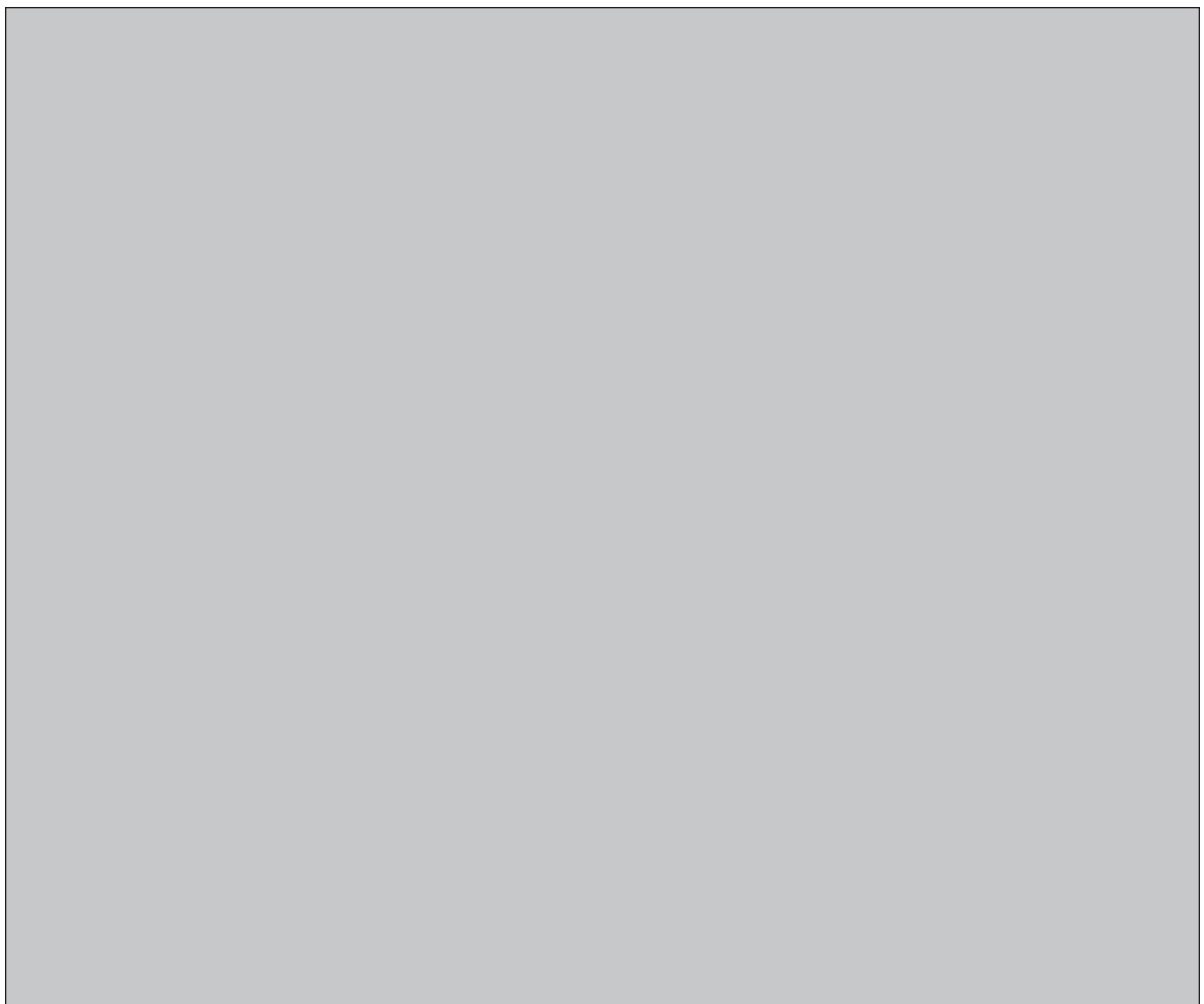


**NWMO BACKGROUND PAPERS**  
**2. SOCIAL AND ETHICAL DIMENSIONS**

**2-1 ETHICS OF HIGH LEVEL NUCLEAR FUEL WASTE DISPOSAL IN CANADA**

**Peter Timmerman**  
**York University**



## **NWMO Background Papers**

NWMO has commissioned a series of background papers which present concepts and contextual information about the state of our knowledge on important topics related to the management of radioactive waste. The intent of these background papers is to provide input to defining possible approaches for the long-term management of used nuclear fuel and to contribute to an informed dialogue with the public and other stakeholders. The papers currently available are posted on NWMO's web site. Additional papers may be commissioned.

The topics of the background papers can be classified under the following broad headings:

1. **Guiding Concepts** – describe key concepts which can help guide an informed dialogue with the public and other stakeholders on the topic of radioactive waste management. They include perspectives on risk, security, the precautionary approach, adaptive management, traditional knowledge and sustainable development.
2. **Social and Ethical Dimensions** - provide perspectives on the social and ethical dimensions of radioactive waste management. They include background papers prepared for roundtable discussions.
3. **Health and Safety** – provide information on the status of relevant research, technologies, standards and procedures to reduce radiation and security risk associated with radioactive waste management.
4. **Science and Environment** – provide information on the current status of relevant research on ecosystem processes and environmental management issues. They include descriptions of the current efforts, as well as the status of research into our understanding of the biosphere and geosphere.
5. **Economic Factors** - provide insight into the economic factors and financial requirements for the long-term management of used nuclear fuel.
6. **Technical Methods** - provide general descriptions of the three methods for the long-term management of used nuclear fuel as defined in the NFWA, as well as other possible methods and related system requirements.
7. **Institutions and Governance** - outline the current relevant legal, administrative and institutional requirements that may be applicable to the long-term management of spent nuclear fuel in Canada, including legislation, regulations, guidelines, protocols, directives, policies and procedures of various jurisdictions.

### **Disclaimer**

This report does not necessarily reflect the views or position of the Nuclear Waste Management Organization, its directors, officers, employees and agents (the "NWMO") and unless otherwise specifically stated, is made available to the public by the NWMO for information only. The contents of this report reflect the views of the author(s) who are solely responsible for the text and its conclusions as well as the accuracy of any data used in its creation. The NWMO does not make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information disclosed, or represent that the use of any information would not infringe privately owned rights. Any reference to a specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise, does not constitute or imply its endorsement, recommendation, or preference by NWMO.

# **Ethics of High Level Nuclear Fuel Waste Disposal in Canada: Background Paper**

**Peter Timmerman  
September 2003**

**Peter Timmerman  
Faculty of Environmental Studies  
York University  
Tel. 416-736-2100x33033; e-mail: [ptimmerman@ifias.ca](mailto:ptimmerman@ifias.ca)/[ptimmer@yorku.ca](mailto:ptimmer@yorku.ca)**

# Introduction: The Ethics of High Level Nuclear Fuel Waste Disposal

This paper is designed to provide a general background for discussions over the ethics of high level nuclear fuel waste disposal (hereafter NFWD). While it does make reference to some language used by ethicists and philosophers, it is hoped that these references are self-explanatory, or explained in context; and is aimed (eventually) at a more general audience.

The issue of high level nuclear fuel waste disposal in Canada engages fundamental social and ethical concerns, prompted not just by familiar debates over the rights and wrongs of siting waste facilities of any kind, but because, for many people, the issue invokes and involves questions about the basic trajectory of modern society. Nuclear fuel waste disposal is a form of “ethical magnet” -- it draws to it a range of concerns. There are those who wish to limit discussion to specific technical choices about where or what to do with the waste; but the Canadian experience to date suggests that this has been resisted by the wider public.

The reasons for this resistance include:

- concern that the limiting of discussion to specific technical choices is symptomatic of the technical “mindset” that got us into this situation in the first place.
- concerns over technology in general, focussing on waste as an example of the unforeseen consequences of certain kinds of technology;
- concerns over nuclear power specifically, rightly or wrongly associated with the “nuclear age” in which we live;
- concerns over the extraordinary lengths of time (into the tens of millenia) that nuclear waste must be managed or segregated.
- concerns over the potential inequitable distribution of risks and benefits associated with choosing a disposal site (or maintaining a storage site).

These concerns, in various forms, have been articulated over many years in the long process of developing a response to the issue. Two accessible summaries of these concerns for Canadians, stand out. One is the Report of a Workshop, Moral and Ethical Issues Related to the Nuclear Fuel Waste Concept (AECL, TR-549; COG-91-140) held in March 1991; and the second, drawing on her experiences as a member of the Nuclear Waste Management and Disposal Concept Environmental Assessment Panel (known as

the Seaborn Panel) from 1989-1998, Senator Lois Wilson's book, Nuclear Waste: Exploring the Ethical Dilemmas (2000). Many other submissions to the Seaborn Commission from NGO's, academics, and citizens dealt with ethical issues, though few of them considered these in detail.

The Seaborn Panel, responding to their belief that the disposal concept had not been adequately demonstrated from a social perspective, nor did it have broad public support at the time, made a series of recommendations, including the need to "develop an ethical and social assessment framework", "a comprehensive public participation plan", and an "Aboriginal participation process". From the perspective of an ethicist, many of these recommended steps overlap -- ethics is as much about ethical processes as it is about appropriate ethical arguments.

In what follows, some of the essential ethical questions, and their background, are introduced.

## Ethical Questions

In spite of the efforts listed above (and others), we are a long way from having an acceptable social and ethical framework within which to discuss high level nuclear fuel waste management (NFWM). There has not been a great deal of work done on this issue in Canada. We do not have even a common vocabulary to talk about what is at stake; or agreement over the domain and range of the issues that should be discussed.

Nevertheless, it is possible to work towards a framework, not necessarily to achieve agreement, but at least to be clearer about what is being argued for or against, and the implications of taking one position or another. Ethicists who work on issues such as this are not there (usually) to come up with the one shining solution; but rather should be seen perhaps as diagnosticians -- e.g. this argument is going off the rails for these reasons; this stance likely entails this other stance, and so on. They also tend to be watchful of the ways in which language leads us on -- a metaphor such as "a framework", for example, suggests that we should be looking for a static fixed structure, like the framework of a house. It is rather more likely that any appropriate ethical "framework" is going to evolve over time, change its focus as different phases of a decision-making process come into play, and have to be resilient (though not completely boneless -- to use another series of metaphors).

This short paper is designed to facilitate the development of a workable, if not perfect, ethical framework for discussion, initially by the Ethical Panel struck by the NWMO; and then by a wider constituency. In this draft form, it is structured as a set of general questions, to which brief discussions are appended. These questions have been drawn

from the existing documentation referred to earlier, and will be supplemented in later versions with a more substantive bibliography and glossary.

Initially, the ethical issues may be divided (not exhaustively) into 7 questions:

- **1. How should we think about ethics in the context of dealing with NFWM?**
- **2. What are some stated ethical guidelines already put forward in the NFWM debates to date?**
- **3. What have been some important general ethical positions found to date in the NFWM debate?**
- **4. How might the scientific and technical facts of the case influence the possible ethical responses?**
- **5. What is our ethical responsibility to future generations, and to this generation?**
- **6. What are the boundaries of concern, and of discussion?**
- **7. What constitutes an ethical process?**

## 1. How should we think about ethics in the context of dealing with NFWM?

There is no one way to think about ethics, though ethicists and philosophers have developed sophisticated languages and theories, and (occasionally) have applied them to real world situations. In the case of nuclear waste management there are some facets of the issue that challenge our values and ways of thinking quite profoundly, and raise important ethical concerns.

The consideration of the NFWM issue is difficult, not just because of the complexity of the technical information, but also because human beings in general, and this society in particular, are not used to thinking about the very long term. Many people are also ambivalent about technological innovation: happy to take the rewards, but concerned about possible risks and uncertainties; again, in part because wrestling with the long term consequences of things that provide us with short-term benefits is not exactly widespread.

Our current ethical and religious frameworks are used to dealing, on the one hand, with the immediate, local and the neighbourly; and, on the other, with “eternal” moral absolutes: the “in-between” time is less familiar to us. Nevertheless, we sometimes do make decisions with long-term consequences. Governments decide to build power plants with 50 year lifetimes; or set aside parks in perpetuity. We make promises, such as marriage, which are, ritually at least, to be “forever” -- no matter how things change. And, in fact, given a society devoted to progress, to the colonization of the future, it could be argued that we live oriented towards at least the near future. Certainly the future is often a playground for our dreams, or a dumping ground for our delayed decisions.

In considering the environment, our ethical and religious frameworks have, until very recently, tended to take the persistence of the natural “background” for granted: indeed, the persistence of “springtime and harvest” is a potent symbol in many cultures. Compare that with the global environmental situation today, with impending climate change and extraordinary current levels of species extinction, and we can see how hard it is for us to consider making practical decisions with environmental (and human) consequences for thousands of years.

Apart from this difficulty, it is important also to acknowledge that, at the moment, we do not have a single ethical framework to which everyone subscribes. As members of a modern society, many of us might wish there was such a framework, but many are also aware that there are benefits to not being subject to only one set of beliefs. Ethicists tend to suggest that clashes over ethical beliefs are natural in such a “modern” society, though some are concerned that, without some kinds of agreement or minimal

consensus, these clashes can become “interminable” -- no agreement is possible over deeply held, though opposite, convictions.

What then can we do? One approach is to look for certain touchstones and elements of ethics that most people can agree on, which can then be more formally and openly developed, criticised, adapted, extended. These could be what philosophers might call “ethical intuitions” -- basic feelings of concern, fear, hope, vulnerability -- that have been reinforced, supplemented (or corrupted) by life experiences, religious and ethical teachings, and social rules. These latter are sometimes referred to as “normative theories or practices”.

For example, many ethical traditions build upon, and extend certain ethical intuitions, such as concern for the well-being of the next generation, or even stretching out to our grandchildren. Beyond that, as is well known, some First Nations traditions speak of taking consideration for the consequences of acts to “the seventh generation”. In the Tibetan Buddhist tradition, children are taught to treat animals “as if they were your mother in a previous lifetime,” -- another method of extending ethical responses beyond ourselves, or our immediate families.

In the nuclear debate -- or in the debate over sustainability in general -- this is often referred to as “responsibility for future generations”? What are our responsibilities to those generations? and how do they relate to our current responsibilities? (see #5)

Other approaches (discussed in #3) do work within well-known ethical theories, in part because most of these theories do rely on some forms of familiar ethical intuitions; but also because they have important virtues, such as articulatability and consistency. Being able to defend one’s ethics by reasoned argument isn’t everything; but it is something.



## 2. What are some stated ethical guidelines already put forward in the NFWM debates to date?

A number of statements of ethical principle or guidelines for radioactive waste management in general, and the Canadian process specifically, have been generated over the years. The International Atomic Energy Agency (IAEA) to which Canada belongs, set out a series of principles in 1995 including:

Principles 1 and 2: Radioactive waste shall be managed in such a way as:-- to secure an acceptable level of protection for human health; to provide an acceptable level of protection of the environment.

Principle 4: Radioactive waste shall be managed in such a way that predicted impacts on the health of future generations will not be greater than relevant levels of impact that are acceptable today.

Principle 5: Radioactive waste shall be managed in such a way that will not impose undue burdens on future generations.

In Canada, the Environmental Impact Statement submitted to the Seaborn Commission for the Disposal Concept by AECL (Chapter 3) and supporting documents (Greber et al, 1994) focussed on "acceptability" as the main criterion. "Acceptability" would require adhering to the following ethical norms, based on commitments to --

- (1) safety and environmental protection;
- (2) voluntarism ("no community would be forced to host a disposal facility" according to Ontario Hydro's submission to the Seaborn Commission (Grondin et al, 1994));
- (3) shared decision-making;
- (4) openness;
- (5) fairness.

These norms are not fully fleshed out in the various papers submitted to the Seaborn Panel by AECL or others. AECL 1994, section 3 (esp. 3.4.2 and 3.4.3) does give a general review of the above norms.

As noted in the Introduction to this paper, the Seaborn Panel recommended that an acceptable concept must:

- (a) have broad public support;
- (b) be safe from both a technical and a social perspective;
- (c) have been developed within a sound ethical and social assessment framework;
- (d) have the support of Aboriginal people;
- (e) be selected after comparison with the risks, costs, and benefits of other options; and

(f) be advanced by a stable and trustworthy proponent and overseen by a trustworthy regulator.

For ethicists, the devil is often in the details. For example, a critical word in the above recommendations is “trustworthy”, which opens up a very complicated debate about the methods and criteria for ensuring trustworthiness (question #7 briefly discusses the pivotal element of trust in any future ethical process). The same is true for other general words and principles set out in various places.

### **3. What have been some important general ethical positions found to date in the NFWM debate?**

Specific issues at stake in the NFWM debate include: choice of above-ground storage/below-ground disposal; retrievability/irretrievability; site selection; equitable processes; encouragement/discouragement of nuclear power; responsibility for this and future generations; and so on. But behind these specific issues, and their discussion can be found more general ethical positions, which help shape and focus the kinds of concerns, projections, risks, values, and burdens of proof that different people assume.

There are three, perhaps four, main ethical positions, or clusters of positions, that have been in the forefront of public debate. These stem, as discussed in question #1, from a mixture of ethical intuitions and prevalent ethical philosophies and religions in our society. These positions often clash when brought to the surface in contentious public debates such as forms of hazardous waste management.

The first is often referred to as a "rights" position, and it is based on our society's commitment to fundamental human rights which are believed (or assumed) to inhere in a person just because they are a person. "Rights" as an idea has a long and complex history, and means many different things to different people: nevertheless belief in "rights" is arguably the most powerful current ethical language in use (or over-use). The language of rights often also involves or invokes the idea that people should be considered as ends in themselves and not as means to someone else's ends. One version of this is the idea that people have certain "trump rights" -- that no matter what someone wishes to do to or with them, people can object, even if it imperils important matters; on the positive side, people are also "within their rights" to do certain things. A positive version of this (at least from the perspective of the speaker) is freedom of speech.

In the nuclear waste case, someone might ask: What right do you have to increase my personal risk for the benefit of others?

How do we decide among different claims, or different rights, in a complex world? In the 19th century, accompanied by the rise of modern bureaucracies and a vast increase in human populations, a second prevalent ethical position evolved, usually referred to as "the greatest good for the greatest number" or "utilitarianism". Very roughly, this focusses on considering the best possible outcomes for the largest number of people -- the language tends to focus, not on "rights" but on "goods", though many philosophers think that these can be made interchangeable -- for example, pushing for a "right" to clean water may foster the provision of the greatest amount of clean water for the greatest number of people. The most important thing for this discussion is that many technologies, especially those on a grand scale, are legitimized and buttressed by forms

of “utilitarian thinking”, supported by statistics, policy papers, expert advice, and a bureaucratic process officially at least devoted to the enhancement of the public good.

One of the complexities of the nuclear waste issue (as in the rest of our society) is that both “rights”- based and “utilitarian”-based theories are constantly coming up against each other. In the expropriation of property, siting hazardous waste facilities, expanding airports, routing power lines, one is often faced with clashes where there is minimum benefit or actual cost to one individual (or group), and greater benefit elsewhere. The determination to stand for one’s rights presents a “safety valve” against the sacrifice of an individual to the gods of bureaucracy.

A third major position, which we could call “communitarian”, values specific communities or tribes or regional groups, more or less as if they were individuals on a larger scale, i.e. there are community rights. Again, in hazardous waste management cases, a potentially burdened community may assert its local rights over the benefits accruing to a larger community. Having to accept hydro lines that cut across aboriginal land to provide power to southern communities may not be compensated for by the “trickle back” of some benefits to the affected community. Indeed, levels and kinds of benefits and compensation (if any, actual or “potential”) pose important ethical concerns, that also stretch over the whole siting, construction, and maintenance phases of a disposal process. It is also a recurring irony that threats to a community may actually call that community into existence, creating a new political dynamic.

“Community” language in this context has extended in recent years to involve concerns over the natural or biotic community. This fourth position, which we could call “ecologic” or “green” regards the waste disposal issue as one involving our long-term relationship to the community of nature, or the Earth as a whole. The language of this position regularly involves words like “stewardship”, “trust”, and “the precautionary principle” (i.e. potential threats to the biosphere should be minimized). There are obvious -- but by no means straightforward -- connections to the communitarian position and related religious and ethical traditions, especially those which have evolved a “greener” viewpoint in recent years (see for example, the United Church submission to the Seaborn Panel, 1996).

This fourth position suggests, again, that the extended perspectives of time and space brought into an issue like nuclear waste disposal seem almost inevitably to expand the range of connections and implications that people bring to the table. It remains unclear how traditional or more contemporary ethical positions ought to respond to such a challenge. Some philosophers seem to believe that some adoption or extension or adaptation of traditional positions will suffice; others are not so sure.

#### **4. How might the scientific and technical facts of the case influence the possible ethical responses?**

One obstacle to dealing with the nuclear fuel waste management issue is the vast array of scientific and technical facts that seem to loom up upon entry. There has been a strong tendency over the long process of considering what to do about NFWM to focus on purely technical solutions as if the perfect technical solution would solve all other problems. It is now recognised by most people in the field (though not all), that social acceptability has to be a central element in the solution to the issue, and not just technical acceptability. Less recognised is that the dividing line between technical acceptability and social acceptability is not necessarily neat and clean.

One relevant topic here is "risk" -- the admission that there is no perfect technical solution (no "zero risk"). It is well known that "risk" is a complex term in its own right, though technical risk analyses are familiar elements of a high level nuclear waste management process. The interpretation of risk more broadly -- which may well include interpreting how well, or how much appropriate science has to be carried out to clarify the potential risks -- encroaches on the domain of ethics, if only in illuminating how "risk prone" or how "risk averse" a person, group, institution, nation or society may be.

In debates over the high-level nuclear waste issue, some participants take certain levels of risk or freedom from risk for granted, which influences their assessment of the appropriate technology, after which (or during which) they go on to make certain choices. For example, technical questions about shield rock or the migration of water, or other issues affect the "burden of proof" on one solution over another. Studies on the "burden of proof" -- Who must prove what, and to what levels of certainty? How much safer do you want it to be? -- have shown that burdens shift, and evidence can be interpreted in different ways. This can affect the range of ethical choices available -- is there real risk? how much risk are we prepared to take, and who will be potentially affected?

Complex ethical -- and strategic -- questions for management here include: how much knowledge do we need to make a decision, and of what kind? How much money (and to what end) is it appropriate for a decision-making process to spend in order to achieve what level of certainty? And (an often forgotten question): are we spending or proposing to spend money on this issue when there are issues of possibly greater concern?

Lastly, returning to "risk" briefly, it is interesting to note that many of the people involved in the nuclear waste issue can be divided into social optimists/pessimists and technological optimists/pessimists. People who support deep disposal often believe that society will degenerate into chaos over the next millenia, and needs to be protected

from itself; people who support above ground storage often argue that a better technical solution will be forthcoming, so we should wait. And there are other variations. These can all be seen as weightings of different kinds of social and technical projections from current and past experience.

## 5. What is our ethical responsibility to future generations, and to this generation?

In considering the future, as suggested in #1, we are usually trying to find some means of extending or projecting current ways of handling concerns into the future. One basic problem with this is that we tend to project a more or less modified version of today into the near future -- when we begin dealing with many lifetimes, 10,000 years or more, etc. -- these projections become virtually worthless. It is also important to keep in mind that in projecting we are very often engaged in wishful or apocalyptic thinking: the future becomes a kind of "ink blot test".

In general, discussion about responsibilities for future generations in the nuclear waste issue has discounted the use of one technique familiar to economists, i.e. discounting. While the use of a discount rate (i.e. people value today's goods more than tomorrows) can be useful in the early stages of a siting process, over the very longer term the use of a discount rate, however small, tends to make doing anything appear uneconomical. Some kind of concern for the possible impacts on generations far into the future is widely assumed.

Ethically, is our duty to come up with a complete solution now, or to improve incrementally on behalf of the future, the situation we find ourselves in? The ethical question of how much of a problem or a solution should be handed down to the next generation is sometimes referred as the issue of a "rolling present" or, as a Panel for the U.S. Department of Energy stated in 1997, a "chain of obligation" principle that states that "each generation's primary obligation is to provide for the needs of living and next succeeding generations. Near term concrete hazards have priority over long-term hypothetical hazards" (NAPA/NEA, 1997).

Again, the issue of the future brings to the forefront people's basic perspectives. To some people, the basic responsibility is to take both the burden of risk and the burden of managing the risk off the shoulders of the future.

For some people, this is tied to a social perspective that believes that future generations are likely to be at least as messy as our own, and that we cannot guarantee that they will be able to manage the waste properly. Therefore it should be disposed of somewhere that is virtually irretrievable. Related to this -- and over the very long term -- is some kind of guarantee (by signage or inaccessibility) that future generations would not accidentally stumble over, or dig into, the waste site.

To cite the Nuclear Energy Agency of the OECD: "From an ethical standpoint, including long term safety considerations, our responsibilities to future generations are better discharged by a strategy of final disposal than by reliance on stores which require surveillance, bequeath long-term responsibilities of care, and may in due course be

neglected by future societies whose structural stability should not be presumed" (NEA, OECD, 1995).

For others, it is important that future generations be able to correct or improve upon our current situation, and therefore some form of fairly easy retrievability, above ground storage, or incremental decision-making is indicated. There is an often expressed hope or belief that scientific innovation in the future will be able to solve (or at least improve) the waste problem.

Less often stated is the strong possibility that commitment to above ground storage means that the current above ground storage facilities will be made permanent; i.e. not making a decision is in fact making a decision to continue to burden the areas that currently maintain nuclear facilities with possible risks. More generally, without some commitment to a decision in this generation, the problem will not go away -- there is at least some ethical commitment expressed by most people involved, that given the fact that this generation has benefitted from the energy created by the nuclear power industry, to do more than merely continue generating nuclear waste.



## 6. What are the boundaries of concern, and of discussion?

As stated in #4, “the extended perspectives of time and space brought into an issue like nuclear waste disposal seem almost inevitably to expand the range of connections and implications that people bring to the table”. How the issue is bounded is virtually equivalent to how it is framed. The ramifications are so extensive, that #6 is best handled through a series of challenging questions:

- What is the time frame of concern? 500 generations, 10,000 years, a million years? Indefinitely?
- Which communities in Canada, and what places, should be part of consideration during the disposal process? Should we be considering all of Canada for possible sites, or only those provinces or regions that have immediately benefitted from nuclear power?
- How should we weigh the potential hazards to the natural community in relation to potential hazards to human beings?
- How important is the resolution of the waste issue for the future development (if any) of nuclear power?
- Should we be discussing energy policy overall, conservation? Should we be discussing technological innovation in energy, and/or energy strategies in general?
- Should we be examining the full cycle of nuclear energy production? What about waste from other practices?
- Is the discussion of this problem overshadowed by other, more dangerous, priorities, that we should be discussing, or comparing with this one? What are the proper comparisons to be made about other risks, other issues?
- Do our decision-making processes need to change to cope with this, and other long-term issues? What is the legitimacy of our current ways of responding to complex environmental issues?
- The boundaries of concern will shift when the process moves from a concept to an actual site (for whatever purpose). What ethical considerations will change as a result?
- What is the full range of alternatives, e.g. transmutation, deep sea burial, etc.?

## 7. What constitutes an ethical process?

For many people, this question is the heart of their concern over high level nuclear fuel waste management. There are two main reasons for this.

One, as discussed in the response to earlier questions, if there is no one agreed-upon ethical framework within which decisions can be made, then at the very least an ethical process for discussing, and perhaps deciding, should be in place.

Two, the history of nuclear waste management in Canada is fraught with issues of power, mistrust, and a very slow process of recognition that public participation in the decision-making process is required.

Concerning the first issue, the nature of an ethical process is not without controversy of its own. For example, in the United States, and in some jurisdictions in Canada, a legalistic process is the paramount model. This kind of process has a series of well-known procedures for ensuring certain kinds of due process; fairness; assessment of evidence, etc. However, the assumptions under which it works (e.g. adversary conflict) and the difficulty of non-expert participation, have been criticized extensively in non-judicial settings. This is particularly true in the directly relevant case of considering First Nations concerns and practices (see Ridington, 1990, and others).

Social, political, and ethical philosophers have, in recent years, made a number of attempts to describe more general elements of any ethical process working through dialogue, discussion, and certain kinds of decision-making. Sometimes referred to as "discourse ethics", these elements often include sub-processes or criteria for participation, such as: uncoerced participation; equal access to information and resources; equal rights to set the agenda for discussion; recognition of, and appropriate responses to relevant differences in race, class, gender, etc. as they apply to the forms, methods, and procedures of discussion.

A central theme must be that of trust. As Brown (1994) aptly quotes from Benjamin Disraeli: "All power is a trust...we are accountable for its exercise; that, from the people, and for the people, all springs, and all must exist." More than an "original trust" however, a central element of coping with decision-making over the long term must be the "entrusting" of decision-making to some entity or institution -- unless the participants are proposing to continue to re-decide on all relevant matters over and over again. Continuity of responsibility in some form suggests that some form of entrusting is required.

This brings up issue two, specific issues of trust in this case. The nuclear industry in Canada operates according to a whole range of ethical imperatives, some derived from law, some from engineering codes of practice, some from the requirements of peer

review for research. Its relationship with government is long-standing, since it is essentially a creature of certain national and provincial goals, set down in the 1950s. These goals have not been specifically re-endorsed by the citizenry since, whose endorsement has been of succeeding governments, none of whom has been elected or un-elected on a platform of nuclear power. The industry is accountable in this regard to the various Parliaments and the regulatory commission, but can fairly be characterized as having operated in an elitist and expert domain. With the change in public sentiment towards such domains in recent years, this has fostered an atmosphere of mistrust. The Seaborn Commission -- the most recent of the critics of these processes -- recommended that the Nuclear Waste Management Organization be at arm's length from the utilities, in large part because of the trust issue. Wilson (2000) in characterizing the Government Response to the Seaborn Commission notes: "Given the lack of public awareness of the issue, and the perceived cavalier approach of government to public input and consultation....I doubt whether the public will be convinced easily of the validity of any "satisfactory recommendations" proposed by government or utilities."

One serious ethical (and political) dilemma highlighted by this, and further set out by Johnson (2002) and CCEER (1996), is that two views of democracy are mobilised by the nuclear waste issue. The first is that representative democracy, symbolized by Parliament, and operating according to Cabinet government, is both legitimate and capable of coping with an issue such as this. This has been the continuing justification by various institutions of their consultative practices. The second view, which has gained in influence in recent years, is that a more participatory decision-making process is both more effective, more ethical, and more legitimate.

The ethico-political problem in this case is that the proclaimed intent to promote more participation in decision-making over the nuclear issue is only intended to kick in "down the pipe". There is currently no framework for engaging participation in making decisions over nuclear power. This constraint on participation vitiates the claims of a participatory ethic.

We have not yet developed a mechanism whereby both representative and participatory structures can be used in issues like HLNFWM. Jurisdictions all over the world have been groping towards such mechanisms, including environmental assessments, commissions, fact-finding groups, and so on. It is likely that -- as in this case -- an appropriate mechanism will need to be evolved over time. At its heart will be some need to create, maintain, and foster trust.

## REFERENCES (AND OTHER MATERIAL FOR FURTHER STUDY)

AECL. 1994. Environmental Impact Statement on the Concept for Disposal of Canada's Nuclear Fuel Waste. AECL 10711, COG-93-1.

AECL (Hardy, Stevenson and Associates). 1991. Report of a Workshop, "Moral and Ethical Issues Related to the Nuclear Fuel Waste Concept". AECL, TR-549; COG-91-140.  
-----1993. Nuclear Fuel Waste Management Concept: Literature Review and Analysis: Moral and Ethical Issues. Toronto, Ontario: Hardy, Stevenson and Associates.

Attfield, Robin. 1991. The Ethics of Environmental Concern (2nd Ed.). Athens, Georgia: University of Georgia Press.

Brook, Andrew. 1995. "Risk Assessment and Moral Assessment," in An Environmental Ethics Perspective on Canadian Policy for Sustainable Development. Ottawa, Ontario: Institute for Research on Environment and Economy.

-----1996. "The Ethics of the Deep Disposal Concept". Notes for Presentation to the CEEA, Toronto, Ontario, March 12, 1996.

Brown, Peter G. 1994. Restoring the Public Trust. Boston, Mass.: Beacon Press.

Brunk, Conrad. 1995. "Technological Risk and the Nuclear Safety Debate," in An Environmental Ethics Perspective on Canadian Policy for Sustainable Development. Ottawa: Ontario: Institute for Research on Environment and Economy.

Canadian Coalition for Ecology, Ethics, and Religion. 1996. The Long Haul: A Report to the FEARO Panel on the Proposed Nuclear Fuel Waste Disposal Concept. Toronto, Canada: CCEER.

Flynn, J. et al. 1995. One Hundred Centuries of Solitude: Redirecting America's High-Level Nuclear Waste Policy. Boulder, Colo.: Westview Press.

Greber, M.A., E.R. Frech and J.A.R. Hillier. 1994. The Disposal of Canada's Nuclear Fuel Waste: Public Involvement and Social Aspects. AECL Report AECL-10712, COG-93-2.

Grondin, L. et al. 1994. The Disposal of Canada's Nuclear Fuel Waste: Preclosure Assessment of A Conceptual System. Toronto, Ontario: Ontario Hydro Report N-03784-940010(UFMED, COG-93-6).

Hare, F. Kenneth. 1988. The Ontario Nuclear Safety Review. Toronto, Ontario: Ontario Nuclear Safety Review.

Johnson, Genevieve F. 2002. "The Ethics of Innovation in Alternative Service Delivery: The Case of the Management of Canada's Irradiated Nuclear Fuel," Paper for The Innovation Workshop, Ottawa, Ontario, 9-10 February.

NAPA/NEA, 1997. Deciding the Future: Balancing Risks, Costs, and Benefits Fairly Across Generations: Report by a Panel of the National Academy of Public Administration for the U.S. Department of Energy. Washington, D.C.: NAPA.

NEA, OECD, 1995. The Environmental and Ethical Basis of Geological Disposal of Long-Lived Radioactive Wastes. Paris, France: Nuclear Energy Agency, OECD.

Pijawka, K.D. and A. H. Mushkatel. 1992. "Public Opposition to the Siting of the High Level Nuclear Waste Repository: the Importance of Trust," in Policy Studies Review, Vol. 10(4), pp. 180-194.

Ridington, Robin. 1990. Little Bit Know Something. Vancouver, B.C.: Douglas and McIntyre.

Schrader-Frechette, Kristin. 1993. Burying Uncertainty. Berkeley, Calif.: University of California Press.

Seaborn Panel Report (see Wilson)

United Church of Canada. 1996. Submission to the Public Hearings of the Canadian Environmental Assessment Panel. Toronto, Ontario: United Church, Program Unit on Peace, Environment, and Rural Life.

Wilson, Lois M. 2000. Nuclear Waste: Exploring the Ethical Dilemmas. Toronto, Ontario: United Church of Canada. (Appendix C contains an Executive Summary of the Seaborn Panel's Report)