development – Focusing on Human and Ecosystem Well-being  
Sustainable development was popularized in the 1987 Report of the World Commission on Environment and Development (the Brundtland Commission). It is a concept that guides decision-makers toward choices which are economically, environmentally and socially sustainable.

Sustainable development calls for decisions to be made in a way that ensures both human and ecosystem well-being are maintained (or improved) over the long-term. Maintaining or improving one, at the expense of the other, is not acceptable from a sustainability perspective, because the foundation for life is undermined when only one factor is considered.

Key considerations for elements of an approach, and building blocks which might be adopted in the study, are:

- inter-generational equity;
- integrated decision making;
- living off income rather than capital; and
- equivalent consideration of social, environmental and economic factors.

In applying the concept of sustainable development to the issue of managing nuclear waste, 10 potential questions surfaced in the work commissioned by the NWMO

## **2.0 Proposed Methods of Disposal/Storage:**

The 2002 Nuclear Fuel Waste Act directs the NWMO to examine three methods for the long-term management of used nuclear fuel:

- deep geological disposal in the Canadian Shield;
- storage at nuclear reactor sites; and
- centralized storage (either above or below ground).

In addition to these three methods, many others have been advanced in the past, by governments, industry and researchers. It is within the NWMO's mandate to examine any, or all, of these approaches, and options that have not been proposed in the past, as may be appropriate.



## 2.1 Deep Geological Disposal

Disposal is a method of isolating used nuclear fuel from humanity and the environment. It is conclusive and without the intention of retrieval or reuse.

Deep geological disposal involves burying the used nuclear fuel deep underground. This method is currently favored by many countries and by most international agencies<sup>29</sup>. It would require transporting used fuel from interim storage facilities to a disposal facility (wherever it is located).

The main challenge in effective disposal is to limit the potential for migration of radioactive and toxic contaminants away from the used nuclear fuel. The most worrisome migration process is through the groundwater flow system. Even if contaminants moved one metre per year – that still means the contaminant stream could be five kilometres long in 5,000 years, if ever the contaminants breached their containment barriers.

In the AECL disposal concept (the specific concept referred to in the Act), multiple barriers are proposed for limiting such movement. Barriers include:

- the fuel pellet itself, which is made of ceramic and retains almost all of the fission products;
- the Zircaloy holding tube that seals in the pellets;
- the waste container of materials selected to inhibit corrosion, cracking and perforation;
- multiple buffer zones surrounding the waste container; and
- a host geological medium that naturally limits long-term contaminant movement.

If contaminants should escape from the engineered containment, their movement would depend on the nature of the contaminants themselves, the host rock and the groundwater flow system. Several rock types naturally impede these movements, including granite, rock salt, sedimentary clay and volcanic tuff and, depending on local hydrogeological conditions, can be advantageous as host rock.

In Canada, the stable plutonic granites of the Canadian Shield have been the focus of investigation. In Germany, the feasibility of burial in rock salt formations has been assessed. Switzerland has examined clays, and the U.S. Federal Government has made a commitment to Yucca Mountain, which is composed of unsaturated tuff rock formed by the accumulation of glassy fragments from a volcanic eruption<sup>30</sup>.

Industry has continued work on key issues around a deep geological repository in Canada. One design proposes that 324 fuel bundles would be contained in a steel inner vessel which is surrounded by a copper outer shell. The fuel container would be encapsulated in bentonite self-sealing clay which, in turn, would be packed in a buffer material, a dense backfill, and a light backfill. The container would be buried 500 – 1000

meters below the surface of the Canadian Shield. Figure 4.2 illustrates the extent of the Canadian Shield.

Models have predicted that the depth of the facility, the rock and the nature of the groundwater flow system would, in combination, greatly impede the movement of radioactive and toxic contaminants. The location could withstand significant geological change and extreme events (storms, earthquakes, meteor impact, glaciation and changes in temperature).

Originally, the AECL concept of deep geological disposal included backfilling and sealing the repositories soon after waste emplacement. Today, however, some countries are considering a “staged” approach in which final closure would be postponed for many years. In the meantime, this would mean fuel could be retrieved, should that be desirable. This staged approach may also allow further research to be undertaken and technical change to take its course. Also, monitoring systems would allow us to see how effectively the system is functioning.

The AECL approach and the staged approach are sometimes referred to as the “early seal” and “late seal” options. A “no-seal” option is also possible; this would really be a form of extended centralized storage and is described next.

## **2.2 Centralized Storage**

Storage is a method of maintaining used nuclear fuel in a manner that allows, under controlled conditions, access for retrieval or other future activities. Long-term storage at a central site requires transporting the fuel from the reactor sites. Storage facilities can be located either above or below ground.

Facilities above ground can be designed with varying degrees of longevity in mind. ‘Conventional’ storage buildings could be designed that may need to be replaced every century or so, depending upon the durability of the construction materials that are used. Alternatively, more permanent engineered structures could be designed to remain sealed for up to several thousand years.

Underground storage is either by shallow burial or in caverns or tunnels some tens of metres beneath the surface. The goal is to enhance the degree of security (compared to above-ground methods) while retaining the ease of fuel retrieval. The facilities’ integrity would depend on ongoing maintenance, and future generations would inherit oversight-related responsibilities.

Here in Canada, industry has completed a preliminary review of centralized extended storage. Their above-ground alternatives include casks and vaults in storage buildings; and surface modular vaults. Below-ground alternatives include casks and vaults in buried storage containers; and casks and vaults in rock caverns. These alternatives are shown for above ground centralized extended storage in Figures 4.3 and 4.4.

## **2.3 Reactor-Site Extended Storage**

Both above and below-ground storage alternatives are in use today. Additional possibilities could be designed by simply scaling down the designs and costs of the larger versions of centralized facilities. Each site has its own distinguishing characteristics, and many conditions must be factored into the design, construction, operation and maintenance processes. The breadth of variation is shown in Table 4.1, which describes the alternatives that have received at least some degree of review at various sites in Canada.

Above-ground storage facilities have been operational for a number of decades. However, underground interim storage facilities for used nuclear fuel have not been widely developed – most storage facilities are above ground. The best-known example of an operating underground interim storage facility is the CLAB facility in Sweden, where used fuel is stored in pools some 30 metres below the surface; this is in fact a centralized storage facility, not a reactor site storage facility. France is currently examining ‘very long-term interim storage’ methods, involving either near-surface pools like CLAB, or deeper facilities set in small hills.

One advantage of storing used fuel at the reactor site is that it eliminates the need to transport the fuel to another (centralized) location. Further, because there are multiple facilities, no single facility is particularly large.

## **3.0 Methods Receiving International Attention**

This discussion looks at additional methods that are being considered in some national programs around the world, and at methods that are likely to receive some attention in the future.

### **3.1 Reprocessing, Partitioning and Transmutation**

“Processing” refers to the preparation of fresh fuel before it goes into the reactor. “Reprocessing” is a general term for applying chemical processes to used nuclear fuel for the purpose of recovery and recycling of fissionable isotopes.

No country currently employs reprocessing for the sole purpose of managing nuclear waste. The primary purpose is to recover and reuse materials extracted from the used fuel. The long-term management of the residual wastes must still be addressed.

Reprocessing technology first was developed and exploited in the nuclear weapons programs of such countries as the United States, the United Kingdom, Russia, then later in the military programs of a number of some other countries, including France, China and India. The aim was to extract weapons-grade plutonium from used nuclear fuel. (The other main weapons material, uranium-235, is produced in uranium-enrichment plants

specifically for military purposes). This military-related investment in infrastructure has significantly influenced the choice of fuel cycle-related infrastructure in countries that have later begun civilian nuclear power programs.

Recently, because of nuclear disarmament initiatives in the United States and the former USSR, the need for uranium recycling – and for the recovery of plutonium for fast reactors – has declined, as has interest in weapons-related reprocessing. At the same time, interest has increased in the possible use of reprocessing to mitigate some of the problems associated with the disposition of used nuclear fuel.

Reprocessing takes place after the used nuclear fuel has cooled for a few years. The fuel is moved to a reprocessing facility where it is stored in large lead and steel casks. There, it is dissolved in nitric acid and the volatile radioactive gases are carefully contained. Separation and segregation processes isolate products into different streams, such as useable uranium and plutonium; highly radioactive liquid waste; and less radioactive solids, liquids, and gases. These processes are referred to as “partitioning.”

Reprocessing and partitioning rearrange and recycle components. A further process might be developed to actually transform some radioactive components into non-radioactive elements, using nuclear reactions initiated by neutrons or protons. This process changes one element to another, and is called “transmutation.”

Transmutation is the subject of research programs in many countries, including Japan, France, the United States, Russia, the Republic of Korea and Italy, as well as the European Community<sup>33</sup>. The process is of interest because successful transmutation could significantly reduce the time horizon of risk associated with used nuclear fuel, unwanted nuclear weapons and surplus plutonium.

### **3.2 Storage or Disposal at an International Repository**

In the early 1990s, the international organization Pangea conceived of an international repository project. The project was based on the conviction that the long-term containment of nuclear waste materials would be easier to demonstrate and achieve if a simple, stable geological environment were chosen using global considerations, rather than being hindered by artificial national boundaries<sup>34</sup>. Natural geological barriers would, it was claimed, provide the main measure of safety, and would avoid the need for complex engineered solutions. Using geological and climatic data, broad regions were identified as potentially able to provide optimal conditions for an underground repository.

Pangea sought to identify and develop a high- isolation site for a repository capable of accepting used fuel and high-level waste from any country. A potentially suitable site was identified in Australia, but there was considerable political opposition and the project was abandoned. Pangea itself ceased activities in 2002 and was replaced by the Association for Regional and International Underground Storage (ARIUS). Membership is open to organizations and individuals who support these aims. ARIUS is currently lobbying national and international bodies with a view to developing pilot facilities. This is the only body actively pursuing international disposal, although a proposed Directive from the European Commission recommends that such methods should be explored<sup>35</sup>.

In April 1999 an American company, ‘Non-Proliferation Trust Inc.’ (NPT) was established to pursue developing an international storage facility at Zheleznogorsk in Russia. The facility, with a design life of 40 years, would be developed in an existing cavern in a hillside, employing dry storage casks. A memorandum of understanding between NPT and the Russian nuclear ministry was signed in 2000.

Any assessment of international storage or disposal would necessarily include all the costs, benefits and risks of the site and related infrastructure (including transportation), linked to all affected societies and cultures. Transborder movement of used fuel would not be in violation of any international treaty, but in some cases might contravene the self-sufficiency principle that most countries with substantial nuclear programs apply to their radioactive waste management. This principle suggests that any state generating electricity using nuclear power must assume responsibility for the long-term management of used fuel within its own boundaries<sup>36</sup>.

In theory, the design could be either above or below ground. The facility could either be based in another country and accept Canadian waste, or be based in Canada to accommodate its own and other countries’ waste. Should this repository method be considered, a complex issue would be choosing a suitable site.

### **3.3 Emplacement in Deep Boreholes**

Some countries, which must dispose of only small quantities of high-level waste, are looking at a method called “emplacement in deep boreholes.” In this method, solid packaged waste would be placed in deep boreholes drilled to depths of several kilometres, with diameters of typically less than one metre. The waste containers would be stacked in each borehole and would be separated from each other by a layer of bentonite or cement. The borehole would not be completely filled with waste: the top two kilometres would be sealed with materials such as bentonite, asphalt or concrete.

Sweden, Finland and Russia, among others, have examined the deep borehole method as a possible alternative to a deep repository. Boreholes could be drilled both offshore and onshore in many types of rock, which broadens the number of possible disposal sites. Although proponents argue that related long-term risks to people and the environment would be very low, there are significant technical questions requiring further research.

## **4.0 Methods of Limited Interest**

Eight methods are included in this category. They have been studied over the past 40 years, but none are being implemented, nor are they the focus of major research effort. Some are contrary to international conventions. Brief summaries are provided here to share information on the broad range of options that have been raised historically.

## 4.1 Direct Injection

This method involves injecting liquid radioactive waste directly into a layer of rock deep underground. The United States has used this method to dispose of liquid hazardous and low-level waste. The former Soviet Union has also used this method, to dispose of liquid high-level waste – at locations usually close to the waste generating sites.

Direct injection requires detailed knowledge of subsurface geological conditions. It does not incorporate any man-made barriers. There would be no control of the injected material after disposal. Retrieval would be impossible. There are many technical unknowns that would require extensive research to be confident of the suitability of this method for a specified site.

Although direct injection does not contravene international conventions, it would not be consistent with the spirit of international guidance on the long-term management of radioactive wastes.

Current published assessments do not suggest any substantive advantage and no country is pursuing direct injection as a means of dealing with an entire national inventory of used nuclear fuel.

## 4.2 Rock Melting

In this method, liquid or solid waste is placed in an excavated cavity or a deep borehole. Heat generated by the waste would increase, melting the surrounding rock and dissolving the radionuclides in a growing sphere of molten material. As the rock cools, it would solidify and incorporate the radionuclides in the rock matrix, dispersing the waste throughout a larger volume of rock.

In one variation of this method, heat-generating waste is placed in containers. When the rock melts around the containers, the waste is sealed in place.

Research was carried out on this method in the late 1970s and early 1980s, when it progressed to the stage of engineering design. The design involved a shaft or borehole which led to an excavated cavity at a depth of two to five kilometres.

It was postulated (but not demonstrated) that the waste would be immobilized in a volume of rock one thousand times larger than the original volume of waste.

Another early proposal was to use weighted containers of heat-generating waste that would continue to melt the underlying rock, allowing them to move downwards to greater depths as the molten rock solidified above them. There was renewed interest in this method in the 1990s in Russia, particularly to dispose of limited volumes of specialized waste, such as plutonium.

Russian scientists have also proposed that high-level waste, particularly excess plutonium, be placed in a deep shaft and immobilized by a nuclear explosion which would melt the surrounding rock.

There have been no practical demonstrations that rock melting is feasible or economically viable.

### **4.3 Sub-seabed Disposal**

In this method, radioactive waste containers are buried in a suitable geological setting beneath the deep ocean floor. Sub-seabed disposal was investigated extensively in the 1980s, primarily under the auspices of the Seabed Working Group set up by the Nuclear Energy Agency (NEA) of the Organization for Economic Co-operation and Development (OECD). Canada participated in this group, along with the United States, the United Kingdom, Japan and several European countries.

The sub-seabed disposal concept involves using missile-shaped canisters called “penetrators” to hold solid waste. The penetrators are dropped from ships, and bury themselves to a depth of a few metres or more in the sediments on the ocean floor. The disposal sites would be ones where the sediments have a high capacity to absorb radionuclides, and where the water is a few kilometres deep.

The idea behind the concept is that the waste form, inner canister, penetrator and sediments would provide sufficient protection to prevent the release of radionuclides into the ocean for thousands of years. When release finally does take place, it would occur very slowly and there would be substantial dilution.

An alternative concept would draw on deep sea drilling technology to stack waste packages in holes drilled to a depth of 800 metres, with the uppermost container about 300 metres below the seabed. Research on sub-seabed disposal ceased in the early 1990s when it became clear that there would always be intense political opposition. International conventions may prohibit ocean access to a sub-seabed repository.

Another alternative concept is to access a sub-seabed location via on-land shafts and drifts. This is being studied in Sweden, where a deep geological repository would be located deep beneath the ocean floor. In this instance, the ocean itself is the last line of defense: in theory, if contaminants escaped and moved to the ocean environment, their volume would be small, and the buffering and diluting capacity of the ocean would mitigate any consequences.

### **4.4 Disposal at Sea**

This method consists of placing packaged waste on the bed of the deep ocean. The packaging would consist of canisters designed to last for a thousand years or more. The waste would be in a solid form that would release radionuclides into the ocean very slowly when the canisters fail.

The site would be one where the water is a few kilometres deep, so that the waste would not be affected by human activity; there would be substantial dilution of radionuclides before they reach the surface.

Sea disposal was investigated by the NEA's Seabed Working Group, but not in the same detail as the sub-seabed disposal method. Sea disposal would be an extension of the 'sea dumping' method that was used until the early 1980s to dispose of solid low-level radioactive waste. It is now prohibited under international conventions.

#### **4.5 Disposal in Ice Sheets**

In this method, containers of heat-generating waste would be placed in very thick, stable ice sheets, such as those found in Greenland and Antarctica. Three possibilities have been suggested.

In the "meltdown" concept, containers would melt the surrounding ice and be drawn deep into the ice sheet, where the ice would refreeze above the wastes, creating a thick barrier. In the "anchored emplacement" concept, containers would be attached to surface anchors that would limit the containers' penetration into the ice by melting at around 200-500 metres. This would allow for possible retrieval for several hundred years (before surface ice covers the anchors).

In the "surface storage" concept, containers would be placed in a storage facility constructed on piers above the ice surface. As the piers sank, the facility would be jacked up to remain above the ice for perhaps a few hundred years. Then the entire facility would be allowed to sink into the ice sheet and be covered over.

There has been very little work on disposal in ice sheets because there has never been enough confidence about predicting the fate of the waste; also, it is possible radionuclides could be released into the ocean. Further, disposal of radioactive waste in Antarctica is prohibited by international treaty. Denmark has indicated that it would not allow such disposal in Greenland.

#### **4.6 Disposal in Subduction Zones**

This method was initially proposed in the 1980s. In theory, it involves placing waste in a subducting (or descending) plate of the earth's crust. Subduction zones are always offshore, so this concept can be considered a variant of emplacement in the sea or beneath the seabed. The waste could be emplaced close to an active subduction zone by means of tunneling, deep sub-seabed boreholes, or free-fall penetrators.

Little attention has been paid to this method because of the inability to predict the fate of waste. It has been suggested that waste might return to the surface via volcanic



eruptions. This method has also been seen as a form of sea disposal (and so would be prohibited by international conventions).

#### **4.7 Disposal in Space**

This method would permanently remove radioactive waste from earth by ejecting it into outer space. Alternative destinations that have been considered include the sun, orbit around the sun, and ejection beyond the solar system. This method has been suggested for disposing of small amounts of the most toxic waste. This method has never been part of any major research and development program. Opposition to disposal in space has been reinforced by the Challenger and Columbia accidents.

#### **4.8 Dilution & Dispersion**

The method would involve dissolving the fuel in acid, neutralizing the solution and discharging it slowly down a pipeline into the sea. The discharge site and rate would be such that radiation doses to people never exceed internationally-accepted limits. Another possibility would be to transport the fuel solution by tanker to the open ocean and release it there.

“Dilution & Dispersion” differs from all other storage and disposal methods in that there is no containment of the waste or isolation from the environment. It has never been proposed or considered seriously for used nuclear fuel disposal because sea disposal is prohibited by international conventions.



**Presentation given by:  
Soha Kneen  
At ITK's Multi-Stakeholder Meeting  
(February 23-27, 2004) on the issue of the  
Long-Term Management of Nuclear Fuel Waste  
in Canada**



COMPILED BY:

SOHA KNEEN, ENVIRONMENT DEPARTMENT COORDINATOR – ITK  
FEBRUARY 2004

### Intent of the legislation (re: the Nuclear Fuel Waste Act and section 12(7) of Bill C-27):

On November 15, 2002 the Nuclear Fuel Waste (NFW) Act was brought into force. The NFW Act marked a substantial achievement by the Government of Canada in meeting its responsibilities regarding the long-term management of nuclear fuel waste and set in motion the processes, structures and decision-making steps necessary for successful implementation of the Act. The NFW Act was developed on the foundation of extensive consultation with the public and stakeholders, including several policy communications by the Government of Canada in 1996 and 1998. In the 1998 Government of Canada Response to the Seaborn Panel, the Government indicated that it would undertake a participation process for Canada's Aboriginal peoples to understand and assess nuclear fuel waste issues. The Government also indicated that, to the extent possible, the process would be designed and executed by Aboriginal people so that it is appropriate to their value system. Since 1998, the Government of Canada has been in discussion with representative Aboriginal organizations about how they want to be consulted.

### Background:

In discussions with NWMO representatives, ITK staff members have underlined the fundamental importance of aboriginal, and specifically speaking, Inuit involvement in the development of management options that are required by the Nuclear Fuel Waste (NFW) Act. It is essential that comprehensive public consultations with Inuit will be conducted in order to develop long-term management approach options, which are to be submitted by the NWMO on November 15, 2005. It is furthermore of great importance that this consultation process takes place in a relevant, meaningful, and culturally appropriate way that takes into account the remoteness, as well as language needs of Inuit communities that must be consulted throughout this process.

In the past, Inuit have been opposed to the Long-Term Management of Nuclear Fuel Waste in the Canadian Arctic. The need remains, however, to consult and educate Inuit on this issue to back up/substantiate/explore Inuit views in a cohesive manner. Of particular interest to Inuit is, for example, the risk of trans-boundary problems associated with the Long-Term Management of Nuclear Fuel Waste.

As a result, ITK proposed a three-year process to consult Canadian Inuit on the issue of Nuclear Fuel Waste Management and Disposal, as mandated in section 12(7) of Bill C-27.<sup>3</sup> This multi-year process will culminate in a comprehensive report detailing Canadian Inuit ethical, social, environmental and economic considerations in regard to storing nuclear fuel waste, attempt to answer whether or not nuclear fuel waste storage on Inuit lands is acceptable, and if acceptable, what method of storage would be preferred.

This consultation model will allow Inuit to express their opinions in a culturally specific manner that will produce a comprehensive report that will accurately reflect the Canadian Inuit areas of concern on the questions surrounding section 12 of Bill C-27.

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<sup>3</sup> Section 12.(7) of bill C-27, An Act respecting the long-term management of nuclear fuel waste, states, "The waste management organization shall consult the general public, and in particular aboriginal peoples, on each of the proposed approaches."

### Consultation with the Inuit Land Claims Organizations:

ITK will consult on an ongoing basis with the Inuit Land Claims Organizations and facilitate consensus building on answers to the consultation questions. ITK will not and cannot speak for Regional groups until the consultative and consensus-building process is complete.

### Reasons and objectives of the consultation:

- The design and execution of a culturally specific consultation program by ITK on the long-term management of nuclear fuel waste in Canada.
- To provide information, means and opportunity for Inuit people to conduct a dialogue amongst themselves and share their opinions and views with the Government of Canada;
- To provide a series of reports, and in particular a final report, to Natural Resources Canada, which will then be transmitted to the Minister, which outlines the views and opinions of ITK's constituents concerning the long-term management of nuclear fuel waste in Canada. That is, to create a body of knowledge related to the views and opinions of Aboriginal peoples on nuclear fuel waste;
- To provide the Minister with the views and opinions of Inuit peoples in advance of the recommendation to the Governor-in-Council on the approach for the long-term management of nuclear fuel waste;
- To assist in developing capacity for Inuit peoples at an organizational level, as well as allowing Inuit peoples to acquire knowledge on matters related to nuclear fuel waste management;
- To develop communications between Inuit peoples and the Government of Canada on the issue of nuclear fuel waste management.

### Description/Scope:

The consultations are to be explicitly and strictly in relation to the long-term management of nuclear fuel waste in Canada and the structures and processes laid out in the Nuclear Fuel Waste Act. Issues for discussion include:

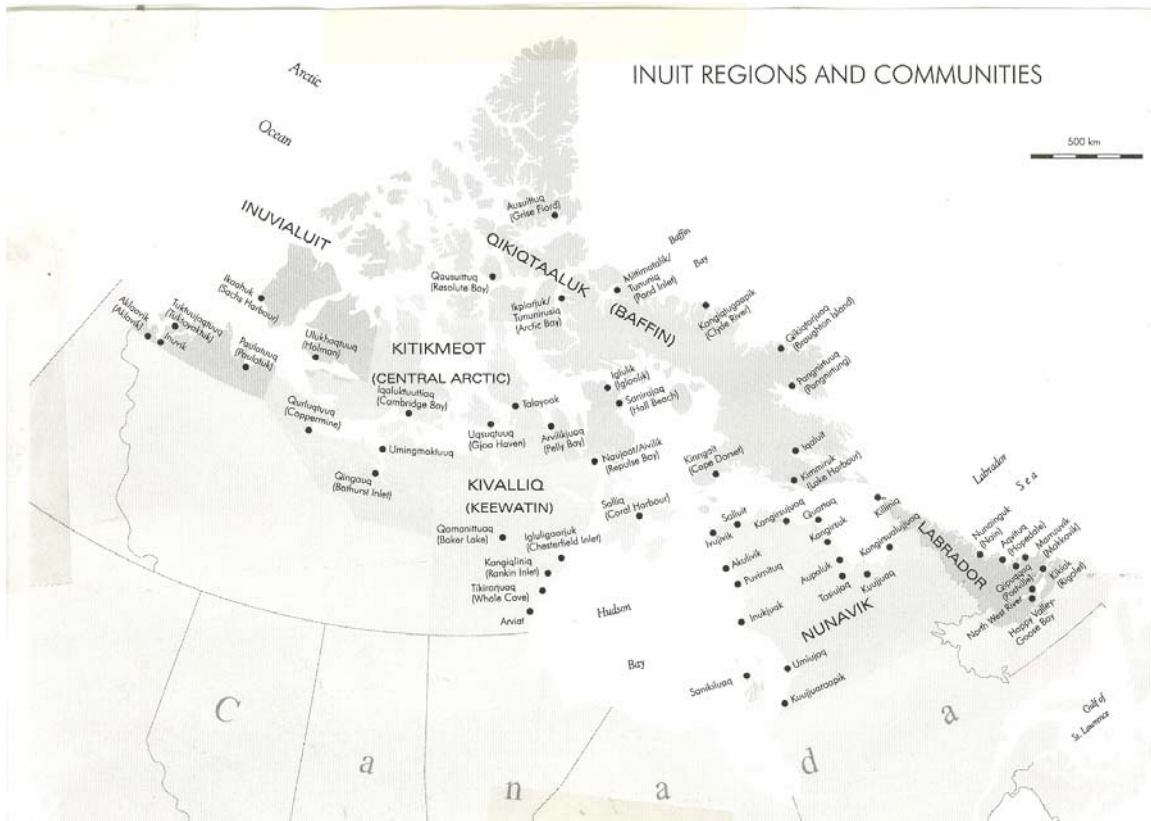
- The long-term management of nuclear fuel waste in Canada including opinions laid out in the NFW Act, and others as proposed by the Nuclear Waste Management Organization (NWMO);
- Traditional Aboriginal Knowledge (TK) in relation to nuclear fuel waste management; basis for utilization of TK and methods for doing so;
- Aboriginal, treaty and other rights as related to nuclear fuel waste management;
- Other relevant topics as they arise, which are approved by the Minister.

What needs to be done:

- Possible formation of a National Working Group (NWG) on the Management of Nuclear Fuel Waste (with representatives from the Inuit regions, NIYC, ICC and the Pauktuutit Inuit Women’s Association);
- Discussion of 2004-2005 Strategy;
- Development of possible milestones;
- Discussion of the four regional consultations (re: choice of location, logistics, etc.);
- Discussion of regional involvement/input in the national coordination of the four regional consultations;
- Discussions for working guidelines and procedures and capacity building within the regions/communities;
- The development of a Terms of Reference (TOR) for the NWG.

Possible locations for the four regional consultations:

- |    |              |                                     |
|----|--------------|-------------------------------------|
| 1. | Baker Lake   | Nunavut (NTI)                       |
| 2. | Happy Valley | Labrador (LIA)                      |
| 3. | Paulatuq     | Inuivialuit Settlement Region (IRC) |
| 4. | Kuujuaq      | Nunavik (Makivik/KRG)               |



## **Appendix C (Excerpts from ITK’s Multi-Stakeholder Meeting titled the *National Inuit Conference on the Environment*):**

### **1. Notes from the presentations by Dr. Peter Brown (NRCan) and Donna Pawlowski (NWMO) on the history and future of the Long-Term Management of Nuclear Waste in Canada**

Peter Brown of Natural Resources Canada (NRCan) gave a brief presentation on nuclear waste management. Brown began by saying that the NWMO was founded on the basis of extensive consultation with stakeholders in 1997-98. Ongoing discussions with ITK are now concerned with the planning stage of the consultation process. He reiterated earlier speakers’ cautions against media hype around issues of concern and said this is “especially true of nuclear fuel waste.”

He explained that the term nuclear fuel waste refers to irradiated fuel bundles. The federal government retains responsibility for nuclear issues and so continues to be involved in the decision making process. He described the current “safe storage” of waste bundles at reactor sites in southern Ontario, New Brunswick, Quebec and Manitoba. Brown also outlined the federal policy framework that ensures proper disposal methods, the history of nuclear waste disposal in Canada and the Nuclear Fuel Waste Act (NFW Act), which enforces the “producer/polluter pays” concept.

The NFW Act provided the legal framework that required nuclear energy corporations to set up Waste Management Organizations (WMO) and to establish trust funds for long-term disposal. Existing trust funds currently hold some \$650 million that can be used for nothing other than nuclear waste disposal. The NFW Act, he noted, also provided for consultation, in particular with Aboriginal peoples, on each proposed approach to waste disposal and for incorporating that input into the government’s decision-making process.

A participant asked about the process of consultation in Nunavut and the issue of mining and the correct way of disposing of mine tailings. Brown replied that uranium mine tailings are strictly regulated and that companies must put up bonds to ensure they decommission their tailings appropriately. Old mine sites, he noted, are considered abandoned if no company is still there and billions of federal dollars have been allocated recently to deal with abandoned mine sites.

Donna Pawlowski then continued with a presentation on behalf of the NWMO. This new organization is developing an approach for Canada for handling of used nuclear fuel. She discussed what nuclear fuel is, beginning with its exit from the mines in yellow powder

form. She explained how this powder is formed into black pellets that are then inserted into tubes and grouped together into fuel bundles weighing about 20 kg each. One bundle provides enough electricity for 100 homes for one year. There are currently 22 reactors in Canada, providing about 24% of all energy used in the country. These bundles, she added, are also used in research reactors in universities and in hospitals for making isotopes for medical procedures. The finished bundles are removed from the reactors by robot due to the high levels of heat and radiation. She described the amount of waste currently as enough to fill three hockey rinks. With the hazards of spent fuel continuing for thousands of years, and continuing use of nuclear fuel, the waste will increase many times over. Long term plans for disposal are required for good stewardship. Waste stored under water can only be removed to dry storage after 10 years, when it has cooled enough. Storage is then in concrete bins at nuclear power plants with 24-hour security and monitoring, fences, guards, and international agency monitoring to ensure safety.

For long-term waste storage, she said, the NWMO is considering at least three options:

- Burial in the Canadian Shield 500 or 1,000 metres below ground
- Storage at reactor sites, or
- Centralized storage above or below ground.

The Canadian Shield ranges throughout the North in Nunavut and the NWT, down into Saskatchewan, Manitoba, and Ontario and throughout Quebec and Labrador. Deep geological storage would allow the site to be sealed. This was cited as a deterrent to possible loss or theft of radioactive materials, in comparison with above-ground storage options.

The NWMO will submit a report with recommendations to the federal government in November 2005. When the government chooses an option, the NWMO will be responsible for implementation. She referred to the initial discussion document and its focus on four key questions/areas:

1. The problem facing Canada
2. Appropriate list of options
3. Considerations include social, economic, environment, and technical
4. Overarching considerations include governance, decision making, ethics, continuous learning, Aboriginal values

“Are we asking the right questions? What are the responsibilities of our generation and future generations?” She also asked the participants to discuss whether working on a sustainable development framework is the right way to start the study. With this issue as yet unresolved, solutions and suggestions often conflict with “the people,” so the problem needs new information, new and different types of knowledge.

She showed participants a calendar outlining the crucial dates in the process, from the original conversations about expectations in 2002, through the discussion and consultation stages to the final report with suggestions to government in 2005. The key



commitment from the NWMO, she underlined, is “No surprises;” everyone will know the recommendations going into the consultations. The NWMO desires a collaborative arrangement with Inuit communities so that Inuit perspectives and knowledge will be reflected in the study and will guide the direction for Canada.

She described the NWMO, telling participants that it is a private sector, not-for-profit organization that is held at arm’s length from producers but whose share-owners are nuclear plant owners. There is, she added, no conflict or bias that favours industry.

A participant asked if there is currently any way to neutralize nuclear waste. At present, she responded, there is not. Research is ongoing, so perhaps there may be a way in another 40 or 50 years.

Another participant asked whether the critical issue is national security or radioactivity. She expressed concern that the solution to the waste problem will lead to further nuclear proliferation instead of sufficient funding for sustainable energy resource research. Who guards the safe keeping of stored waste? Pawlowski replied that the current storage facilities in Canada are secure. There is no problem with leaking or breaking down of the storage containers, but there still needs to be consideration of future needs. She said the social component has been missing until now, and stated the need to examine social and human factors to find “socially acceptable ways of dealing with it.”

This is not a matter of great urgency, but rather one that has been put off continually over the past 30 years of production. The federal government “decided to deal with the issue while enjoying the benefits of reactors” and to use income from them to pay for study of this issue. In considering actions, she added, whether such actions should be taken now or in the future is a consideration. By not reprocessing the waste, she said, Canada is taking away a step that makes the plutonium and uranium more “accessible” and increases the risk of theft for weapons use.

A participant asked what or who prevents someone from invading the “storage hole” in the Canadian Shield and removing the waste for use in creating nuclear weapons. Pawlowski replied that the U.S. has already decided to ship nuclear waste to Yucca Mountain in Nevada to store. She cited other countries that also use deep geologic disposal, including Sweden and Finland. The international nuclear energy body, she added, recommended deep geological disposal partly because it makes access to the material difficult.

A participant expressed concerns about the problems in northern Quebec with mining exploration dumps. If there “will be another dumping site for nuclear waste, I think it will not create good relations with my people.” Unless there are billions of dollars in compensation, “we don’t want to hear of another dumping site in our region.” Responding to this, a presenter said some previous practices, particularly in mining, are not appropriate today but that dealing with nuclear waste is entirely different. The government body responsible has a mandate of public health and safety so they will not approve any site that will impact negatively on people’s health and environment.

## **2. Excerpts of the notes obtained from the Multi-Stakeholder Workshop Proceedings:**

### **Facilitator: Soha Kneen, Environment Coordinator, Inuit Tapiriit Kanatami**

Kneen distributed copies of a briefing note and draft terms of reference, which provided the basis of discussion for the break-out session.

Participants were referred to five additional documents in the conference package. One, titled “*Nuclear Fuel Waste Management Information Kit*,” was compiled as a summary of key terms and proposed methods for nuclear fuel waste management. The information was compiled from the Nuclear Waste Management Organization’s (NWMO) Discussion Document 1: “*Asking the Right Questions? The Future Management of Canada’s Used Nuclear Fuel*.” The other documents are one-page NWMO fact sheets entitled “*The Nuclear Waste Management Organization*,” “*Nuclear Fuel Waste in Canada*,” “*The Canadian Nuclear Regulatory Framework*,” and “*How Nuclear Fuel Waste is Managed in Canada*.”

Kneen introduced Louis Manzo, Director of Lands and Certified Technical Engineer with the Kivalliq Inuit Association (KIA). Manzo is also a member of the Canadian Nuclear Safety Commission (CNSC) who presented to the individuals assembled on his past experience.

Kneen thanked Manzo for his presentation and asked participants to refer to the briefing note that she had distributed at the beginning of the session.

### **Setting Direction**

Kneen launched the discussion by informing the participants that ITK had applied for and received funding to organize a three-year process to consult Canadian Inuit on the issue of nuclear fuel waste management and disposal, as mandated in section 12(7) of Bill C-27. Bill C-27, an Act covering the long-term management of nuclear fuel waste, states, “The waste management organization shall consult the general public, and in particular Aboriginal peoples, on each of the proposed approaches.”

Referring to the briefing note, Kneen noted that the multi-year consultation process would culminate in a comprehensive report detailing the ethical, social, environmental and economic considerations of Canadian Inuit with regard to storing nuclear fuel waste. Four two-day regional dialogues are proposed. Possible locations for the consultations are Baker Lake, Nunavut; Happy Valley, Labrador; Paulatuuq, Inuvialuit Settlement Region; and, Kuujuaq, Nunavik.

Kneen said she wanted to move forward on planning the consultation by establishing a National Inuit Task Force on the Long-Term Management of Nuclear Fuel Waste. The briefing note provided background information, the reasons and objectives for the consultation, a description of the scope of the consultation, and an outline of what needed to be done that day. The purpose of the session was to initiate the establishment of the Task Force, to discuss the scope and strategy for the consultation, and to develop the milestones. It is proposed that the task force would have representation from the Inuit regions, the National Inuit Youth Council (NIYC), the Pauktuutit Inuit Women's Association and the Inuit Circumpolar Conference (ICC). Kneen is the National Coordinator on the Management of Nuclear Fuel Waste, and chair of the Task Force.

There was a brief discussion about whether or not the Inuit had previously opposed the storage of nuclear waste. Several participants felt that no formal statement about storage had been issued to date. Kneen indicated that at a recent ITK annual general meeting, a resolution had been approved that addressed the issue.

Kneen noted that through this break-out group she was proposing the formation of a National Task Force that would design an Inuit consultation process to provide Inuit with the opportunity to express their opinion in a culturally specific manner.

A participant said it would be important to talk about the use of nuclear power in general, to determine if the use of nuclear power itself is acceptable in the Inuit regions. He suggested that determining whether the use of nuclear power is acceptable could be a first step in the consultations. Another participant agreed, saying he believed that not many communities understand the issues, particularly the link between much-needed electricity, and the inevitable creation of nuclear waste from nuclear reactors.

Another sought clarification on the Inuit lands mentioned in the briefing note, and Kneen confirmed that this meant the regions.

Another question concerned the deadline for the consultation, and the challenges of trying to do consultations over a period of just a few days. A participant also asked about the role of the government of Nunavut in the consultations.

Kneen stated that the consultations will take place between April 2005 and June 2005, and that the organization of the consultation is specific to the constituents of ITK.

A participant expressed concern that communities might perceive a relationship between the sites being proposed for the consultations (Baker Lake, Happy Valley, Paulatuq, and Kuujjuaq), and the possible location of waste. Concern was expressed that there could be a reaction from communities if the assumption is made that a dump is being proposed. Clear communication will be very important.

Several participants spoke about the importance of the consultation. They stressed the need to articulate a clear and sound position on the use of nuclear energy, as well as a position on the storage and disposal of nuclear waste. One participant highlighted the

importance of a thorough and broad consultation to ensure that people support the results. Another participant noted that deep geological disposal of used nuclear fuel is the preferred method of the Atomic Energy Control Board. It is also the method currently favoured by many countries and by most international agencies. Concern was expressed that storage in the stable plutonic granite of the Canadian Shield is the preferred option in the category of deep geological disposal, and that the Canadian Shield extends significantly into Inuit territory. A question was posed about whether the consultation could go beyond the limited scope of waste management and address larger issues.

One participant said it might be premature to oppose any nuclear waste storage in light of the need to find suitable interim solutions while further scientific research is undertaken. She stressed the importance of ensuring a broad representation of people, particularly women, children, and Elders.

Another participant spoke about whether there will be smaller nuclear power plants in the communities, suggesting that there needs to be discussion on where to draw the line with regards to the use of nuclear energy. He noted that currently none of the waste is produced in the North; if the management of nuclear waste were to be discussed, then it would be important to include discussion about whether there should be smaller nuclear power plants in the communities. Further, he stated, "if we don't have the technology to dispose of the waste, maybe we shouldn't be producing it at all."

The next speaker agreed, speaking about the need to clean up the existing mess before taking on any further challenges. She also talked about the need to allow the government of Nunavut to make decisions.

A participant said storage sites would not be close to large populations; the federal government will be looking for isolated and remote areas. Another participant clarified that deep geological disposal means permanent disposal.

Concern was expressed about security for nuclear waste storage. "How are we going to ensure that no one comes to steal it? What kind of pressure does that put on our government, rangers, and people?"

A participant reiterated that the federal government is looking at both disposal and semi-permanent storage, hoping that science will intervene with better solutions. A significant link was noted between the need to find storage and disposal space, the implications for deep drilling and disposal, and the need for a road to the sub-Arctic.

A participant said the federal government will make the final decisions with or without Nunavut's voice, and other governments will have a voice too. Scientists will be the ones to decide exactly what areas will be used. It was noted that there is much pressure to get the road built and that the whole matter is very sensitive, since the results could bring many benefits as well as much damage.

One participant asked whether similar consultations have been held elsewhere in the world, suggesting that it would be helpful to consider issues and best practices that may have already been identified.

Kneen agreed that the Task Force would examine such considerations, once it was formed. Experts need to be consulted, and other working materials need to be researched and analyzed.

Another participant noted that Norway is considering deep geological disposal of waste, and asked what consultations had occurred. Again, the question was raised about whether consideration would be given to broadening the scope of enquiry.

A participant supported the idea of looking internationally at what has already been done in terms of consultations, asking how much consultation had been done with indigenous people. He also asked if NWMO has position papers.

A participant said the information in the NWMO book, *“Asking the Right Questions? The Future Management of Canada’s Used Nuclear Fuel”* is currently the leading edge in thinking.

Another expressed concern that if the scope is broadened too much, it might not be possible to meet the required consultation timeframe.

A participant noted the need to consider whether to be part of the discussion or to remain outside, as happened with the firearms regulations, for example.

On the scope of deliberations, a participant said the NWMO is willing to consider discussion papers. He added that some things are so connected to the disposal issue that they can be articulated within the bounds of that discussion. He cautioned that certain points of view might not be listened too, but noted that in the past, Inuit views have been taken into consideration on occasion—for example, the Inuit role in stopping the Cruelty to Animals Bill.

A participant spoke of the need to broaden the base of consultation. She suggested it would be important for Pauktuutit Inuit Women’s Association to acquire funding to consult with a different constituency than ITK’s.

Another participant said that in light of ITK’s work on global contaminants, the discussion should be expanded beyond nuclear waste storage to include other global issues. Accidental transportation of contaminants, such as those transported by air and water currents, is a matter of global security.

A participant replied that in international agreements, the country that extracts the minerals is responsible for the waste disposal. He said Canada leads the world in research on nuclear waste disposal and Canadian scientists are hired to provide their expertise in Third World countries.

The previous speaker said that as an Inuk, it was not enough for her to talk about a position from a Canadian perspective. Rather, if international agreements did not protect her land and her children, then something needed to be done about that.

Kneen agreed that cross-boundary issues are important. However, the scope of consultations that ITK has been given is specific to Canada.

Another participant agreed about the importance of considering global issues. He said the Inuit and ICC have contributed to the betterment of humankind globally by the stand taken on POPs. Taking a position that reflects a global perspective might be a good thing to do in this situation. It is clear that any type of contaminant can be inadvertently transferred, and that pollutants can have an affect on us even if an accident happens in Russia, for example.

Following a break, Kneen cited the need to conclude the discussion, to initiate the Task Force, and to set milestones for the work ahead. She referred to the draft terms of reference that outlined the mandate, roles and responsibilities, and National Task Force membership.

After a brief discussion on funding and consultation timelines, participants discussed membership of the Task Force, considered the contents of an initial letter that would go out to member organizations, and worked on a strategy framework for the consultation.

Several decisions were made as changes and additions to the draft terms of reference

For the second day of the break-out discussion, Kneen began with a presentation on the draft terms of reference, so that the group could work collectively on changes and capture those changes immediately on the PowerPoint slides.

### **Draft 2004–2005 Work plan**

The objectives of the work plan that relate to the communications goals are to develop a national communication/education strategy regarding the Long-Term Management of Nuclear Fuel Waste, and to develop and produce educational materials (in both Inuktitut and English). Educational materials will include pamphlets, fact sheets, radio announcements, and posters.

An additional objective is to prepare quarterly activity reports for Natural Resources Canada, the NWMO and the stakeholders.

Further work plan activities are finalizing the terms of reference in the first quarter of the 2004–2005 fiscal year and preparing an interim document on Inuit perspectives regarding

Nuclear Fuel Waste issues. Additional activities will include engaging in two face-to-face meetings, and participating in a minimum of two teleconference calls. As well, the locations of the four 2-day regional dialogues must be chosen, the events scheduled, and assistance provided in the selection of participants for the dialogues.

Kneen thanked everyone for their participation and noted that she would be in touch with the participants to follow-up with the next steps of the newly established Task Force.