

Final Report on the National Inuit-Specific Dialogues on the Long-Term Management of Nuclear Fuel Waste in Canada



Determining the National Inuit- Specific Perspective

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Introduction:

On November 15, 2002 the Nuclear Fuel Waste (NFW) Act was brought into force by the Federal Government. The NFW Act was passed to confirm that the Government of Canada was meeting its responsibilities regarding the Long-Term Management of Nuclear Fuel Waste and set in motion the processes necessary for the successful implementation of the Act. The NFW Act was developed as a result of extensive consultation with the public and stakeholders by the Government of Canada in 1996 and 1998. In 1998 the Government of Canada Response to the Seaborn Panel, the Government further included that it would undertake a participation process for Canada's Aboriginal peoples.

In discussions with the Nuclear Waste Management Organizations (NWMO) and Natural Resources Canada (NRCan) representatives, ITK staff members had underlined the fundamental importance of Inuit becoming involved in the formation and development of management options that are required by the Nuclear Fuel Waste (NFW) Act. It was expressed that it is essential that a comprehensive public dialogue with Inuit is conducted in order to develop long-term management approach options, which will be included in the NWMO submission to the Minister of Natural Resources Canada on November 15, 2005. It was furthermore stated that it is of great importance that this dialogue 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 had remained, however, to dialogue with and educate Inuit regarding the possible benefits or effects that will accompany the Long-Term Management of Nuclear Fuel Waste. Of particular interest to Inuit is, for example, the risk of transboundary problems associated with the Long-Term Management of Nuclear Fuel Waste. In order to put together the Inuit perspective on this matter, ITK held dialogues in the four Inuit land claim regions (Nunavut, Inuvialuit Settlement Region, Nunavik and Nunatsiavut). As a result, ITK proposed and is currently in the final stages of a three-year national dialogue process within the four Inuit Land Claims Regions on the issue of the Long-Term Management of Nuclear Fuel Waste in Canada, as mandated in section 12(7) of Bill C-27. These dialogues took place in the following locations.

- | | | |
|--|---|----------------------|
| 1. Iqaluit (Nunavut) | - | November 9-10, 2004 |
| 2. Inuvik (Inuvialuit Settlement Region) | - | November 17-18, 2004 |
| 3. Kuujuaq (Nunavik/northern Québec) | - | January 27-28, 2005 |
| 4. Makkovik (Nunatsiavut/Labrador) | - | February 9-10, 2005 |

Throughout these national dialogues, ITK staff emphasized to the participants of each of the regional Inuit-Specific Dialogues that ITK does not endorse any of the proposed approaches to Nuclear Fuel Waste management. Rather, these dialogues were intended to provide Inuit in Canada with information on the issue of the Long-Term Management of Nuclear Fuel Waste, as well as to ensure that Inuit can have a

voice in the dialogue process, which is currently in its final stages. This stance was adopted to act in tandem with the already existing resolutions that were issued by both the Inuit Circumpolar Conference (ICC), in 1977, and in 1997 by Nunavut Tunngavik Incorporated (NTI) on this subject matter. These resolutions (please see Appendices D and E) outline ICC's and NTI's opposition to the storage/disposal of any type of chemical, biological and specifically nuclear waste in the Arctic.

It is important to note here that clear overlaps existed with regard to the information provided (please see Appendix B for the presentations provided at each of the Inuit-Specific Dialogues) at the National Inuit-Specific Dialogues and the expectations participants had of these dialogues. It is, however, also important to note that some questions, expectations and comments, although on related subjects, did fall outside of structure of these dialogues (see Appendix A) as no information on the subject of the Long-Term Management of Nuclear Fuel Waste in Canada had previously been available in the four Inuit land claims regions prior to the dialogues which were conducted by ITK staff during the 2004-2005 term.

Description/Logistics of the Dialogues

Throughout 2004-2005, ITK, with the help of the National Task Force Members of the Inuit land claims organizations, has been actively engaged in the organization, coordination and execution of the National Inuit-Specific Dialogues on the Long-Term Management of Nuclear Fuel Waste in Canada.

The four Inuit-Specific Dialogues were very well received in each of the Inuit land claims regions. The participants of each of the dialogues were happy with the level of relevant information that was provided (in the form of information packages and expert presentations that were held during each of the Inuit-Specific Dialogues) on this subject, the translation of the documents provided, as well as with the general coordination that was necessary in order to conduct these dialogues effectively and efficiently.

Difficulties did, however, arise with respect to the logistical arrangements of the NWMO experts. Although the meeting dates and locations were provided by ITK staff to the NWMO well in advance of the dialogues taking place, it appeared that the majority of the NWMO representatives that presented at these dialogues were not provided with a great deal of time to prepare nor to make their personal travel and accommodations arrangements.

The particular problems experienced can be seen as directly resulting from the NWMO's inability to take the northern situation into consideration when planning their upcoming activities. Weather, length of travel and the size of a community that is being visited for the purpose of these types of meetings must always be taken into consideration when attending or planning such meetings. This unfortunately also resulted in a perceived lack of sincerity on the part of the NWMO by dialogue participants.

Final Recommendations/Comments (listed by Inuit Land Claims Region)

The discussions, which took place at each of the Inuit-Specific Dialogues were extensive and covered a number of areas (the proposed management options for nuclear fuel waste, effects of radiation exposure, transport of nuclear fuel waste, uranium mining, and alternative energy sources) in relation to the matter. As a result of this and the varying influences that guided each discussion within each of the four Inuit land claims regions, the recommendations and comments from each of the regional Inuit-Specific Dialogues are included below.

Nunavut Recommendations:

Preamble:

These recommendations are provided with the understanding that they are informal submissions and are not the result of a consultation process that took place within the Nunavut territory.

Not enough time and funding were allocated in order to conduct a formal consultation that would be effective, meaningful and culturally appropriate. In section 12(7) the Act states that they shall consult the general public and in particular Aboriginal people. The meeting that has taken place over the past couple of days cannot be considered a consultation under this act. It does not warrant the provisions under the Act. (see p. 5 of the act) Consultation with southern Aboriginal peoples cannot be understood as consultation with Inuit.

The meeting that has taken place during Nov. 9-10, 2004, was a positive meeting, which has resulted in the provision of information and educational materials to those in attendance.

Attendees present at this meeting specified that they could not provide formal feedback that is representative for their organizations or communities as they have not yet been able to take the information provided back to their constituents. (With the exception of NITI who already has a resolution in place on this matter)

Even if there was funding, it is not a matter for these organizations to take the lead in doing this. It should be the NWMO and NRCan, with the assistance of the Inuit Tapiriit Kanatami, who should conduct meaningful and formal community consultations within the Nunavut Settlement Area (NSA). The regions should not be expected to take the lead. The consultations should be initiated and organized by the NWMO and NRCan with Inuit directing the process. Formal consultations with Inuit should be initiated in addition to the current dialogue process. Meaningful consultations are defined as culturally appropriate, time sensitive, (look at provision of materials, providing them ahead of time, providing maps and pictures as opposed

to just providing the info and asking for comments – look at methods that would be most useful and beneficial) – prior notification should be reasonable.

This type of process would represent a culturally and geographically appropriate initiative for Inuit to take a formal regional and national position on the matter of the Long-Term Management of Nuclear Fuel Waste in Canada.

Dialoguing with Inuit of Nunavut on the Long-Term Management of Nuclear Fuel Waste with the NWMO prior to November 15, 2005 is important. However, Inuit and other Nunavumiut are citizens of Canada too and have been left out of some of the NWMO processes (such as the Advisory panel, the Scenarios Team and the Ethics panel).

Inuit have values unlike others. Inuit know a lot about the land and the animals on the land. Inuit also have agreements and processes in place that require for Inuit to have a voice.

It should also be recognized that a resolution by NTI does already exist (please see Appendix D), but that it does not prevent the attendees of the Nunavut dialoguing commenting on the L-T Management of Nuclear Fuel Waste in Canada as a whole. However, due to the uncertainties of climate and weather conditions, storage, disposal or transportation of Nuclear Fuel Waste in Nunavut is not acceptable now or in the future.

Specific Recommendations:

1. The NWMO and NRCAN must do more research/risk assessments before actually making a choice on the options for the Long-Term Management of Nuclear Fuel Waste;
2. The NWMO and the Government of Canada must take the necessary steps and conduct research to develop alternative energy sources in Canada with the goal in mind to eventually stop the production of Nuclear Fuel Waste;
3. To conduct ongoing research on methods of eliminating the hazardous nature of Nuclear Fuel Waste;
4. Use a combination of options (Canadian shield – but shallower in the ground and keep it accessible – don't fully encapsulate it – reason: may develop technologies to destroy the waste in the future);
5. Regardless of the option selected – proper consultation should take place across the country to inform the public of what the selected option means – a formal consultation should take place with the public;
6. All written materials provided to the general public should be released in the appropriate language (incl. Inuktitut and Inuinnaqtun).

Current comments:

- Increased education to the public including and especially in the North is necessary

- Getting into the logistics of language, education issues, transportation issues – as it applies to community relations/consultations/dialogues – outline difficulties and obstacles regarding the organization of these types of events in the North
- Suggestion of an extended deadline as there isn't enough time to properly educate the public on the issue of the Long-Term Management of Nuclear Fuel Waste
- Traditional land use should be included in the community well being objectives of the NWMO assessment
- Traditional Knowledge (IQ) is important to the nature of the value of human life, wild life, the land, the sea, our ecosystem – in the South food comes from a store – in the North the land is the food source/ecosystem/the land – Inuit will take every measure they can to protect it!
- Consultation regarding each of the proposed approaches has not taken place with Inuit. To date dialogues have taken place, but a consultation has not been initiated. In addition; one dialogue has taken place for 27,000 people. One dialogue in one community is not appropriate consultation in any court of law.
- The Nunavut Land Claims Agreement (NLCA) constitutionally entrenches rights of Nunavut Inuit. Consideration of any economic regions falling within the NSA without Inuit involvement and approval is contrary to the NLCA, which takes precedent over legislation like the NFW Act.

Inuvialuit Settlement Region Recommendations:

Preamble:

These recommendations are provided with the understanding that they are informal submissions and are not the result of a consultation process that took place within the Inuvialuit Settlement Region.

Not enough time and funding were allocated in order to conduct a formal consultation that would be effective, meaningful and culturally appropriate. Section 12(7) the Nuclear Fuel Waste Act states that they shall consult the general public and in particular Aboriginal (Inuit, First Nations, Metis) people. The meeting that has taken place over the past couple of days cannot be considered a consultation under this act.

It is, however, the case that all present at this dialogue feel that an in depth and fully funded consultation consisting of all 6 communities in the Inuvialuit Settlement Region should take place. Those involved in the current dialogue further feel that a full consultation should include all components of Inuvialuit society.

Further, all activities that affect the Inuvialuit Settlement Region must follow the processes outlined by the Inuvialuit Final Agreement prior to commencing.

Therefore, any activities that do not follow these processes are in contravention of the Land Claim and are therefore illegal in nature.

Regarding the subject of the Long-Term Management of Nuclear Fuel Waste, the attendees of this dialogue took the following positions.

- To shut down existing reactors, stop the production of Nuclear Fuel Waste, and stop any continued production of nuclear reactors until a way has been found to dispose of Nuclear Fuel Waste;
- To keep the Nuclear Fuel Waste at the existing reactor sites near the population centers;
- To support the idea of rolling stewardship (decide on the on-site option for the next 200 years and then revisit the issue of the management of Nuclear Fuel Waste at that time);
- To hire unaffiliated and independent scientists to conduct a study on a management approach for the Long-Term Management of Nuclear Fuel Waste;
- To increase research in the area of containment methods (e.g. dry storage containers);
- To increase the information provision on the subject of the Long-Term Management of Nuclear Fuel Waste to the Canadian public (including in the North);
- To organize a tour of a nuclear reactor in order to obtain all available information of the issue. Participants should include representatives from each of the Inuit Land Claims Region.

Option-Specific Recommendations:

1. All three options that were provided to the attendees of this dialogue were considered unacceptable as a method for the Long-Term Management of Nuclear Fuel Waste. However, the option of on-site storage was deemed the most workable at this point in time for the following reasons.
2. Transportation is not required;
3. Transportation represents unacceptable risks that are involved in transportation;
4. Generally, as the fuels cool over the first few hundred years, the danger to the public decreases exponentially.
5. It is generally thought that the transport of radioactive waste poses a much greater danger to the public and the environment than temporary or intermediate on-site storage, using responsible methods.
6. Transportation of waste spreads the risk factor across thousands of miles and hundreds of communities across the country.

Location:

Attendees at this dialogue felt that the current location of the reactor sites and current storage sites (near population centers) is favourable as it ensures that this subject receives the attention that it requires. The removal of these materials to a remote location may not ensure a continued focus by the general public. A continued focus on a possible management method is required in order to decide on how to proceed in the short and long term.

Guardianship:

The nuclear guardianship ethic must guide our choices.

Until a solution is found only the rolling stewardship solution is deemed an acceptable approach.

Each generation has the responsibility to preserve the foundations of life and well-being for those who come after. To produce and abandon substances that damage following generations is morally unacceptable. Given extreme toxicity and longevity of radioactive materials, their production must cease.

As Canadians we have the responsibility to protect our environment and inform the future generations on this subject. Future generations have the right to know about the nuclear legacy bequeathed to them and to protect themselves from it.

Nuclear reactors and weapons production facilities should be permanently closed.

The attendees of this dialogue further stated their opposition to the other two proposed options for the following reason:

These options would require:

- Transporting highly radioactive waste from the site of generation to create new sacrifice areas will not eliminate the problem;
- They are not feasible options as the general Canadian public (north and south, east and west) would not accept the moving of nuclear wastes to one central site (not to have it in their backyards);

It was further stated that the participants of this dialogue that they did not want Nuclear Fuel Waste in the ISR, but that they also did not want to advocate for the materials to be moved anywhere else either.

Nunavik Recommendations:

Preamble:

These recommendations are provided with the understanding that they are informal submissions resulting from a regional dialogue, which took place in Kuujjuak, Nunavik on January 27-28, 2005.

Not enough time and funding were allocated in order to conduct a formal consultation that would be effective, meaningful and culturally appropriate. Section 12(7) the Nuclear Fuel Waste Act states that they shall consult the general public and in particular Aboriginal (Inuit, First Nations, Métis) people. The meeting that has taken place over the past couple of days cannot be considered a consultation under this act.

Attending at this meeting were representatives from the Kativik Environmental Advisory Committee (KEAC); National Inuit Youth Council (NIYC); Nunavik Hunters, Fishers and Trappers Association; KRG; Northern Village of Kuujjuak; Makivik Corporation; and individual community members.

Those present stated their appreciation that ITK had organized this workshop and that ITK staff had ensured that both sides of the issue had been made available to the regional participants of this meeting.

Draft Recommendations:

At this meeting the following was agreed on by those present:

- Attendees could not understand why the question of the disposal/management methods of Nuclear Fuel Waste was posed to this region, as the region neither consumes energy derived from Nuclear Reactors nor produces Nuclear Fuel Waste as a result of the energy production process;
- Although attendees understood that this is an issue of concern to all Canadians, they did not feel that the region should have to shoulder the burden of having to deal with the issue of Nuclear Fuel Waste in any manner;
- None of the options that were presented to attendees contribute to a long-term solution to the nuclear fuel waste problem at the national level. Any decision on which option to pick will be misinterpreted as consent to the nuclear industry's activities on this matter;
- Attendees further stated clearly that they did not want to choose any of the proposed options. Rather they stated that nuclear energy should cease to be produced (and the resulting Nuclear Fuel Waste should not continue to be accumulated) and that focus should be placed on solving the current issue of managing the existing Nuclear Fuel Waste;

- Attendees further stated that an emphasis should be placed on research that would examine alternative and low risk energy sources and that extensive funding should be directed into this area (including energy efficiency research - how to use more efficiently);
- Attendees wanted to further state clearly that they are in direct opposition to any Nuclear Fuel Waste to be stored, disposed of or transported through their territory. They further stated that these materials should also not be stored, disposed of or transported through territories near or adjacent to Nunavik (this includes transportation through the Northwest Passage and other northern routes);
- Attendees further wanted to send a clear message to the Minister (NRCan) and the province of Quebec that they are advocating the discontinuing of the use of energy derived from nuclear reactors (shutting down reactors);
- Attendees felt that the NWMO should be able to consider options (such as the discontinuation of energy derived from nuclear reactors) within a public dialogue process (such as what was proposed by Seaborn panel);
- Attendees are in direct opposition to the reprocessing of Nuclear Fuel Waste in Canada, as it will result in the possible extraction of plutonium;
- Attendees stated that the NWMO's code of ethics should always be kept in mind and to carry that code to the end of this process (in a meaningful manner);
- Attendees further stated that the Government of Canada should maintain its promise to hold public hearings on the question whether nuclear reactors should be shut down or not (as had been intended by Dr. Seaborn);
- Assuming that the nuclear industry doesn't shut down overnight – an impartial and independent organization (not funded by the industry) should direct and conduct a public hearings process on the issue of whether or not nuclear energy should be continued to be used in Canada;
- Attendees recommended that a balanced educational program (using multi-media) on the broad issue of Nuclear Energy (uranium mining, production of nuclear energy, disposal/management of NFW, Environmental and Health impacts of Nuclear Fuel Waste) should be specifically designed for the North and that this program should be initiated across northern Canada. This type of educational program must be designed and conducted by external (from the Gov't), independent agencies and/or National organization (Aboriginal or otherwise).

Attendees at this dialogue hoped that science would solve the problem of the disposal/management of Nuclear Fuel Waste some day. This is, however, not possible today. Until the time until there is a completely satisfactory solution to the problem of Nuclear Fuel Waste, nuclear reactors should be shut down and no more Nuclear Fuel Waste should be generated at this point in time.

Nunatsiavut Comments:

Preamble:

These recommendations are provided with the understanding that they are informal submissions resulting from a regional Inuit dialogue, which took place in Makkovik, Nunatsiavut (Labrador) on February 9–10, 2005.

It was formally stated by the participants of this meeting that it is not recognized as a consultation process, but as an information dialogue. The reasoning for this is that not enough time and funding was allocated to conduct a formal consultation that would be effective, meaningful, and culturally appropriate. Section 12(7) of the Nuclear Fuel Waste Act states that they shall consult the general public and in particular Aboriginal (Inuit, First Nations, Métis) people. The meeting that has taken place over the past couple of days cannot be considered a consultation under this act.

In order for this to be considered a consultation, more time and funding should have been allocated in order to conduct full community consultations in each community in Nunatsiavut.

Some present also stated that it would be very difficult to have recommendations resulting from this dialogue, as there are not enough people present from the region to have a valid set of recommendations as a result. It is not representative.

Comments:

- All present were in opposition to the storage/disposal of Nuclear Fuel Waste in Nunatsiavut and the Canadian Arctic;
- Nuclear Fuel Waste should remain on-site as opposed to moving it into an unpopulated or remote area.
- All present came to agreement that all three of the nuclear waste management options are extremely dangerous. More emphasis should be placed on safety and elimination Nuclear Fuel Waste; however, for the time being this seems the only option available;
- Participants were concerned about the possible risks involved during transport;
- The Government of Canada should in the House of Commons declare that the Arctic is a Nuclear Free Zone; Inuit in Nunatsiavut will be encouraged to contact their MPs to raise the issue in Parliament;
- In addition any lands recognized as Inuit home lands should be included as a Nuclear Free Zone;
- Landuse/use of sea or other environs should be included in a point here!!!
- Statement emerged that both the producers and the consumers should be responsible for the safe storage/disposal of nuclear fuel waste;
- Problems with contaminants already in the system—don't want to add any more;
- Ask the Government of Canada and the producers of waste to put a lot more funding into finding ways of getting rid of the Nuclear Fuel Waste;
- The government should look into the development of alternative energy options;

- More education needs to take place in general as well as within the public school system on the issue of nuclear power and the resulting Nuclear Fuel Waste;
- Need to protect already existing industry and resources that are already present (land, water, animals, environment);
- Those present agreed that the Government should stop calling nuclear energy a clean energy as it results in the production of Nuclear Fuel Waste;
- The nuclear industry should be required to conduct studies using external experts in order to conduct scientific studies into what effects radiation has on human health and the environment when exposure occurs;
- The NWMO should be an independent body—and not led by industry (as outlined by the Seaborn Panel);
- For amount of nuclear waste produced and the amount of electricity produced—what levels/amounts of energy are produced by the use of other energy sources (use of fossil fuel, etc.)—also questioned safety of these approaches (incl. emissions and pollution as a result); comparison studies need to be presented to the public.

Around this table there wasn't consensus as some felt that the nuclear industry should be shut down, whereas others did not feel this way. Their comments were as follows:

- Nuclear Industry should be shut down and should put more emphasis on the Canadian Government and industry to get rid of the tailings and waste;
- Health and safety should be considered before production;
- It was stated that representatives of the nuclear industry should be brought into communities via consultation process, to provide their points of view on this subject.

Final comment:

Inuit are starting to become educated about and aware of the hazards of nuclear waste. However, Inuit would like every community in Canada (with a special focus on Ontario—or on those who use electricity generated by nuclear power) to make a decision for themselves in terms of whether or not to continue with nuclear power; don't want to tell others what to do within their territory. A national education program and full consultations across Canada should take place as opposed to the current dialogue process.

Conclusion

The relationship between Inuit and their environment continues to be a fundamental element of Inuit culture and identity. The environment is integral to Inuit social, cultural and economic development and well-being, to the extent that it is difficult to separate the health of the environment from the health of the people.

As a result it was very important for Inuit to participate in the national dialogue process, which was being conducted by the NWMO on the subject matter of the

Long-Term Management of Nuclear Fuel Waste in Canada. As the storage/disposal of Nuclear Fuel Waste has potential safety, environmental and health implications, participation in this dialogue process represented an important opportunity for Inuit to provide their opinions and feedback to both NRCan and the NWMO on this subject matter; thereby recognizing the importance of the Inuit voice in the ongoing national dialogue process.

Although the National Inuit-Specific Dialogues cannot be considered a formal consultation process with Inuit, consensus was reached by the participants of the four Inuit-Specific Dialogues on the Long-Term Management of Nuclear Fuel Waste on the following items.

- Not enough time and funding were allocated in order to conduct a formal consultation that would be effective, meaningful and culturally appropriate. In section 12(7) the Act states that they shall consult the general public and in particular Aboriginal people. The dialogues, which took place within the four Inuit Land Claims Regions cannot not be considered consultations under this Act.
- Inuit in all four Land Claims Regions stated their complete opposition to the storage of Nuclear Fuel Waste in the Canadian Arctic and specifically speaking, their opposition to the storage of Nuclear Fuel Waste in their Land Claims Regions (which include marine areas and aerospace).
- The participants at each of the four Inuit-Specific Dialogues further stated their complete opposition to the storage/disposal and transport of Nuclear Fuel Waste in areas adjacent to Inuit owned lands (Nunavut, Inuvialuit Settlement Region, Nunavik and Nunatsiavut), Inuit co-managed lands and land governed by Inuit Land Claim Agreements.
- As Aboriginal Canadians, Inuit are also in opposition to the storage/disposal of Nuclear Fuel Waste anywhere else within Canada and insist that Nuclear Fuel Waste should remain on the site of existing nuclear reactors. The reason for this stance is that although Inuit directly oppose the storage/disposal/transport of Nuclear Fuel Waste on the “said lands,” Inuit as Canadians also do not advocate that Nuclear Fuel Waste should be stored on any new sites.
- A follow-up process must take place in order for these dialogues to conclude effectively;
- Decision-making structures that may be initiated with regards to the implementation of a final management approach for the disposal/storage of Nuclear Fuel Waste, must include that mechanisms for direct community involvement are implemented and that potentially affected communities have the right to refuse to host a Nuclear Fuel Waste disposal/storage site;
- As Secondary Wastes (materials exposed to radiation within nuclear power plants) are also hazardous to human and environmental health, these wastes must be included when addressing the issue of the Long-Term Management of Nuclear Fuel Waste in Canada;

- As there will be a need to communicate the results from the Government of Canada reports to the Inuit Land Claims Regions, an Inuktitut/English terminology dictionary must be developed in order to facilitate the information distribution and translation of materials regarding the subject of the Long-Term Management of Nuclear Fuel Waste in Canada;
- Inuit encourage the honest and accurate disclosure of the true costs associated with the Nuclear Industry (development of technologies/costs of management methods) and where/to what degree these costs are passed on to the general public;
- The Nuclear Industry should in no way interpret the findings contained within the feedback provided by Inuit as an encouragement or acceptance of an increase in the production of nuclear energy and the subsequent production of Nuclear Fuel Waste;
- The Government of Canada must take the necessary steps to conduct research and develop alternative energy sources in Canada.

In conclusion the participants of the National Inuit-Specific Dialogues on the Long-Term Management of Nuclear Fuel Waste in Canada stated that the production of nuclear energy and the subsequent problem of the Long-Term Management of Nuclear Fuel Waste in Canada represent a volatile issue that will continue to be present in 30 years, 60 years or in 300 years. It was further stated that the production of nuclear energy was initiated without a thought towards a means of disposing of the inevitable and highly toxic byproduct of Nuclear Fuel Waste. As such it represents a very serious waste problem, which goes against Inuit ethics with regards to environmental protection and the inseparability of environmental and human health.

As such it is important to emphasize that environmental protection in the Canadian Arctic is of utmost concern to Inuit and that as Aboriginal Canadians, Inuit consider the implications of additional locations for the storage or disposal of Nuclear Fuel Waste a very serious problem to all Canadians.

Recommendations/Comments on Alternative Energy Sources in Canada:

The subject of renewable energy sources and the need to conduct research into this area by the Canadian Government was discussed at length at each of the four Inuit-Specific Dialogues. During the dialogues which took place in three of the four Inuit land claims regions it was stated that the Government of Canada must take the necessary steps to conduct research and develop alternative energy sources in Canada

with the goal in mind to eventually replace nuclear energy with alternative and clean energy options and to stop the production of Nuclear Fuel Waste.

One region (Nunatsiavut) could, however, not reach consensus on this matter. As a result their feedback regarding this matter contains two sets of comments. The initial set of comments included an emphasis on the conducting of research on alternative energy sources, but it did not include any comments regarding the elimination of nuclear reactors as sources of energy. The secondary set of comments, however, advocated that the Nuclear Industry in Canada should be shut down and that more emphasis should be placed on the Canadian Government and Industry to eliminate the production of Nuclear Fuel Waste in Canada.

**Appendix A: Expert Presenters for the National
Inuit-Specific Dialogues on the Long-Term
Management of Nuclear Fuel Waste in Canada**

Expert Presenters for the four Regional Inuit-Specific Dialogues on the Long-Term Management of Nuclear Fuel Waste in Canada

Name	Organization	Location of Presentations
Jo-Ann Facella	Program Manager, Nuclear Waste Management Organization (NWMO)	Iqaluit, Nunavut
Tony Hodge	Senior Advisor, Nuclear Waste Management Organization (NWMO)	Inuvik, Inuvialuit Settlement Region
Michael Krizanc	Communication Manager, Nuclear Waste Management Organizations (NWMO)	Kuujuak, Nunavik; Makkovik, Nunatsiavut
Dr. Gordon Edwards	Coalition for Nuclear Responsibility	Iqaluit, Nunavut; Inuvik, Inuvialuit Settlement Region; Kuujuak, Nunavik; Makkovik, Nunatsiavut
Robert Del Tredici	Atomic Photographers' Guild	Iqaluit, Nunavut; Inuvik, Inuvialuit Settlement Region; Kuujuak, Nunavik; Makkovik, Nunatsiavut

Appendix B: Expectations and Comments by the Participants

Expectations and Comments by the Participants:

After introducing themselves, participants stated their expectations for the session. Most participants said they had come for the following information:

- Long-term effects of storage;
- Effects on Nunavut;
- Impacts on the environment;
- Impacts on wildlife;
- Degree of safety associated with storage;
- Proposed storage location(s);
- Proposed storage method(s);
- Existing plans;
- Storage of Nuclear Fuel Waste in light of current gold mining development;
- Locations where Nuclear Fuel Waste is currently stored;
- Existing research, including who conducted the research.

In order to ascertain the level of understanding within the room at the meeting which took place in Inuvik, Inuvialuit Settlement Region, one participant asked the others that were present if they knew why they were asked to attend. This question received the following responses:

- The government is asking to store nuclear waste in the North.
- The Act sounds as though a site with a large Aboriginal population has been chosen.
- This is reminiscent of past issues surrounding oil and gas.
- Nuclear makes people think of war.
- It does not seem a good idea to fill in the questionnaire.
- Having seen the results of industry, why would Northerners want something like this on their land?
- Is that how southerners regard the North—a place to dump garbage?
- The group should send a message that it does not want the waste in the North.

These responses were indicative of the fact that no information on the subject of the Long-Term Management of Nuclear Fuel Waste had been made available to the region generally speaking prior to the commencement of these dialogues. ITK had circulated educational information, but the region generally speaking had not been informed by either the Government of Canada or the NWMO.

Additional Comments Included the Following:

Nunavut:

1. One participant said that he was present to state that Inuit would not allow storage of Nuclear Fuel Waste on their land. Another participant pointed out that a 1997 NTI resolution strongly opposed storage and transport of nuclear goods in Nunavut. A representative from the Nunavut Planning Commission (NPC) noted that storage of Nuclear Fuel Waste comes under the aegis of NPC, with Article 11 of the 1993 NLCA concerning land use planning. She expressed the NPC's interest in hearing about proposed sites, as well as perspectives of other countries and participants at this session, with a view to progressing toward a community consultation.

Inuvialuit Settlement Region:

2. A participant asked why the Gwich'in are not at the table since they share many Northern lands and have an important perspective. Kneen said these are Inuit-specific dialogues organized by ITK; the Assembly of First Nations will hold dialogues with the Gwich'in. There are currently three dialogues, one for Métis, one for First Nations, and one for Inuit.
3. Members of the group asked if there was a connection between DEW Line sites, nuclear submarines, and the Long-Term Management of Nuclear Fuel Waste.
4. One participant said he had come to the meeting to learn about buried waste in the North. Buried waste in Greenland remained top secret for a long time. "What I want to know is—where was DEW Line waste buried? Was some of it nuclear?" He said he hoped to get such information from this meeting. Events in Greenland give the Inuvialuit and other Northerners a perspective on what could lie beneath. Without first having information, it is not possible to react to this issue.
5. On the issue of nuclear submarines, one participant noted that abandoned submarines are already leading to severe environmental damage in Russia. "Everything will end up in the North at some point," he said.

Nunavik:

1. One participant stated that his goal was to get more information on a potential regional environmental concern and his hope was that Inuit could have input. Other participants anticipated asking constructive questions, while gaining an understanding of the issue and providing recommendations.

Nunatsiavut:

2. A participant from the Labrador Inuit Association (LIA) said he did not know much about the issue and was interested in learning more because of potential uranium development in Labrador.
3. Another said he had renewed interest in the dialogues because he suspected they are actually about uranium mining rather than Nuclear Fuel Waste.
4. A third said his interest came from the point of view of exploration and of a worker at the local fish plant.
5. Another said she was interested because environmental health is one of her responsibilities.
6. Other participants said they were attending to learn as much as they could.

Appendix C: Presentations

Presentations:

ITK:

Soha Kneen, National Coordinator of the National Inuit-Specific Dialogues on the Long-Term Management of Nuclear Fuel Waste in Canada began this segment of the two-day dialogues by stating that ITK does not endorse any of the proposed approaches to Nuclear Fuel Waste management. Rather, these meetings were intended to provide Inuit with information on the issue of the Long-Term Management of Nuclear Fuel Waste, as well as to ensure that Inuit can have a voice in the dialogue process, which is taking place within Canada (both in Canada's South and its North) at this point in time. She further stated that all suggestions made at this dialogue will be included in the resulting report and recommendations.

Kneen then began her presentation by stating that according to the available documentation, the *Nuclear Fuel Waste Act* of November 2002 represented a significant achievement by Canada regarding responsibility for Nuclear Fuel Waste. The Act was founded on consultation with stakeholders, including several policy communications by the Government of Canada in 1996 and 1998, but had no significant consultation with Aboriginal people. In its 1998 response to the Seaborn Panel, the Government of Canada promised to undertake a particular process with Aboriginal people. This Inuit-specific dialogue is part of that commitment.

In discussions with the NWMO and Natural Resources Canada (NRCan) on how to include Inuit in this process, ITK had suggested a comprehensive dialogue. ITK said it was important that Inuit express their opinions in a culturally meaningful way that takes into account the remoteness of communities as well as language needs. In the past, Inuit have opposed the storage or disposal of Nuclear Fuel Waste in the Arctic because of transboundary and other considerations. As part of the current Canada-wide dialogue process, ITK had proposed a three-year Inuit-Specific National Dialogue, which is now nearing its end. This Inuit-Specific Dialogue would culminate in a comprehensive report that includes Inuit opinions on social, economic, environmental, and ethical considerations in the storage of Nuclear Fuel Waste. The report is intended to be submitted to the NWMO by June 30, 2005 and will be included in their recommendations to the Minister of NRCan on November 15, 2005.

Kneen elaborated on the objective of the current national dialogue process as one that focused on the provision of information to Inuit, as well as to enable Inuit in the four Inuit land claims regions to have a voice in the National Dialogue Process that was currently taking place regarding the issue of the Long-Term Management of Nuclear Fuel Waste in Canada. These dialogues, which have been taking place over the past four months, were further intended to assist Inuit to strengthen organizational capacity, acquire knowledge on matters related to Nuclear Fuel Waste, and develop communications with the Government of Canada.

Kneen continued by outlining that the *Nuclear Fuel Waste (NFW) Act* was, according to information provided by the Nuclear Waste Management Organization (NWMO), developed on the foundations of extensive consultations with the public and

stakeholders between 1996 and 1998. In its response to the Seaborn Panel, the Government of Canada indicated that subsequent public dialogues must be appropriate to different value systems. The NWMO has been in discussion with ITK, the Assembly of First Nations, and the Métis National Organization since 1998 to conduct these dialogues.

In its negotiations with both NRCan and the NWMO, ITK had underlined the importance of Inuit involvement in considering options for the Long-Term Management of Nuclear Fuel Waste and in the subsequent recommendations to the federal Minister of Natural Resources. ITK was successful in using a culturally appropriate process in previous Inuit dialogues on this issue. Even if Inuit will continue to oppose the storage and/or disposal of Nuclear Fuel Waste in their territory, Inuit should still be informed on this issue. Kneen noted the additional risks of trans-boundary contamination and possible transportation of Nuclear Fuel Waste through Inuit territories.

Kneen elaborated on the reasons and objectives of the dialogues, including the encouragement of Inuit dialogue on the issue, the production of a series of reports leading to the final report, capacity development at the local level, and Inuit acquisition of knowledge on this issue. The scope of this dialogue focuses strictly on Long-Term Management of Nuclear Fuel Waste in Canada.

Currently, Nuclear Fuel Waste is stored onsite where it is produced, in either wet or dry storage. The majority of Nuclear Fuel Waste is in Southern Ontario, with much smaller amounts at Chalk River and White Shell. Recalling her visit to the Pickering Nuclear Generating Station, Kneen described large dry storage containers and a facility that appeared safe and well-maintained. In response to a question, Kneen said the dry storage containers were steel-reinforced concrete vessels that were filled with Nuclear Fuel Waste and then welded shut.

Kneen noted the complex nature of the Long-Term Management of Nuclear Fuel Waste. Nuclear Fuel Waste can only be held in dry storage after it spends seven to ten years in wet storage, making it unlikely that there could only be one storage site, especially when waste continues to be produced.

Kneen offered more details on the amount of Nuclear Fuel Waste in Canada. Ontario Power Generation produces 90% of Nuclear Fuel Waste in Canada, New Brunswick Power and Hydro-Québec each produce 4%, and other sources produce considerably less. In 2002, there were 1.7 million bundles of accumulated Nuclear Fuel Waste in Canada—enough to fill three hockey rinks in their entirety. At current levels of power production, this amount will double by 2033.

Kneen further stated that while nuclear reactors are not currently located in or close to Inuit communities, it is possible that nearby territories may be chosen for deep geological burial. She further elaborated on this by stating that the Labrador Inuit Association is opposed to storage and disposal of Nuclear Fuel Waste in its territory and adjacent territories.

Summarizing the three methods of Nuclear Fuel Waste disposal and storage under consideration by the NWMO; deep geological disposal in the Canadian Shield, storage at the reactor site, and centralized storage (either above or below ground), Kneen outlined their advantages and limitations:

- **Storage at the reactor site** has the advantages of being situated in a community already accustomed to the presence of a nuclear facility, having the required science and technology at hand, and not requiring transportation. Its limitations are the need for continuing administrative controls and for storing the waste longer than the functioning of the nuclear power plants, the security issues posed by having sites near water, shifting the focus at these sites from the production of power, and that the reactor sites were not selected for storage considerations.
- **Centralized storage** has the advantages of allowing selection of sites solely on the basis of management, involving fewer security concerns, and having the required science and technology on site. Its limitations are that it requires the experience of and funding for effective and continual controls and administration, the potential contentiousness involved in the identification of a site, and the risks and costs associated with transportation.
- **Deep geological storage** has the advantages of possibly being a permanent solution and of not requiring continuing money and management. Its limitations are that it is not possible to prove that it works and that monitoring the site is more difficult.

Nuclear Waste Management Organization (NWMO):

(The content of this presentation script was largely obtained from the Kuujjuak, Nunavik Dialogue – participant questions and comments are included)

The presentations on behalf of the NWMO were given by three individuals:

Name	Title	Community Presented In
JoAnn Facella	Program Manager, NWMO	Iqaluit, Nunavut
Tony Hodge	Senior Advisor, NWMO	Inuvik, Inuvialuit Settlement Region
Michael Krizanc	Communication Manager, NWMO	Kuujjuak, Nunavik Makkovik, Nunatsiavut

The content of each presentation was quite similar. The one difference between the dialogues held in Iqaluit, Nunavut/Inuvik, Inuvialuit Settlement Region and the ones held in Kuujjuak, Nunavik/Makkovik, Nunatsiavut were that the 17 minute video, which was included in the latter dialogues was not shown in both Iqaluit and Inuvik.

The NWMO presentations generally began with a 17-minute video (in the latter two Inuit-Specific Dialogues), the second produced by the NWMO. This video provided an overview of the issue, the proposed approaches, and the methods used by the NWMO in comparing and assessing the options.

Following the video, the NWMO representative gave a PowerPoint presentation, explaining that there are 22 nuclear reactors in Canada, five of which are currently in extended shut-down mode. One of the closed reactors in Pickering, Ontario is coming back into production, and two at the Bruce facility may be returning. It was stated that an environmental assessment is underway at Gentilly, Québec, and a government decision will be made on whether to refurbish the reactor. The New Brunswick government will soon decide the future of the Point Lepreau plant. Atomic Energy of Canada Ltd. currently stores used fuel in Manitoba, Ontario, and Québec. Small amounts of used nuclear fuel are also stored at universities across the country.

The used fuel is contained in 1.8 million bundles at seven sites—Pinawa, Chalk River, Bruce, Pickering, Darlington, Gentilly, and Lepreau—as well as the small amounts at universities. The supply amounts to 60,000 tonnes and is half of the eventual total that will be amassed in the lives of the current nuclear reactors. Most of the waste is in Ontario. The first stage—wet storage—lasts seven to 10 years and is followed by a period of dry storage. The dry storage units are designed to last 50 years, although engineers say they could last up to 100 years.

A bundle is about the size of a fire log. It is used in the reactor for 12 to 18 months and during that time, produces power that would supply a household for 100 years.

The NWMO representatives displayed photographs of storage pools and dry storage casks. He described outdoor concrete dry storage silos that are made of reinforced high density concrete, with steel liners and outer shells. Dry-storage silos house four modules, each containing 80 bundles. When full, they are filled with helium and welded shut.

The NFW Act of 2002 required the establishment of the NWMO and its advisory council, whose chair is David Crombie. The NWMO budget—provided by the nuclear industry on the polluter-pay principle—was initially \$550 million and has been increased by \$110 million each year since, for a total of \$770 million by December 2003. The NWMO study must have a financial formula in its recommendations and is required to study three options but may also consider others. The NWMO report is due by November 15, 2005. The federal government must make the final decision based on the approaches studied by the NWMO.

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

The NWMO's recommended management approach must include more than a technical method. It must include an overarching management system with components such as governance, financial surety, monitoring and reporting, a public participation mechanism, dispute management, and research and development. It must also include an implementation strategy.

The NWMO representative outlined the NWMO milestones since its inception. In its conversations with approximately 300 Canadians, the NWMO heard that Canadians want an iterative approach with regular reports. As a result, the study has been

divided into four sections. The NWMO produced its first discussion document in November 2003 outlining 10 key questions concerning the following:

- Institutions and governance
- Full public engagement and participation in decision-making
- Aboriginal values
- Ethical considerations
- Synthesis and continuous learning
- Human health, safety, and well-being
- Security
- Environmental integrity
- Economic viability
- Technical adequacy

The second discussion document was released in the summer of 2004. The third will be the draft report, to be released in the spring of 2005. And the last stage will be the release of the final report in November 2005.

The NWMO's second discussion document moves toward a framework for assessment of the options. Through the values derived from the citizen dialogues, an ethics panel, and information assembled from experts, the NWMO identified eight objectives for an acceptable management approach. Each of the storage options was scored against these eight objectives:

- Fairness
- Public health and safety
- Worker health and safety
- Community well-being
- Security
- Environmental integrity
- Economic viability
- Adaptability

The NWMO representative gave a brief overview of the three technological methods of managing Nuclear Fuel Waste, and their advantages and limitations. Storage at the current nuclear sites would eliminate the transportation element, but would require multiple administrations. Also, this option would not be particularly fair to the affected communities, who did not sign on to permanent involvement with nuclear waste. Deep geological storage, where nuclear waste would be encapsulated in rooms 500 to 1000 meters below ground, has been researched extensively—over \$700 million has been spent on it.

Noting that the Canadian Shield encompasses Nunavik, a participant asked which area of the Shield is being considered. The NWMO representative responded that the study will not propose sites, just a management approach. The selection of a site can only occur after a method is chosen. Site selection will probably not be final for approximately 30 years after the method is chosen. While the legislation's description

of deep geologic disposal is not limited to the Canadian Shield, the current process is not a site selection exercise.

The participant stated that he hoped the objective of fairness would be applied. The NWMO representative responded that involvement of citizens is very important. The DAD (Decide, Announce, and Defend) process is no longer acceptable.

Asked what would happen if the community near a chosen site were to object, The NWMO representative stated that an increasingly important principle is a willing host community. "It would be reasonable to insist that this be part of the siting principle," he said.

Asked if the community would be paid for storing the waste, the NWMO representative stated that the issue would need to be discussed. There may be jobs associated with storage of Nuclear Fuel Waste, and at some point, Nuclear Fuel Waste may be considered a valuable resource. Alternatively, Nuclear Fuel Waste may cause damage, which would lever compensation. The NWMO representative referred to a different but illustrative issue, the talk of financial arrangement for Kincardine, Ontario, with the re-establishment of the Bruce nuclear reactor. He noted that some people have another name for this kind of financial arrangement—a bribe. One other aspect for consideration is that there must be agreement between the owner of material and the community if a material is to be moved. However, the current report will not go that far.

Returning to his presentation, The NWMO representative stated that the remaining milestones are the draft report in the spring of 2005 and the final report by November 15, 2005. The final report will be made public at the same time it is delivered to the Minister of Natural Resources. The comments of the NWMO's advisory council will also be made public at that time. Since the owners of the Nuclear Fuel Waste are paying for the process and comprise the board of directors, an independent advisory council was established to balance and oversee the NWMO's work. The independent advisory council is providing ongoing comments and will make a final comment on whether the NWMO has done its job. The notes from this council's meetings are available regularly on the NWMO's website.

The NWMO representative stated that the NWMO is looking for ITK's thoughts on what to recommend to the government concerning the process, the three methods, the encompassing management system, the criteria to assess the options, and on who should have what responsibility.

Speaking of balancing benefit and risk, a participant said communities should know what they are getting into. There is still a lot of uncertainty in the science. The most likely method—deep geological disposal—has never been tried before. The NWMO representative stated that even the Egyptian pyramids have lasted for a fraction of the life of used nuclear fuel bundles.

A participant enquired about the health of the nuclear workers in the photographs in the NWMO representative's presentation. The NWMO representative stated that the

health of nuclear workers is better than that of the average Canadian, but reminded the group that these workers are well paid and have health plans.

Asked if homes are close to the existing nuclear plants, the NWMO representative stated that the Bruce and New Brunswick plants are in remote areas while the Pickering and Darlington plants are in built-up areas, but within an industrial area.

Returning to the previous discussion of the health of nuclear workers, a participant added that although all Canadians are exposed to some level of radiation, exposures are cumulative and there is no minimum safe level. The NWMO representative referred participants to a paper on the NWMO website from a physicist who argues that some radiation is good for humans and serves as an inoculation to further exposure. The NWMO representative further clarified that he does not advocate this position.

Canadian Coalition for Nuclear Responsibility/Atomic Photographers' Guild

(The content of this presentation script was largely obtained from the Kuujjuak, Nunavik Dialogue – participant questions and comments are included)

Gordon Edwards introduced himself as a teacher of mathematics at Vanier College in Montréal. He said he was shocked when he learned the problems associated with Nuclear Fuel waste. He joined the Canadian Coalition for Nuclear Responsibility in an attempt to demystify the subject and make information available to ordinary people in a language they could understand.

Robert Del Tredici introduced himself as a teacher of photography in Montréal. When he became aware that all aspects of the nuclear era are invisible, he embarked on a process to make them visible.

Edwards and Del Tredici's presentation took the form of a slide show of Del Tredici's photographs with commentary by both men.

Dr. Robert Del Tredici told participants that the effects of radiation and other invisible phenomenon are in reality highly visible. "No technology casts a deeper shadow than nuclear technology," he said, noting that it is time for transparency on the issue.

Dr. Gordon Edwards indicated that he and his colleague were present to explain this complicated technology in words that make sense.

Edwards suggested the first question participants should ask is: "Why are they coming to ask for our opinion?" One answer could be that government and industry do not know what to do with Nuclear Fuel Waste. Edwards said he had been very interested in nuclear technology when he first graduated. Given its reputation as a "clean" source of energy, he had been shocked to learn that nuclear energy produced radioactive waste. He asked why it has taken 30 years to start asking questions about

Nuclear Fuel Waste management. “Why are Canadians being consulted now and not back then?” he asked.

Showing slides of enormous cement silos, the presenters described the process of containing spent nuclear fuel bundles. “Once these bundles come out of the reactor, they are lethal and can kill someone in 20 seconds,” said Del Tredici. Edwards underlined the danger of Nuclear Fuel Waste by relating the difficulty of maintenance work on the reactors. “At Pickering, some reactors have been shut down for seven years, both because of thousands of maintenance problems and the limited time workers can spend in the reactor,” he said.

Del Tredici described the uranium atom—the basic fuel for the fuel bundles—and pointed out its heavy nucleus. As this nucleus is bombarded, it splits and releases energy. When this process is repeated on millions of uranium atoms, a huge flux of energy is produced, resulting in either an explosion (a nuclear bomb) or the production of energy.

One of Del Tredici’s pictures showed a Russian monument dedicated to the splitting of the atom and the “father” of atomic energy. “This split results in new entities—literally the fall-out,” he said. Edwards noted that the term “fall-out” is used after a nuclear explosion but not for the process contained in a nuclear reactor even though the material is the same. It is essential that Nuclear Fuel Waste be kept safe and monitored at all times. Atom splitting results in at least 211 fission products, which are different every time. “These fission products are the waste,” he said. Del Tredici added that fall-out is still “coming down” from nuclear testing done by the United States, China, and Britain. “The fall-out of that testing is considered part of the natural background radiation,” Edwards explained.

The speakers turned to the human toll from radiation exposure. An American marine, who was exposed at close range to an underwater nuclear explosion, suffered from multiple cancers. Only after his death did the lawsuits he had repeatedly launched while alive succeed in modest compensation for his wife.

Edwards explained that exposure to low levels of radiation may take years to manifest. While some body cells will be immediately killed, others will be permanently damaged and perhaps lead to cancers and blood disease. In children, low levels of radiation exposure have been linked to mental retardation. “Some say some radiation is good for you but all scientific evidence points to the probable fact that there is no safe level,” Edwards said. However, the effects of radiation are difficult to prove without extremely expensive studies of an entire population.

Del Tredici said high rates of tumors, stillbirths, and other serious health problems in St. George, Utah were linked to the Nevada nuclear bomb test site, yet the suit against the United States government was overturned and no compensation was paid. Edwards underlined the common element in these cases: the government told the population not to worry. The problem, Edwards restated, is the time delay of up to 20 years. “Workers feel fine on the job but once they retire, health problems appear,” he said.

Canada is the biggest exporter of uranium and prior to the 1960s all of it went to the United States bomb program. “Here is the problem with the transparency of the nuclear industry,” Edwards said. There is no clear history of Canada’s nuclear involvement and the nuclear industry that could provide answers to such questions has failed to do so. “Did they know of the dangers and go ahead anyway?” Edwards asked. The Canadian Coalition for Nuclear Responsibility knows the answer to this question but the NWMO does not address these points.

Switching the focus to uranium mining, Edwards recounted the tragedy of the Dene mine workers at Port Radium who carried burlap sacks of crushed uranium ore on their backs, unknowingly breathing in radioactive particles. Deline, on the shores of Great Bear Lake (Sahtu), otherwise known as the “Village of Widows,” lost many of its men to cancers as a result. The mine workers were not told two key things: handling the crushed ore would be dangerous to their health and the uranium would be used to create bombs. The relationship between the nuclear industry and the military has led to the mystery and secrecy that still abound even though the dangers of radiation have been known since as early as 1931. The dangers to human health were relayed to government workers who assayed the uranium ore but not to the Dene miners.

Although alpha radiation is a very weak form of radiation easily stopped by a sheet of paper, its inhalation can seriously damage lung tissue cells. Referencing a picture of a radiograph, Edwards noted the pulses of radiation that are given off in affected lung tissue. Even though only a small number of cells are damaged, it is sufficient for the onset of cancer. In the U.S., the Surgeon General has identified home radiation (from radon) as the second most important cause of lung cancer. Edwards noted that the nuclear industry sometimes uses the argument of background radiation for justification to double exposure. “While it’s true that it’s natural, it doesn’t mean you should add to the risk,” he said.

Uranium mine tailings present another serious environmental and health concern. Although the original ore is gone, the same amount of radiation remains and is generally uncontained. This has been acknowledged by industry and a government committee that studied the issue, recommending that uranium mining be halted until a solution is found for high level wastes. Edwards noted that while radioactive tailings have not nearly been given the same attention as high level waste, it remains a serious concern for its ease of entering the food chain. “Why is the NWMO not dealing with all types of waste?” he asked.

In a subsequent overview of Canada’s inventory of radioactive waste, Del Tredici and Edwards wondered why discussions of Nuclear Fuel Waste management have not included the notion of stopping its production.

Edwards then turned to the options for Nuclear Fuel Waste management under discussion. He noted the difficulty of safeguarding dry storage containers in the context of radioactive half lives of thousands of years. “We have never safely disposed of anything,” he said. Even if an underground Nuclear Fuel Waste repository was built, complete with signs warning of the health and environmental

dangers, there is no guarantee that the language would still be understood in a thousand or ten thousand years. The fundamental question remains: Why are we producing this stuff? "It's a very complicated and dangerous way to boil water for the steam, which turns the turbines that produce electricity," said Del Tredici.

Reactors are intended to operate for approximately 30 years. The high maintenance and renovation price tag begs the question: Are they worth refurbishing? Renovations are costly because of the radiation danger and unexpected problem, with renovations to Pickering Unit Four costing \$1.4 billion. Despite the costs, the great attraction to nuclear production persists. Where else can one find such a tremendous concentration of energy in such a small pellet? Nuclear energy sounds like a good idea, so clean and well-safeguarded, but problems arise from its usage. "You have accepted an eternal commitment to look after the waste," Edwards said. The nuclear industry has failed in its responsibility to inform the public by perceiving major technical problems as a public relations problem.

The contamination of the food chain in Lapland from the fall-out of the Chernobyl plant disaster has shown that long-range transport is a serious concern. This release is more important than the original explosion. In reply to a question about the monitoring of the Chernobyl reactor site, Edwards indicated that a sarcophagus protects the melted core. International financial aid is being sought to maintain this protective structure.

Displaying a picture of wet storage, Edwards indicated that 14 feet of water is needed to cool the radioactive bundles. "The heat generated by the spent fuel bundles needs to escape; if the waste was sealed it would be very dangerous," he explained. Dry storage containers are necessarily large because the walls have to be thick enough to contain the radioactivity. Del Tredici noted that similar dry storage containers would be used for centralized storage. "Would this really be a simplification?" he asked.

The third option, underground storage, has problems as well. Del Tredici referred to a test shaft in Manitoba that runs one-quarter of a mile into ancient granite. No one can predict what would happen if Nuclear Fuel Waste was stored in rock containing millions of hairline fractures created by drilling the shaft. The concern is with the fracture zones. Furthermore, there is no doubt that such shafts would fill with water, which would then seep into fracture zones. "How can you restore the original integrity of the rock?" Edwards asked. There is no guarantee that this management option would work, and failure would be disastrous.

Reprocessing uranium brings its own dangers. Del Tredici noted that the amount of waste produced from reprocessing multiplies with the use of corrosive acids. The extracted plutonium is useful for only one thing: nuclear weapons production. Edwards suggested that plutonium is the reason countries want nuclear reactors. Canada's gift of a nuclear reactor to India was never used to generate electricity but was used to produce India's first nuclear bomb.

Edwards noted that the Government of Canada has never passed a law forbidding uranium reprocessing. "They have always kept that door open," he said. The suggestion that Nuclear Fuel Waste is a valuable resource can only refer to its

capacity to be reprocessed into plutonium. The very fact that plutonium gives off alpha radiation while still being relatively safe to handle creates a significant safety issue.

Del Tredici showed a picture of the Hanford nuclear reprocessing storage site in the United States. Millions of gallons of contaminated acid have leaked into the ground causing serious environmental problems. It is immensely difficult to manage this reprocessing waste and the plutonium produced.

A community that accepted Nuclear Fuel Waste in an underground repository or centralized storage would be faced with the possibility of future reprocessing for plutonium and further environmental and security problems. "Shouldn't this be more overtly on the table?" asked Edwards.

Reprocessing of uranium has left its mark in Russia, said Del Tredici. For many years, radioactive liquid waste was dumped directly into a river upstream from Tartar villages. "They have been living with it unknowingly and now that they know about the contamination there is little they can do about it," he said.

Edwards noted that the uncertainty of underground storage is the very problem. "The evidence will come when it's too late," he said.

The question of whether or not it is responsible to store Nuclear Fuel Waste in an irretrievable process remains controversial. "It is arrogant to think that we have a solution and can determine Nuclear Fuel Waste management for future generations," Edwards said. There is no perfect solution and, furthermore, there is no known solution. "We are being asked to choose one of three management options. Are these the only options?" asked Edwards.

Del Tredici showed a photo of the Hiroshima peace bell to suggest that Canadians should not simply be accepting this situation. There is at least one more option: stopping the production of Nuclear Fuel Waste in the first place. Only then can Canadians talk about securely storing the waste.

Edwards contrasted this dialogue process with Sweden's national debate on the issue. The Swedish government provided money to different citizen's groups to educate themselves on the Nuclear Fuel Waste issue. A subsequent referendum determined that nuclear power should be phased out. Similarly, Germany and Belgium are phasing out their nuclear reactors. The question of nuclear reactor phase-out in Canada clearly is not on the table and is not part of the NWMO's mandate. Edwards suggested the Government of Canada and the nuclear industry are determined to continue with nuclear power production.

Edwards questioned the validity of the three options being presented to Canadians. Onsite storage is not a long-term solution if Nuclear Fuel Waste is going to be produced indefinitely. Furthermore, all nuclear reactor sites are located near bodies of water, with the potential for serious environmental problems. Despite sounding like it implies one storage site for the country, centralized storage would actually involve at least eight sites—one centralized location plus the seven current and any new reactor

sites. Another important question is if Canada's trade in nuclear reactors opens up the possibility of importing nuclear fuel waste.

Edwards suggested that any option Canadians choose will be interpreted as an endorsement to continue with nuclear production. "I believe that, eventually, they want to put Nuclear Fuel Waste underground and that the other options are just phases in that direction," said Edwards. The one positive thing about this dialoguing process is that for the first time people are hearing about Nuclear Fuel Waste and are being asked for their opinion. The NWMO has done a much better job of presenting the information than has the nuclear industry in the past.

In closing, Edwards clarified an earlier comment on the Seaborn Panel. Contrary to the claim that the Seaborn Panel said Nuclear Fuel Waste management options are safe but not publicly acceptable, the Panel said broad public support is required and safety is only one part of acceptability. Technical acceptability goes in hand with societal acceptability.

Appendix D: NTI Resolution

NUNA VUT TUNNGA VIK INCORPORATED

BOARD OF DIRECTORS

Arviat, N. W. T.

August 26 to 28, 1997

Resolution No.: B97/08-24

*Re: Storage of Nuclear
Material In Greenland*

Moved by: James Eetoolook

Seconded by: Larry Audlaluk

WHEREAS there are reports that the Premier of Greenland is giving serious consideration to a plan to store weapons grade nuclear waste and other nuclear material from Russia and the United States in Greenland;

AND WHEREAS Rand Unrestricted Draft Series data posted on the Internet as "A Concept for Strategic Material Accelerated Removal Talks {SMART} "Debat om Thule Air Base; "Atom-fængsel" i Grønland" gives considerable detail on this nuclear proposal;

AND WHEREAS Rand estimates the material involved could be enough to manufacture about 100,000 nuclear warheads;

AND WHEREAS in addition to Greenland, other circumpolar locations including Canada, Iceland, and Northern Scandinavia could be under consideration;

AND WHEREAS the U.S. airbase at Thule, Greenland is cited as the most favorable location by the designers of the project proposal;

AND WHEREAS the transport of hazardous materials to or from the proposed Thule site could threaten people, lands or waters protected under the Nunavut Land Claims Agreement;

AND WHEREAS concern has been expressed to NTI by residents of Grise Fiord, N.W.T., a community which is relatively close to Thule;

AND WHEREAS: NTI is opposed to the storage of nuclear and other hazardous materials in the arctic;

NUNA VUT TUNNGA VIK INCORPORATED

BOARD OF DIRECTORS

Arviat, N.W.T.

August 26 to 28, 1997

AND WHEREAS NTI has already conveyed its strong concerns about this matter directly to the President of the Inuit Circumpolar Conference and requested that he convey the matter to the Premier of Greenland;

THEREFORE BE IT RESOVED that NTI voice its opposition to any plans for the storage of nuclear goods, or the transportation of such goods in the Arctic.

AND BE IT FURTHER RESOLVED that NTI take steps to notify representatives of governments and organizations involved in any such planning of our strong opposition to such plans.

In favour: 9
Against: 0
Abstentions: 0

CARRIED Date of Vote: August 28, 1997

Appendix E: ICC Resolution (June 1977)

ICC Resolution (June 1977):

RESOLUTION 77-11 (Concerning peaceful and safe uses of the Arctic Circumpolar Zone)

RECOGNIZING that it is in the interest of all circumpolar people that the Arctic shall continue forever to be used exclusively for peaceful and environmentally safe purposes and shall not become the scene or object of human conflict or discord; and

ACKNOWLEDGING the emphatic contributions to scientific knowledge resulting from a cooperative spirit in scientific investigations of the Arctic;

NOW, THEREFORE, BE IT RESOLVED:

- (a) that the Arctic shall be used for peaceful and environmentally safe purposes only, and that there shall be prohibited any measure of a military nature such as the establishment of military bases and fortifications, the carrying out of military maneuvers, and the testing of any type of weapon, and/or the disposition of any type of chemical, biological or nuclear waste, and/or other waste. Further, present wastes be removed from the Arctic;
- (b) that a moratorium be called on emplacement of nuclear weapons; and
- (c) that all steps be taken to promote the objectives in the above mentioned.

Appendix F: Acronyms

AECL	Atomic Energy of Canada Ltd.
HTC	Hunters and Trappers Committee
ICC	Inuit Circumpolar Conference
IRC	Inuvialuit Regional Corporation
ISR	Inuvialuit Settlement Region
ITK	Inuit Tapiriit Kanatami
LIA	Labrador Inuit Association
NIRB	Nunavut Impact Review Board
NFW Act	Nuclear Fuel Waste Act
NIYC	National Inuit Youth Council
NLCA	Nunavut Land Claims Agreement
NPC	Nunavut Planning Commission
NRCan	Natural Resources Canada
NTI	Nunavut Tunngavik Inc.
NWMO	Nuclear Fuel Waste Management Organization

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 INUIT TAPIRIIT KANATAMI

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 ᐃᓂᐃᑦ ᐃᓂᐃᑦ ᐃᓂᐃᑦ

የኮሎኒያል ባንክ ለግብርና እና የግብርና ልማት ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር ለግብርና እና የግብርና ልማት ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር
 ለዲፕሎማሲያዊ ግብይት ሚኒስቴር ለግብርና እና የግብርና ልማት ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር

ቀበሌ	በግ ለህጋዊ ማዘጋጀት	ሚጠይቅ
የግብርና ሚኒስቴር	ለግብርና ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር	ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር
ግብርና ሚኒስቴር	ለግብርና ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር	ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር
ለግብርና ሚኒስቴር	ለግብርና ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር	ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር
ለግብርና ሚኒስቴር	ለግብርና ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር	ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር
ለግብርና ሚኒስቴር	ለግብርና ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር	ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር
ለግብርና ሚኒስቴር	ለግብርና ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር	ለግብርና ሚኒስቴር ለዲፕሎማሲያዊ ግብይት ሚኒስቴር

▷▷J◁ ▷

C'sd▷▷L▷C ◁L ▷'b▷'▷▷C

bNL▷σC

ላላዊ ልዩ ስርዓት ለማሳደግ ይኖርብናል።

ግብፅ:

1. ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል። ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል። ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል።

ሌሎች:

- 2. ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል። ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል።
- 3. ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል። ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል።
- 4. ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል። ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል።
- 5. ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል። ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል።

ግብፅ:

1. ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል። ለሰርዓት ለማሳደግ ለሌሎች ሰርዓት ለማሳደግ ይኖርብናል።

መረጃ:

2. መረጃውን ለማወቅ ለማድረግ ከገለጹት ዓይነቶች መካከል የትኩረት መስጠት በሚችል የሆኑትን ዘዴዎች ይወስኑ። መረጃውን ለማወቅ የሚያገለግሉት ዓይነቶችም ይወስኑ።
3. ለማወቅ ይህ ዓይነት መረጃ የትኩረት መስጠት በሚችል የሆኑትን ዘዴዎች ይወስኑ። ለማወቅ የሚያገለግሉት ዓይነቶችም ይወስኑ።
4. ለማወቅ ይህ ዓይነት መረጃ የትኩረት መስጠት በሚችል የሆኑትን ዘዴዎች ይወስኑ። ለማወቅ የሚያገለግሉት ዓይነቶችም ይወስኑ።
5. ለማወቅ ይህ ዓይነት መረጃ የትኩረት መስጠት በሚችል የሆኑትን ዘዴዎች ይወስኑ። ለማወቅ የሚያገለግሉት ዓይነቶችም ይወስኑ።
6. ለማወቅ ይህ ዓይነት መረጃ የትኩረት መስጠት በሚችል የሆኑትን ዘዴዎች ይወስኑ። ለማወቅ የሚያገለግሉት ዓይነቶችም ይወስኑ።

▷ΔJ◁ ◁

▷^b▷^r▷^c

ፈሮግጥ በባለሥራት ፈላጊነቱን ለማረጋገጥ ይረዳል። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት።

ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት።

ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት።

ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት።

ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት።

ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት። ግልጽ ሆኖ ለሥራ ለማምጣት ግዴታ አለበት።

ክፍል ለጠቅላይ ሚኒስትር ማህተም ማቅረብ ይቻላል። ለዚህም ምሳሌ ለጠቅላይ ሚኒስትር ማህተም ማቅረብ ይቻላል።

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Inuit Tapiriit Kanatami
BOARD OF DIRECTORS MEETING
Resolutions

9 June 2005

Resolution: B05/06/09-09

Re: Nuclear Fuel Waste

Moved: Paul Kaludjak
Seconded: Pita Aatami

WHEREAS the relationship between Inuit and their environment continues to be a fundamental element of Inuit culture and identity;

WHEREAS the environment is integral to Inuit social, cultural and economic development and well-being;

WHEREAS it is difficult to separate the health of the environment from the health of Arctic people;

THEREFORE BE IT RESOLVED THAT the Inuit Tapiriit Kanatami and the four Inuit Land Claim Regions (Nunavut, Inuvialuit Settlement Region, Nunavik, and Nunatsiavut) are in complete opposition to the storage/disposal and transport of Nuclear Fuel Waste in the Canadian Arctic and specifically speaking in the four Land Claims Regions (incl. marine areas and aerospace);

THEREFORE BE IT RESOLVED THAT the Inuit Tapiriit Kanatami and the four Inuit Land Claim Regions (Nunavut, Inuvialuit Settlement Region, Nunavik, and Nunatsiavut) are in complete opposition to the storage/disposal and transport of Nuclear Fuel Waste in areas adjacent to Inuit owned lands, on Inuit co-managed lands and land governed by Inuit Land Claim Agreements;

THEREFORE BE IT RESOLVED THAT the Inuit Tapiriit Kanatami supports the Government of Canada in making the necessary steps to conduct research and develop alternative energy sources in Canada;

THEREFORE BE IT RESOLVED THAT the Inuit Tapiriit Kanatami supports the Government of Canada in encouraging other nations to restrict the transportation of Nuclear Fuel Waste across international boundaries;

THEREFORE BE IT RESOLVED THAT Nuclear Fuel Waste continues to be stored at the existing reactor sites until a way is found to safely dispose of this waste without endangering the environment, human health and safety of all Canadians.

In favour: unanimous
Against: 0
Abstentions: 0

Carried: June 09, 2005

**INFORMATION KIT
FOR THE
NATIONAL INUIT-SPECIFIC DIALOGUE
ON THE
LONG-TERM MANAGEMENT OF NUCLEAR FUEL
WASTE IN CANADA**



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INUIT TAPIRIIT KANATAMI

Sources:

Nuclear Fuel Waste Act
NRCan Power Point Presentation (Dr. Peter Brown, Feb. 24, 2004)
NWMO Discussion Document: Asking the Right Questions
AFN Fact Sheet
<http://www.nucleartourist.com/world/canada.htm>

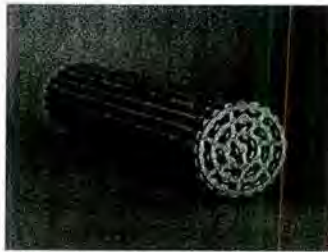
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1.0 BACKGROUND

Commercial production of nuclear power began in Canada when Atomic Energy of Canada Ltd. (AECL) opened the Douglas Point nuclear generating station in 1968. Additional nuclear generating stations were built throughout the 1970's, 80's and 90's. As of 2003, there were 22 licensed CANDU (Canadian Deuterium Uranium) reactors in Canada, that as part of their operations, produce highly radioactive used nuclear fuel waste.

2.0 WHAT IS USED NUCLEAR FUEL WASTE?

Nuclear fuel waste is the used uranium fuel from nuclear reactors, which is used to produce energy. This Nuclear Fuel Waste is contained within irradiated fuel bundles (please see the picture below), which weigh approximately 20 kg each.



NRCAN Power Point Presentation
(Dr. Peter Brown, Feb. 24, 2004)

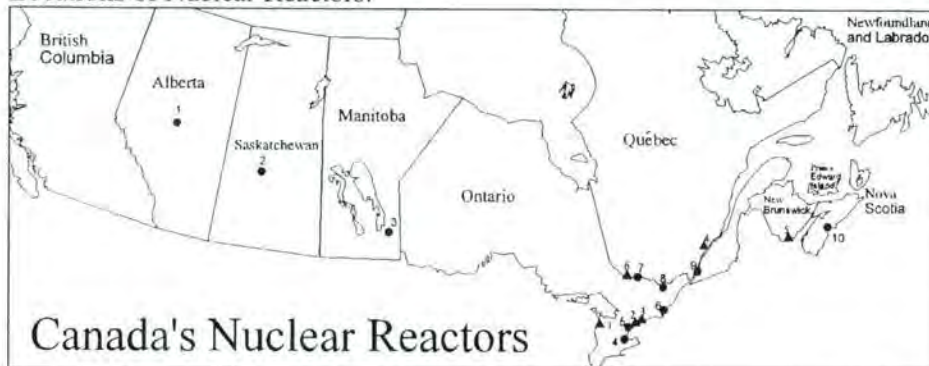
These bundles, she added, are also used in research reactors in universities and in hospitals for making isotopes for medical procedures. The finished bundles are removed from the reactors by robot due to the high levels of heat and radiation. With the hazards of spent fuel continuing for thousands of years, and continuing use of nuclear fuel, the waste will increase many times over. Long term plans for disposal are required for good stewardship.

Because of its radioactivity and toxic properties, nuclear fuel waste is dangerous to human and environmental health.

3.0 WHERE IS USED NUCLEAR FUEL WASTE CURRENTLY STORED?

For the most part, used nuclear fuel waste is currently stored on-site at nuclear generating facilities, either in wet or dry storage. Some waste is also stored at the Chalk River and Whiteshell Laboratories.

Locations of Nuclear Reactors:



On the map, circles represent research reactors; triangles represent commercial facilities
(<http://www.nucleartourist.com/world/canada.htm>).

Locations of Radioactive Waste Sites in Canada:



4.0 WHO PRODUCES NUCLEAR FUEL WASTE?

Nuclear fuel waste is produced by nuclear generating facilities that have been operating since the mid- to late 1970's. Ontario Power Generation is responsible for approximately 90% of the waste, New Brunswick Power for 4%, Hydro-Québec for 4%, and Atomic Energy of Canada Ltd. for 2%. Other waste owners (i.e. universities) produce much smaller quantities of nuclear fuel waste.

5.0 HOW MUCH NUCLEAR FUEL WASTE IS THERE IN CANADA?

As of 2002, approximately 1.7 million used nuclear fuel bundles (approximately 40,000 metric tonnes) have been produced (enough to fill three hockey rinks). At current rates of nuclear power production, 3.6 million used fuel bundles will be produced by 2033.

6.0 HOW LONG DOES NUCLEAR FUEL WASTE REMAIN DANGEROUS?

The radioactivity of substances is measured in half-lives, or the amount of time for the material to lose half of its radioactivity. Waste by-products such as uranium have half-lives as long as 710,000 years.



7.0 MANAGING NUCLEAR FUEL WASTE IN CANADA

The management of nuclear fuel waste in Canada has been a lengthy process and the focus of much debate. A brief overview of the history of nuclear fuel waste management is provided below.

- 1977 – The Hare Commission, contracted by Energy, Mines and Resources Canada, released a report favouring the use of deep geological burial in igneous rock for the management of nuclear fuel waste.
- 1988 – The Minister of Energy, Mines and Resource Canada referred the concept of deep geological disposal to the Minister of Environment for review.
- 1989 – The Seaborn Panel was established to review the concept of deep geological disposal.
- 1996 – Prior to completion of the Seaborn Panel’s work, the Government of Canada released its “Policy Framework for Radioactive Waste Management” where they identified that industry should be responsible for the management of their wastes.
- 1998 – The Seaborn Panel released its report, concluding that “While the safety of the AECL concept has been adequately demonstrated from a technical perspective, from a social perspective it has not.” A key aspect of their report was that it recommended any proposed waste management organization must be at arms length from industry to have credibility.
- 1998 – The Government released its response to the Seaborn Panel’s findings, recommending that industry be responsible for management of its waste.
- 2002 – The Nuclear Fuel Waste Act was passed, requiring the producers of nuclear fuel waste to form a waste management organization (Nuclear Waste Management Organization [NWMO]) to provide recommendations on the long-term management of nuclear fuel waste by November 15, 2005. The Government is responsible for reviewing and approving key NWMO activities.

8.0 THE NUCLEAR FUEL WASTE ACT

The Nuclear Fuel Waste Act (NFWA) came into force on November 15, 2002. This Act is a key to the implementation of the 1996 Policy Framework for Radioactive Waste. Natural Resources Canada is overseeing the NFWA. Important elements of the Act include the following:

- The establishment of the Nuclear Fuel Waste Management Organization (NWMO) is to implement the long-term management of nuclear fuel waste. The major owners of nuclear fuel will establish this organization to deal with the management, finances and operations around nuclear fuel waste.
- The NWMO is required to study the following 3 methods of managing nuclear fuel waste: deep geological disposal in the Canadian Shield, storage at nuclear reactor sites and centralized storage, either above or below ground. Other management options may be considered, at the discretion of the NWMO.

- Major owners of nuclear fuel waste must pay into trust funds to finance the long-term management of nuclear fuel waste.
- The NWMO must consult with the general public, and in particular Aboriginal peoples, on each of the proposed approaches.
- Within three years of the Act, the NWMO must submit a study which includes a detailed technical description of each proposed approach, specifying an economic region for its implementation.
- The Governor in Council (Prime Minister) has the authority to make a decision on the choice of approach for the long-term management of nuclear fuel waste in Canada, to be implemented by the NWMO.
- Each approach must include plans for how the NWMO will minimize effects on a community's way of life.
- The Act requires the NWMO to establish an Advisory Council, who will provide written comments on the study of the proposed approaches.

9.0 INUIT AND NUCLEAR FUEL WASTE

No Inuit communities are currently located close to a nuclear power plant. Some, such as Inuit living in Nunavik (northern Québec), and those residing in Nunatsiavut (Labrador), hold traditional territory in areas that could be considered for the Long-Term storage of Nuclear Fuel Waste. The Labrador Inuit Association (LIA) is, however, opposed to the storage of Nuclear Fuel Wastes in Nunatsiavut and adjacent areas of northern Québec and Labrador.

Depending on the method of management chosen, there is a potential for Inuit communities to be affected. Consideration must also be given to those communities along potential transport routes, should Nuclear Fuel Waste require transportation from the nuclear reactor sites where it is produced to their intended storage facilities.

10.0 THE SEABORN PANEL

The Seaborn Panel was appointed by the Federal Government in 1989 to assess the options regarding the Long-Term Management of Nuclear Fuel Waste in the Canadian Shield.

Some of the concerns expressed by Aboriginal representatives that were present at that time included the following.

- They did not have the opportunity to study the proposal for nuclear fuel waste disposal in the Canadian Shield;
- The proposals do not incorporate Traditional Knowledge;
- The proposals conflict with their deeply held beliefs.

The Seaborn Panel released its final report in 1998, concluding that while the safety of deep geological disposal was demonstrated, the concept did not have the broad public support needed to move forward. One of the Seaborn Panel recommendations was to initiate an Aboriginal participation process. The proposed Nuclear Fuel Waste Act (Bill C-27) was reviewed by two Committees before it became law in 2002.

11.0 RECENT DEVELOPMENTS

The Nuclear Fuel Waste Act came into force in November 2002. In this act, a provision for consultations with the general public and “in particular Aboriginal peoples, on each of the proposed approaches” was included.

12.0 NEXT STEPS

Now that the Nuclear Fuel Waste Act has become law, the Inuit Tapiriit Kanatami (ITK) will begin to play a new role with regards to the Inuit engagement around the Long-Term Management of Nuclear Fuel Waste. Natural Resources Canada and the Nuclear Waste Management Organization have provided funding to ITK to facilitate a three year dialogue on the Long-Term Management of Nuclear Fuel Waste in Canada. Other organizations, including the Assembly of First Nations (AFN), the Métis National Council (MNC) have also received funding for the purpose of conducting these dialogues or consultations.

For more information on the ITK directed dialogue process, please contact ITK’s National Coordinator on the Inuit-Specific Dialogue on the Long-Term Management of Nuclear Fuel Waste in Canada at:

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Environment Department
Inuit Tapiriit Kanatami
510-170 Laurier Ave. W.
Ottawa, ON, K1P 5V5

Ph.: (613) 238-8181, ext. 242
Fax: (613) 233-2116
E-mail: kneen@itk.ca

13.0 PROPOSED DISPOSAL/STORAGE METHODS

13.1 Key Terms:

13.1.1 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

13.1.2 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.

13.1.3 Treatment:

Processes applied to used nuclear fuel that changes 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.

13.1.4 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.

13.2 Outline of 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.

13.2.1 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 agencies²⁹. 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, which 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 eruption³⁰.

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.

13.2.2 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.

13.2.3 Reactor-Site Extended Storage

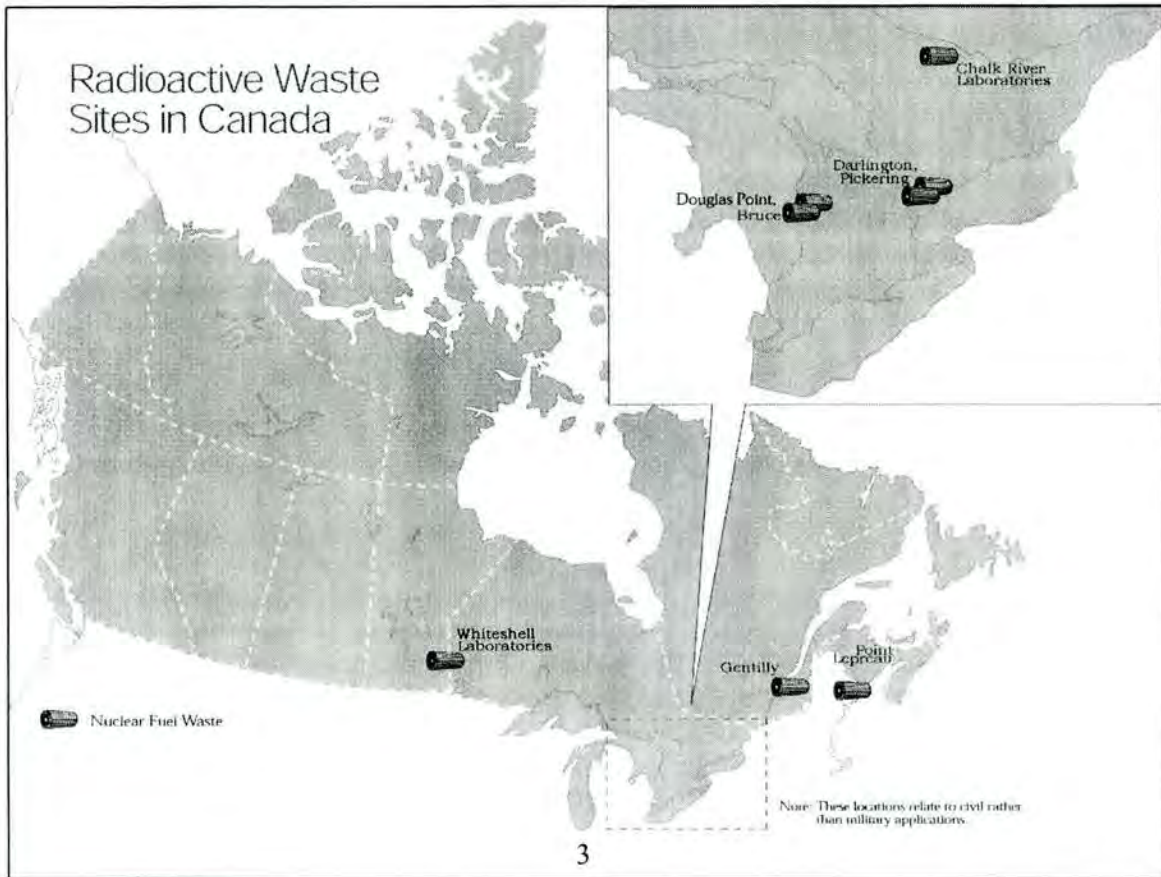
Both above and below-ground storage alternatives are in use today. Additional possibilities could be designed by simply scaling down the designs and costs of the larger versions of centralized facilities. Each site has its own distinguishing characteristics, and many conditions must be factored into 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.

1.0	ለጽሑፍ ማረጋገጫ.....	3
2.0	የጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ).....	3
3.0	ጽሑፍ ማረጋገጫ (ጽሑፍ ማረጋገጫ) ስርዓት (ጽሑፍ ማረጋገጫ).....	3
4.0	የጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ).....	4
5.0	የጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ) ለዘጠኝ ጽሑፍ.....	4
6.0	የጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ) ስርዓት (ጽሑፍ ማረጋገጫ).....	5
7.0	ጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ) ጽሑፍ.....	5
8.0	ስርዓት (ጽሑፍ ማረጋገጫ) ስርዓት (ጽሑፍ ማረጋገጫ) ስርዓት.....	5
9.0	ለጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ).....	6
10.0	ጽሑፍ ማረጋገጫ ስርዓት.....	6
11.0	ጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ).....	7
12.0	የጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ).....	7
13.0	ስርዓት (ጽሑፍ ማረጋገጫ) / ስርዓት (ጽሑፍ ማረጋገጫ).....	8
13.1	ጽሑፍ ማረጋገጫ.....	8
13.1.1	ስርዓት (ጽሑፍ ማረጋገጫ).....	8
13.1.2	ስርዓት (ጽሑፍ ማረጋገጫ).....	8
13.1.3	ጽሑፍ ማረጋገጫ.....	8
13.1.4	ስርዓት (ጽሑፍ ማረጋገጫ) ስርዓት (ጽሑፍ ማረጋገጫ).....	9
13.2	የጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ) / ስርዓት (ጽሑፍ ማረጋገጫ).....	9
13.2.1	ጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ).....	9
13.2.2	ጽሑፍ ማረጋገጫ ስርዓት (ጽሑፍ ማረጋገጫ).....	11
13.2.3	ስርዓት (ጽሑፍ ማረጋገጫ) ስርዓት (ጽሑፍ ማረጋገጫ).....	11

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4.0 ᐅᓂᐃᕐ ᕐᓂᓂᕐᓂᕐᓂᕐᓂᕐ ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐ?

ᐃᑖᕐᓐᓂᕐᓂᕐᓂᕐ ᓐᓂᓂᕐᓂᕐᓂᕐᓂᕐ ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ 1970-ᕐᓂᕐ ᕐᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ. ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ 90-ᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ 4-ᕐᓂᕐ, ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ 4-ᕐᓂᕐ ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ 2-ᕐᓂᕐ. ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ (ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐ) ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ ᓐᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ.

5.0 ᕐᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ ᓐᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ?

2002-ᓂᕐᓂᕐ, 1.7 ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ (40,000 ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ) ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ (ᐃᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ). ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ 3.6-ᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ 2033-ᓂᕐ ᓂᓂᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐᓂᕐ.

ITK Review of the NWMO Discussion Document #1: Asking the Right Questions



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INUIT TAPIIRIT KANATAMI

March 2005

Ottawa, Canada

Introduction

Inuit Tapiriit Kanatami represents Canada's Inuit on matters of national concern. There are approximately 50,000 Inuit living in 53 communities. The Inuit territory of Canada is divided into four main regions: The Nunavut region (further divided into the Kitikmeot, Kivalliq and Qikiqtaaluk regions), the Inuvialuit region (the western Arctic), Nunavik (northern Quebec) and Nunatsiavut (Labrador).

ITK is the national voice of the Inuit of Canada and addresses issues of vital importance to the preservation of Inuit identity, culture and way of life. One of the most important responsibilities of ITK is to promote Inuit rights and to ensure that Inuit are properly informed about issues and events that affect their lives, and that processes purporting to address Inuit interests are properly informed by Inuit knowledge, perspectives and vision.

The ITK Department of Environment has the responsibility of protecting and advancing the place of Canada's Inuit in the use and management of the Arctic environment. It acts on this responsibility in close cooperation with Inuit regional organizations.

ITK's comments on NWMO's Discussion Paper #1 are intended as a supplement to the on-going dialogue with Inuit that has been initiated on the long-term management of nuclear fuel waste in Canada.

Background

Canada's Inuit have a long history of exposure to radionuclides. This history is thoroughly documented in the Canadian Arctic Contaminants Assessment Reports (I & II). Historically, anthropogenic radionuclides in the Canadian north originated from atmospheric testing of nuclear and thermonuclear weapons between 1955 and 1963 and the radioactive fallout from the Chernobyl accident in 1986.

Cesium levels in Arctic biota have generally declined since 1963 and fallout from Chernobyl has imbedded itself in soil and lake sediment. Other possible, yet small, sources include the burning-up of nuclear powered satellites upon re-entry to the atmosphere, discharges from nuclear power plants and reprocessing plants, and nuclear waste dumping directly into the Arctic Ocean. The impact of ocean disposal remains unmeasured.¹

¹ Chris M. Furgal and Robbie Keith, Canadian Arctic Contaminants Assessment Report: Overview and Summary, Northern Perspectives V25 no.2, Winter 1998.

A large portion of the homeland of Canada's Inuit is situated in the Canadian Shield. As a backdrop to ITK's comments is the concern that location, remoteness of communities and small populations, make Inuit and their lands vulnerable as a choice for the siting of nuclear waste disposal facilities. Canada's north is also experiencing a mining boom and a renewed interest in exploring and developing the north's mineral potential, including uranium, increasing the overall sense of vulnerability.

The preliminary results from the Inuit Dialogues draw attention to a fundamental difference in approach to nuclear issues generally – one that has its origins in mandate of the NWMO. ITK understands that the NWMO was not instructed to take a position on the future role of nuclear energy in Canada, but rather to examine options for managing existing and future waste.

However, when seeking to involve and better understand the views of Inuit in this process it is important to know that representatives of the Inuit regions to the Dialogues share the common position that the ultimate goal of any nuclear debate in Canada should be focused on reduction and eventual elimination. Further they agree that Canada's northern region should not be an option for any form of nuclear waste facility, transport or production. Indeed, the Board of Directors of Nunavut Tunngavik Incorporated, the organization created pursuant to the 1993 Nunavut Land Claims Agreement to represent all Inuit beneficiaries in Nunavut, adopted a resolution in 1997 stating its objection to any storage of nuclear or other hazardous materials in the arctic.² ITK has verified that this resolution continues to stand today.

Further, as early as 1977, the Inuit Circumpolar Conference, an organization representing Inuit of the circumpolar region, adopted a resolution concerning peaceful and safe uses of the Arctic Circumpolar Zone, including a prohibition on the disposition of any type of nuclear waste.³

Asking the Right Questions?

ITK has thought long and carefully about how the role of Aboriginal peoples in the NWMO process has been characterized and constructed. This is the starting point for understanding if the right questions have been asked, from an Inuit perspective. The *Nuclear Fuel Waste Act* requires that Aboriginal peoples be consulted in the process for establishing a long-term approach for the management of used nuclear fuel. The NWMO has further refined this instruction by seeking to consider the traditional knowledge and understanding of Aboriginal peoples.

In developing the ten questions set out in this Discussion Paper, the NWMO sought the views of Canadians through a variety of techniques. These included:

² Nunavut Tunngavik Inc., Resolution No. B97/08-24, Arviat

³ Inuit Circumpolar Conference, Resolution 77-11

- **Early Conversations:** We note that the Far North was explicitly excluded from the consultation effort (see report on Discussion Findings, January 2003)
- **Envisioning the Future:** No Inuit involvement in the Scenarios Team. Report by the Global Business Network, November 2003 (we note First Nation involvement)
- **Exploring Concepts:** No Inuit involvement?
- **Alternative Perspectives:** A traditional knowledge workshop was held in September 2003 with Inuit involvement. The purpose of the workshop was to provide Aboriginal peoples with an opportunity to participate in developing guidelines for the management of nuclear waste in Canada.

From ITK's perspective, one of the most important discussions during the Traditional Knowledge Workshop led to the statement: "Recognize that a people's 'world view' can determine sustainable use or environmental degradation'." (pg.9)

Given this, ITK was pleased to see Q-3 as an overarching question. By this, ITK assumes that Inuit (and other aboriginal) perspectives and insights will be sought and will inform consideration of the social, environmental, economic and technical aspects. Having said this, ITK is concerned by the absence of a specific reference to knowledge and information in the question itself. Inuit have far more to offer the process than simply their 'perspectives' and 'insights'. Inuit have detailed information, broad knowledge, and understanding of northern ecosystems. If ever, storage in Canada's northern regions were considered, Inuit would have to be directly involved in assessing the viability of such an option.

ITK does have some concern, however, that Inuit (and other Aboriginal peoples) may be 'compartmentalized' by having identified a separate question attempting to create inclusion. Ideally, one would equally read in 'aboriginal' in all of the other questions. From ITK's perspective, when exploring the other questions, efforts must be made to involve Inuit.

Next, from the perspective of establishing an appropriate context for involving Inuit, the NWMO should also make explicit in this Discussion Paper (and others) that all of the Inuit regions in Canada are covered by land claims agreements protected by Section 35 of the *Constitution Act, 1982*. Each of these agreements set out the rights of Inuit, rules for accessing lands owned by Inuit and the powers and authorities of management institutions for lands, waters and wildlife. Any decision-making process contemplated by the NWMO for these regions must take

into account the particularities of each land claim agreement. These agreements are:

1975	The James Bay and Northern Quebec Agreement (Inuit of Nunavik) ⁴
1984	The Inuvialuit Final Agreement
1993	The Nunavut Land Claims Agreement
2004	The Labrador Inuit Land Claims Agreement

Inuit are not a special interest group. They are the owners of very large tracts of northern lands and are an Aboriginal people with constitutionally protected treaty rights. This sets up a series of requirements and obligations for involvement that go beyond the principles of good public policy.

Finally, very legitimately and importantly, the NWMO is situating its work in the context of other international processes. The rights, roles and authorities of indigenous peoples are also very much part of international processes. For the Inuit of Canada, this has special significance as they have actively participated in various international processes that have application to setting standards how northern lands and resources are used and developed. Of particular note is the work of the Inuit Circumpolar Conference, the Arctic Environmental Protection Strategy, the Arctic Council and the Northern Dimension of Canada's Foreign Policy. ITK urges that the NWMO consider these processes, and the role that Inuit play in each, as it moves forward.

⁴ Negotiations are currently underway to recognize and affirm Nunavik Inuit rights in the offshore areas of Quebec and Labrador and in northern Labrador.

ITK Review of the NWMO Discussion Document #2: Understanding the Choices



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INUIT TAPIIRIT KANATAMI

March 2005

Ottawa, Canada

Introduction

Inuit Tapiriit Kanatami represents Canada's Inuit on matters of national concern. There are approximately 50,000 Inuit living in 53 communities. The Inuit territory of Canada is divided into four main regions: The Nunavut region (further divided into the Kitikmeot, Kivalliq and Qikiqtaaluk regions), the Inuvialuit region (the western Arctic), Nunavik (northern Quebec) and Nunatsiavut (Labrador).

ITK is the national voice of the Inuit of Canada and addresses issues of vital importance to the preservation of Inuit identity, culture and way of life. One of the most important responsibilities of ITK is to promote Inuit rights and to ensure that Inuit are properly informed about issues and events that affect their lives, and that processes purporting to address Inuit interests are properly informed by Inuit knowledge, perspectives and vision.

The ITK Department of Environment has the responsibility of protecting and advancing the place of Canada's Inuit in the use and management of the Arctic environment. It acts on this responsibility in close cooperation with Inuit regional organizations.

ITK's comments on NWMO's Discussion Paper #2 are intended as a supplement to the on-going dialogue with Inuit that has been initiated on the long-term management of nuclear fuel waste in Canada. In commenting on Discussion Paper # 2 it is also important to note that, at this time, ITK is not purporting to present the Inuit view point on the process set out to select the assessment methodology nor its application to the disposal options. ITK is facilitating the Inuit Dialogues, but cannot report on behalf of the Inuit regions in advance of the final results from this process. These comments, therefore, are necessarily limited to the implications of the NWMO having proceeded to the stage of selecting and applying a methodology in the absence of more detailed Inuit input.

Background

Canada's Inuit have a long history of exposure to radionuclides. This history is thoroughly documented in the Canadian Arctic Contaminants Assessment Reports (I & II). Historically, anthropogenic radionuclides in the Canadian north originated from atmospheric testing of nuclear and thermonuclear weapons between 1955 and 1963 and the radioactive fallout from the Chernobyl accident in 1986. Cesium levels in Arctic biota have generally declined since 1963 and fallout from Chernobyl has imbedded itself in soil and lake sediment. Other possible, yet small, sources include the burning-up of nuclear powered satellites upon re-entry to the atmosphere, discharges from nuclear power plants and

reprocessing plants, and nuclear waste dumping directly into the Arctic Ocean. The impact of ocean disposal remains unmeasured.¹

A large portion of the homeland of Canada's Inuit is part of the Canadian Shield. As a backdrop to ITK's comments is the concern that location, remoteness of communities and small populations, make Inuit and their lands vulnerable as a choice for the siting of nuclear waste disposal facilities. Canada's north is also experiencing a mining boom and a renewed interest in exploring and developing the north's mineral potential, including uranium, increasing the overall sense of vulnerability.

The preliminary results from the Inuit dialogues draw attention to a fundamental difference in approach to nuclear issues generally – one that has its origins in mandate of the NWMO. ITK understands that the NWMO was not instructed to take a position on the future role of nuclear energy in Canada, but rather to examine options for managing existing and future waste.

However, when seeking to involve and better understand the views of Inuit in this process it is important to know that representatives of the Inuit regions to the Dialogues share the common position that the ultimate goal of any nuclear debate in Canada should be focused on reduction and eventual elimination. Further they agree that Canada's northern region should not be an option for any form of nuclear waste facility, transport or production. Indeed, the Board of Directors of Nunavut Tunngavik Incorporated, the organization created pursuant to the 1993 Nunavut Land Claims Agreement to represent all Inuit beneficiaries in Nunavut, adopted a resolution in 1997 stating its objection to any storage of nuclear or other hazardous materials in the arctic.² ITK has verified that this resolution continues to stand today.

Further, as early as 1977, the Inuit Circumpolar Conference, an organization representing Inuit of the circumpolar region, adopted a resolution concerning peaceful and safe uses of the Arctic Circumpolar Zone, including a prohibition on the disposition of any type of nuclear waste.³

It is also important to recall, as was discussed in ITK's comments on Discussion Document # 1, that all the Inuit regions are now governed by constitutionally protected land claims. The subject of 'consultation' is an important feature of these treaties. Consultation with Inuit (and other Aboriginal peoples) has been litigated in Canada and legal jurisprudence now exists. We make this point because a very large portion of Canada's Arctic region is covered by Inuit land claims, including large tracts of land owned by Inuit. These treaties create legal obligations and processes that must be respected.

¹ Chris M. Furgal and Robbie Keith, Canadian Arctic Contaminants Assessment Report: Overview and Summary, Northern Perspectives V25 no.2, Winter 1998.

² Nunavut Tunngavik Inc., Resolution No. B97/08-24, Arviat

³ Inuit Circumpolar Conference, Resolution 77-11

For example, in the Labrador Inuit Land Claims Agreement, the most recent of Inuit treaties, consult is a defined term:

"Consult" means to provide:

- (a) to the Person being consulted, notice of a matter to be decided in sufficient form and detail to allow that Person to prepare its views on the matter;
- (b) a reasonable period of time in which the Person being consulted may prepare its views on the matter, and an opportunity to present its views to the Person obliged to consult; and
- (c) full and fair consideration by the Person obliged to consult of any views presented.⁴

Understanding the Choices

In reviewing Discussion Document # 2, as well as the Assessment Team's report, ITK is particularly concerned that the NWMO process is moving forward ahead of the parallel process established to engage Inuit.

While the *Nuclear Fuel Waste Act* sets out a requirement for the NWMO to consult separately with Aboriginal peoples, there remains the question of how the results of these consultations are being incorporated into the broader values being assigned by NWMO to Canadians at large. Discussion Document # 2 sets out six core values, drawn from the National Citizens' Dialogue, that direct the long-term management of used nuclear fuel.

- **Responsibility** – we need to live up to our responsibilities and deal with the problems we create
- **Adaptability** – continuous improvement based on new knowledge
- **Stewardship** – we have a duty to use all resources with care, leaving a sound legacy for future generations
- **Accountability and Transparency** – to rebuild trust
- **Knowledge** – a public good for better decisions now and in the future
- **Inclusion** – the best decisions reflect broad engagement and many perspectives; we all have a role to play

⁴ Labrador Inuit Land Claims Agreement, initialled on August 29th, 2005 by the Inuit, the Government of Canada and the Government of Newfoundland and Labrador, signifying their intent to recommend this agreement for ratification.

The preliminary results of the dialogues with Aboriginal peoples, however, appear to be limited to how traditional knowledge will be included in the development of a long term management approach and to be “responsive to their emphasis on planning within very long time horizons”. There is further engagement that “to the extent that the NWMO is able, these principles [of Aboriginal Traditional Knowledge] will be carried forward as part of the values foundations on which the study will proceed”. These are set as:

- **Honour:** the wisdom that can be garnered from speaking to elders in both the aboriginal and non-aboriginal communities
- **Respect:** the opinions and suggestions of all who take the time to provide insight into this process
- **Conservation:** particularly as it applies to the consumption of electricity, must be a major part of the solution, not just a footnote in the NWMO process
- **Transparency:** is essential to the process when NWMO (the producer of the problem) has to suggest the solution
- **Accountability:** must be part of the fabric of any solution so that those responsible (whether for the concept or the delivery) are held to high account by the public for their actions, given the nature of the problem.

As discussed in ITK’s comments on Discussion Document # 1, there is a risk of isolating Inuit and their values from mainstream Canadian values. This identified risk appears now to have evolved into reality. Discussion Document # 2 makes it clear that the six core values articulated through the National Citizens’ Dialogue, (where recall there was no Inuit involvement) will direct the long-term management of used nuclear fuel.

ITK is currently facilitating Inuit-specific Dialogues and a final report will soon be available. Through this process, Inuit are developing their own policy framework for addressing the management of nuclear fuel waste. It is essential that the NWMO await the results of this process before committing to an option.

Discussion Paper # 2 goes on then to describe the development of a methodology for assessing the various disposal methods based on a set of criteria constructed in the absence of results from the Inuit (and other Aboriginal) Dialogues. It would appear that the NWMO process is moving faster than the parallel processes established for Aboriginal peoples. Nowhere in Discussion Document # 2 is it made clear if and then how these processes will converge.

The Assessment Team that was assembled to select and apply a methodology for rating the selected options did not include any Inuit representation. Nor from our

reading of the “Assessing the Options: Future Management of Used Nuclear Fuel in Canada” were Inuit referred to other than acknowledging that they, as Aboriginal peoples, have a particular role to play in setting establishing public acceptance by providing input into the decision-making process.

From ITK’s perspective, it is important to note the following statements in the Assessment Report, as this report formed the basis for the views presented in Discussion Document #2:

A key characteristic of multi-attribute utility analysis [the selected methodology] is its emphasis on the judgments of the decision-making team that the analysis is intended to serve. This is sometimes interpreted as a weakness, in the sense that applications may appear overly subjective. (pg.21)

To take advantage of all inputs as the foundation for its work, the Assessment Team developed a synthesis of Canadian values drawing from all available inputs including early insights from the Dialogue and the Roundtable on Ethics. (pg.64)

These clarifications on the foundations for the Assessment Report compound our concern over the timing of the parallel processes and if there can be a serious opportunity for the results of the Inuit-specific Dialogues to meaningfully influence the decision-making process.

Later in the Assessment Report, the Objectives Hierarchy developed by the Assessment Team is plotted against the original ten questions from Discussion Document #1. The Assessment Team concluded that Question 3 concerning Aboriginal Values was a generic question that would inform all the objectives. While this is laudable, once again, we are concerned about timing. The only input that the Assessment Team had to work with was the report on the Traditional Knowledge Workshop. While this is a valuable product, from ITK’s perspective it cannot be considered as capturing the full scope for how Inuit should be involved in the decision-making process.

We move on in the Assessment Report to Section 5.6 where the eight objectives are described in more detail. We note with some alarm a statement in Objective 4: Community Well-being:

... Many groups may feel that their shared interests are affected regardless of whether they live physically close to used nuclear fuel management facilities. Depending on the sites that eventually are proposed for consideration, Canada’s Aboriginal peoples may have a particularly significant stake... (pg.71)

As reported in ITK's comments on Discussion Document # 1, Inuit have made it clear they do not want to see nuclear waste disposal facilities in their regions.

The Assessment Report then goes on to describe, in detail, how the assessment methodology was applied and summarizes the results.

Within the limits of the analysis, not only did the deep geological repository generally score better than the other alternatives, but it also generally scored at a level that suggests it will perform well in meeting the eight objectives not only in comparison to the others but also on its own merits, particularly over the long term. The favourable results for the deep geological repository derive largely from advantages realized over the long time period during which any management approach must perform. (pg.105)

Finally, the Assessment Report sets out an implementation scenario "in the event that the Government of Canada agrees with and accepts the deep geological repository as the preferred technical approach."

Our intent in highlighting the Assessment Report is not to critique the report itself. We leave that to others with expertise in assessment and valuation methodologies. Our point is that a group of credible experts was established as an Assessment Team to select and apply an assessment methodology to the three disposal options without the benefit of any formal Inuit input other than ITK's participation in the Traditional Knowledge Workshop.

Discussion Document #2 then goes on to say that the Assessment Team "agreed that the geological repository would create the least adverse community impact. No significant long-term operations are required under a geological repository, making it likely that the facility would be largely forgotten in the long term. (emphasis added). From an Inuit perspective, this is a huge value judgment indicating an absence of sensitivity and understanding for how Inuit value their lands and environment.

Discussion Document #2 then acknowledges that ...

"While the importance of factoring in and addressing the concerns of Aboriginal peoples is recognized in general, and specifically concerning [community well-being], the Assessment Team did not feel capable of anticipating the perspectives of Aboriginal peoples. The perspective of Aboriginal peoples will need to be understood and brought into the assessment in regard to assessment the methods on community well-being, as well as on each of the other objectives identified in this assessment". (pg.64)

The question remains: When and how?

ITK has worked very efficiently, given the shortened timeframe for the Inuit Dialogues. In conducting the Inuit-specific Dialogues, ITK is operating under the assumption that the results will be timely and able to influence adjustments to the framework developed by the Assessment Team. ITK seeks assurance from the NWMO that this will be the case. Otherwise, the commitment to involving Inuit will become a sidebar to decisions already taken.

ITK Review of the NWMO Discussion Document #3: Choosing a Way Forward



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INUIT TAPIRIIT KANATAMI

August 2005

Ottawa, Canada

Introduction

Inuit Tapiriit Kanatami (ITK) represents the Inuit of Canada on matters of national concern. There are approximately 50,000 Inuit living in 53 communities. The Inuit territory of Canada is divided into four main regions: The Nunavut region (further divided into the Kitikmeot, Kivalliq and Qikiqtaaluk regions), the Inuvialuit region (the western Arctic), Nunavik (northern Québec) and Nunatsiavut (Labrador).

ITK is the national voice of the Inuit of Canada and addresses issues of vital importance to the preservation of Inuit identity, culture and way of life. One of the most important responsibilities of ITK is to promote Inuit rights and to ensure that Inuit are properly informed about issues and events that affect their lives, and that processes purporting to address Inuit interests are properly informed by Inuit knowledge, perspectives and vision.

The ITK Department of Environment has the responsibility of protecting and advancing the place of Canadian Inuit in the use and management of the Arctic environment. It acts on this responsibility in close cooperation with Inuit regional organizations.

ITK's comments on the latest NWMO report, "Choosing a Way Forward" are intended to complement our *Final Report on the National Inuit-specific Dialogues on the Long-term Management of Nuclear Waste in Canada* submitted to the NWMO on June 30, 2005.

Further, ITK Resolution B05/06/09-09 adopted unanimously by the ITK Board of Directors on June 9, 2005, continues to state the Inuit's "complete opposition to the storage/disposal and transport of Nuclear Fuel Waste in areas adjacent to Inuit owned lands, on Inuit co-management managed lands and land governed by Inuit Land Claims Agreements". It is important in this regard to note that the Labrador Inuit Land Claims Agreement received Royal Assent on June 23, 2005. With the exception of the offshore area of Nunavik, this completes comprehensive land claims for the Inuit Canada. The Resolution goes on to select what was essentially Option 2 from the Discussion Documents - that is, storing waste at the existing sites "until a way is found to safely dispose of this waste without endangering the environment, human health and safety of all Canadians".

ITK's Response to "Choosing a Way Forward"

The NWMO is seeking input and opinion on a new option that emerged as thinking progressed through the evaluation of the original three options presented in earlier Discussion Documents. This new option is called Adaptive Phased Management and is based on a phased approach to eventual centralized containment of nuclear fuel waste and isolation deep underground.

From ITK's perspective, this option has value as its premise is that used fuel would continue to be stored at nuclear reactor sites until results from Phase I and Phase 2 research, analysis and consultation were obtained. This carries with it the assumption

that there would be no Phase 2 - interim shallow underground storage, or a Phase 3 - long-term deep centralized storage unless this was proven technically feasible and socially acceptable. Generally, this conforms to the position adopted by our Board of Directors.

Having said that, the siting criteria established for this option is also of interest to ITK. Choosing a Way Forward states..."we believe that fairness would best be achieved if the site selection process is focused within the provinces that are directly involved in the nuclear fuel cycle - namely Ontario, New Brunswick, Québec and Saskatchewan". With the exception of Québec, this effectively excludes the Inuit regions.¹

The Report then further sets out another important criteria, that a willing host community is found. In this regard, it is clear that Inuit communities, including those in Nunavik (northern Québec) would not satisfy this criteria.

A further consideration, which serves to diminish interest in the Inuit regions, is the limit on transportation options. The operation of a centralized facility requires that fuel from existing reactor sites be transported and that an emergency response plan is developed. The lack of road or rail infrastructure in most Inuit regions and the degree of risk associated with sea or air transport combine to further discount the North as a suitable region. These same factors would make the development of satisfactory emergency response plans very unlikely.

ITK in no way wishes to appear to be advocating that the challenges be simply shifted to other regions and withdraw from the discussions. That would not be responsible. Rather, having read the report with care, we have noted that the NWMO process itself is coming to a conclusion that the North is not a suitable location for long-term storage. We also refer to the map on page 161 of the Report where the siting criteria associated with the Adaptive Phased Management Approach have been applied. Here too, with the exception of Nunavik, the Inuit regions have been totally excluded.

That being said, it is important to remind NWMO of one of the conclusions stated in the *Final Report on the National Inuit -Specific Dialogues on the Long-Term Management of Nuclear Waste in Canada*, namely:

"As Aboriginal Canadians, Inuit are also in opposition to the storage/disposal of Nuclear Fuel Waste anywhere else within Canada and insist that Nuclear Fuel Waste should remain on site of existing nuclear reactors....Inuit as Canadians do not advocate that Nuclear Fuel Waste should be stored on any new sites".

¹ Note: The geological characteristics of the Labrador Trough, which extends through a large portion of Nunavik (northern Québec) make this part of Québec an unlikely candidate for technical reasons.

Questions and Observations Concerning the Adaptive Phased Management Approach²

ITK is making the assumption that unless the 30-year Phase I period comprehensively addresses all of the technical considerations implicit in moving to Phase 2 and is considered socially acceptable to Canadians at large, used fuel will continue to be stored at reactor sites.

What is not clear is in the case where there is no Phase 2 (interim storage), what would have to take place over the following 20-year period (to year 50) to address all the technical and policy issues necessary to make Phase 3 acceptable. We turn to Section 13.1 of the Report for guidance. Here we find a commitment to developing an Engagement Process which will lead to a final site selection and a technical description of a proposed project encompassing all surface and underground facilities, access and infrastructure requirements and a long-term monitoring program. An application for site preparation is made or intent to apply is then given. This triggers the environmental assessment process.

The Report further states:

"The implementing agency would be required to demonstrate, during the Environmental Assessment process, that there would be no significant adverse impact on the environment resulting from the construction, operation, decommissioning and closure of the deep geologic repository."

While not explicit, ITK is assuming that environment in the context is used broadly to include all social, economic and cultural considerations. In Chapter 14 of the Report, we find more detail. "The intention is to avoid or minimize significant socio-economic effects on a community's way of life or on its social, cultural or economic aspirations." (page 202). The Report then takes a comprehensive view, stating that "socio-economic effects management involves the coordinated application of mitigation, enhancement, compensation, monitoring and contingency measures and community liaison measures." (page 202).

We note in Section 14 the attention paid to exploring innovative ways to address the socio-economic effects and encourages NWMO to work direction with Aboriginal organizations to benefit from their experiences and on-going analyses of processes established to address Aboriginal concerns in other contexts. In northern Canada, Inuit have treaty-based environmental assessment regimes in which they participate equally with government officials in making decisions. The decision-making processes set out in these treaties also require consideration and accommodation of Inuit knowledge, perspectives and values.

² Posing questions on the Adaptive Phased Management Approach, which contemplates transport and storage at new sites, should not be understood by NWMO to imply any interest in this option beyond Phase I - maintaining the waste at existing sites.

Implicit in the environmental assessment processes established in our land claims agreements (as is the case generally in EIS processes) is the option that the project does not receive approval to proceed. We find no reference that this possibility is being entertained by NWMO. Nor do we find any reference to the possibility that all of the research, technical studies, etc. discussed in Chapter 16 could lead to a conclusion that there is insufficient confidence in safety aspects to support a decision to proceed. Rather, the underlying presumption of the Adaptive Phased Management option is that centralized, isolated containment will go forward. The timeframe may shift according to accepted science, but as stated on page 67 of the Report, "we can recommend the end point that we believe is the most desirable end state".

The Engagement Process will also need to pay particular attention to the views of Aboriginal Peoples, most often a minority voice in the larger debate. This could be even more acute in southern regions where Aboriginal Peoples are often demographically in a minority and politically marginalized. On behalf of other Aboriginal groups, ITK is concerned that their positions may be subsumed by the larger population if the process gets to the stage of searching for a host community. ITK urges the NWMO to be sensitive and alert to this possibility. This likelihood would further increase in a situation where there is an active lobby mounted in support of a site and a local Aboriginal group or community was opposed.

Finally, when reading this Report, we are left with the uneasy feeling that this huge and expensive effort is leading to a conclusion that collectively, as a society, we just don't yet know enough about how to safely manage nuclear fuel waste and yet, at the same time, will continue to produce it. The responsibility for decision-making is being pushed forward to future generations with the hope that science will have advanced to a point where more precise solutions are conceivable.

In our *Final Report on the National Inuit-specific Dialogues on the Long-term Management of Nuclear Waste in Canada* ITK advocates for a non-nuclear society in Canada where nuclear materials are neither mined, produced or transformed. We understand that this was not the mandate given to the NWMO. However, from the Inuit perspective, the long-term management of nuclear fuel waste is simply a component of the much larger issue of meeting Canada's energy needs into the future. Looking at the issue holistically requires consideration of broader questions of the role of hydrocarbons, nuclear fuel and renewables in the overall energy production picture. It is for this reason that Inuit brought forward recommendations related to alternative sources of energy that could eliminate the need to continue reliance on nuclear fuel.

ITK strongly encourages the Government of Canada to provide policy support and resources towards the development of alternative energy sources and energy conservation as the foundation for a truly sustainable "way forward".

Fact Sheets on the Issue of the Long-Term Management of Nuclear Fuel Waste in Canada



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INUIT TAPIIRIT KANATAMI

COMPILED BY:

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OCTOBER 2004

Sources:

Nuclear Fuel Waste Act
NRCan Power Point Presentation (Dr. Peter Brown, Feb. 24, 2004)
NWMO Discussion Document: Asking the Right Questions



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 a comprehensive public dialogue process is conducted with Inuit 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 dialogue with Canadian Inuit on the issue of Nuclear Fuel Waste Management and Disposal, as mandated in section 12(7) of Bill C-27.¹ 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 dialogue 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.

¹ 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 dialogue on an ongoing basis with the Inuit Land Claims Organizations and facilitate consensus building on answers to the dialogue questions. ITK will not and cannot speak for Regional groups until the dialogue and consensus-building process is complete.

Reasons and objectives of the consultation:

- The design and execution of a culturally specific dialogue 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 dialogues 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.



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.

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 Community³³. 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.

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 boundaries³⁴. 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 explored³⁵.

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 boundaries³⁶.

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.

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.

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.

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.

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.

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.

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.

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.

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).

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.

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.

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