

Examining the Role of the Future Production of Nuclear Fuel Waste in the Current Assessment of Nuclear Fuel Waste Management Options

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Nuclear fuel waste (NFW) has been in existence for over thirty years in Canada. The Government of Canada has recently legislated the Nuclear Waste Management Organization (NWMO) to assess three options for NFW management. These three options include deep geologic disposal, centralized storage and on-site storage at existing nuclear energy production centres.

An important issue in the NWMO's assessments is the role of the future production of NFW in Canada. Keeping this issue separate from the assessment of NFW management options has been the stance favored in previous assessments, which have advanced deep geologic disposal as the preferred method for waste management. Many participants in these previous assessments have called for the issue of the future production of NFW to not be decoupled from the assessment of waste management options.

This paper will advance the argument that the future production of NFW is an important issue that must be incorporated into the current NFW management assessment being conducted by the NWMO. Doing so would ensure that stakeholders' participation in the assessment, recommendation, and implementation of a NFW management option is meaningful and fully reflects their views on NFW in Canada.

Introduction to the Problem

Canada's experience with nuclear energy production is both recent and short in historical terms. However, many important consequences have resulted from becoming a nuclear energy producer. In particular, Canada has not yet found a method for dealing with the wastes left behind from nuclear energy production. These wastes are of serious concern, as they are highly radioactive substances which will remain extremely hazardous for many hundreds of thousands of years. Canada has recently undertaken the final phases of a process for deciding upon and implementing a management option for nuclear fuel waste (NFW), which, due to its long life span and toxicity, may be impossible to dispose of in a clean and safe manner.

This process has thus far shown to be highly innovative, especially in light of Canada's history with environmental assessments¹. In brief, the Nuclear Waste Management Organization (NWMO) has been charged with the task of evaluating and recommending to the federal government the most viable method of managing Canada's spent nuclear fuel. The process which the NWMO is following entails prioritizing equally both technical and social input. To date, this has broken with the pattern established by previous environmental assessments by actively soliciting and incorporating the feedback of Canadian citizens and numerous stakeholders, such as environmental groups, Native associations, and concerned citizens. In particular, non-technical feedback emphasizing the role of values in assessing waste management options has been sought from the Canadian public and these stakeholders.

¹Murphy and Kuhn, in "Setting the Terms of Reference in Environmental Assessments: Canadian Nuclear Fuel Waste Management", have stated that the Seaborn Panel proceedings, which preceeded the legislation creating the NWMO, transformed the manner in which future environmental assessments would occur. This is because the Seaborn Panel "transcended the scope of the terms of reference and provided both technical and social definitions of safety and acceptability of the NFW (nuclear fuel waste) disposal concept." (249)

Attempting to include social input broadens the scope of the NWMO's assessments, to the point where the task assumed by the NWMO appears daunting. The factors which the NWMO will have to take into account in its assessments reflect the nature of Canada's social make-up: diverse, broad, and in constant evolution. There is a large number of stakeholders involved in the debate over nuclear fuel waste management. Attempting to assess their views will involve balancing their respective interests in the issue with the input they bring to the table, while considering their relations with other stakeholder groups. This also raises the issue of taking into account the historical positions of these groups, their influence in the realm of the nuclear industry, and the extent to which they will be affected by the implementation of any waste management option.

The relationship of these groups with the NWMO must also be taken into account. As the NWMO's discussions seek open and honest public input, the NWMO must be viewed as a trustworthy organization able to meet the challenges of the task it is undertaking. To this end, the NWMO has emphasized in its Mission, Vision, and Values statement that it seeks to prioritize conduct which demonstrates openness, honesty, and respect for all with whom the NWMO will deal².

The problem of managing NFW is fraught with controversy and tension, and no clear answers appear to exist. Although there may be general consensus involving the dangerous nature of the waste and the need to implement an acceptable waste management option as quickly as possible, many other aspects of the issue are highly contentious. For example, there is a significant amount of disagreement regarding which of the three management options mandated to be examined by the NWMO should be implemented³. The issue of NFW

² NWMO. "Mission, Vision, Values". www.nwmo.ca

³ These three options include: deep geologic disposal, centralized above-ground storage, and on-site storage at nuclear energy generating stations.

management has also raised questions about other aspects of NFW, such as its creation in energy generation.

There is a very real possibility that there will be little agreement on many issues relating to nuclear fuel waste management. One of the more contentious issues in NFW management assessments has been the future direction of Canada's production of nuclear energy. Previous environmental assessment panels have been challenged, and in some accounts severely handicapped, by their approach to this issue, which has generally been to exclude it from the discussion⁴. The NWMO, created by legislation springing from the results of these previous assessments, has incorporated in a limited sense the issue of future nuclear energy production. To date, the NWMO's inclusion of future nuclear energy production has been to note in its assessments when the issue has been raised by stakeholders. Also, when designing scenarios depicting waste management options, the NWMO has limited the capacity of waste management centres to manage only those wastes projected to be produced to the end of the life-spans, without major refurbishment, of current nuclear generators.

Some stakeholder groups believe that this level of inclusion of the issue is sufficient; others hold that the NWMO should take a more active role in contributing to the future direction of Canada's nuclear energy production. Still others have held that although the future production of spent nuclear fuel plays a vital role in assessing waste management options, it may be necessary to decouple waste production and waste management in order to ensure that a waste management option is indeed selected and implemented. As the amount of these highly dangerous waste products is steadily increasing, and as there exists only temporary on-site

⁴ As Lois Wilson, a former Seaborn Panel member, notes, many interveners expressed frustration at being unable to discuss the future production of spent nuclear fuel, because the topic had been excluded from the panel's mandate by the federal Ministry of Energy, Mines, and Resources in 1988. Wilson holds that due to this exclusion, it was extremely difficult to situate the management of NFW in any meaningful context for discussion.

storage for these wastes, it is critical that a decision be made about how Canada will manage its spent nuclear fuel, and that this decision be quickly implemented.

However, an important consideration remains: can a waste management option be decided without determining whether and how it should affect nuclear energy production? This is a critical question present in the attempt at determining and implementing a waste management option.

Questions Concerning the NWMO

The issues facing the NWMO are very complex and difficult. They raise many questions regarding the results at which the NWMO should arrive. These issues also raise questions about the process being undertaken to achieve those results. What are the limitations facing the NWMO? Given that an acceptable waste management option has been declared impossible to arrive at⁵, and that the NWMO faces many limitations inherent both to its structure and the process it is undertaking to assess waste management options, is it possible for the NWMO to adapt to meet these limitations in order to provide the best possible assessment of waste management options? How are these limitations the result of previous NFW management environmental assessments? How has the NWMO incorporated some of the important social values of Canadians in its assessment process? How should the NWMO change its practices in order to address the complexities of the NFW management issue? Would separating the issue of future NFW production from the management of present accumulations of NFW really assist the NWMO in making its assessments? How have other stakeholders assessed decoupling current

⁵ This point is made in the NWMO's second discussion document, "Understanding the Choices", 84. No single technical method is likely to address all of the objectives of all Canadians.

accumulations of NFW from future production of NFW? What do other stakeholders think about decoupling NFW management from the future production of NFW? Should the NWMO issue a statement on the future production of NFW in Canada? Is it possible for the NWMO to expand its mandate and issue a direct statement on the future direction of NFW production?

These questions result from acknowledging that NFW is hazardous material which may be nearly impossible to dispose of in a manner consistent with the values of all Canadians. It has been accepted that a perfect solution will likely not be found, but a decision regarding NFW management must be made and implemented in order to deal with this pressing problem. What remains important is continued assessment and analysis of the process undertaken in assessing waste management options, in order to ensure that the process continues to reflect the values and commitments of Canadians.

The Implications of the Seaborn Panel Proceedings

After the dropping of nuclear bombs on Japan in the Second World War, focus within the industry began to shift away from nuclear weapons research to more peaceful applications of nuclear technology. Although Canada continued to mine uranium and export it to nations with nuclear arms programs (mainly Britain and the United States), Canada renounced any intention of developing a nuclear arms program. Instead, through the creation of the crown corporation Atomic Energy of Canada Limited (AECL) in 1952, Canada focused on uranium mining and export, producing research reactors, and on generating nuclear energy⁶.

The introduction of nuclear power into Canadian power grids occurred in 1968 at the Douglas Point nuclear generating station. During the span of twenty years between the

⁶http://www.ccnr.org/myth_1.html

construction of Chalk River in 1947 and the first use of nuclear energy in 1968, cancer patients began receiving radiation treatment at various medical institutes across Canada, such as at London, Ontario and Saskatoon, Saskatchewan in 1951. Research laboratories into nuclear physics were established, such as at McMaster University in 1959⁷. In the same year AECL was incorporated, the Chalk River nuclear establishment was transferred to AECL jurisdiction, along with the commercial production division of Eldorado Mining & Refining, which developed and marketed Cobalt-60 cancer therapy equipment, and the CANDU reactor.

Although Canada had incorporated nuclear energy into the power grid, a long-term management plan for the wastes produced through nuclear energy generation was not in place. In the 1970's, research was begun into potential management options. 1977 was the year in which Dr. Kenneth Hare's report *The Management of Canada's Spent Nuclear Fuel Waste* was released. This report was commissioned by the federal government to assess long-term waste management options. The report proposed that the concept, endorsed by the AECL, of burial in geologic formations demonstrated the best potential as a disposal method for Canada's spent nuclear fuel. The AECL conducted extensive research on the report from 1978 onward, with discussion on the environmental assessment beginning in 1986.

As per government specification, an environmental assessment panel was formed in 1988. This panel was chaired by Blair Seaborn and was therefore unofficially known as the Seaborn Panel. The Seaborn Panel was mandated to assess the AECL concept of deep geological disposal. This proved to be a daunting task from the outset. To begin with, the Seaborn Panel was limited by its terms of reference, which were set by the federal Minister of Energy, Mines and Resources without input from stakeholders such as environmental organizations and Native

⁷ Brown, Morgan J. *Canadian Nuclear History*. ([Cited 12 February 2005]. Available from World Wide Web: www.cns-snc.ca/history/canadian_nuclear_history.html)

associations. This omission alienated these stakeholder groups from the panel proceedings. They argued that their concerns were not incorporated into the framework structuring the discussion, and were therefore excluded⁸. The exclusion of many stakeholder concerns prevented those stakeholders from participating in any meaningful way.

The terms of reference excluded several issues relating to the production of nuclear energy, such as the use of nuclear technology in military applications, the importing of NFW from other countries, and whether Canada will continue to rely on nuclear energy. The exclusion of these topics also created disagreement between the panel and many interveners, who interpreted the mandate differently in terms of what could and could not be addressed with regards to the complete nuclear fuel cycle, from creation to disposal of waste. Others held that excluding these questions surrounding the nuclear fuel cycle impeded the possibility of performing a serious and complete review. As Lois Wilson, a member of the Seaborn Panel asks, “Why should the public give their views on possible solutions but be precluded from commenting on the origin of the problem: the nuclear generation of electricity⁹?” Intervenors raised the question of how the Seaborn Panel would address stakeholders with value systems which do not accept the limitations of the panel’s mandate, particularly in not addressing the production of NFW. They also questioned how competing world views would be assessed against one another and incorporated into the panel’s study. Ultimately, intervenors were frustrated at being unable to address these issues associated with waste management, as they held these issues to be significant in attempting to assess a deep geological disposal concept.

⁸ These issues included other methods of NFW management besides deep geologic disposal, Canada’s energy policy and nuclear military applications. (Murphy & Kuhn, 262)

⁹Wilson, 18.

Another challenge was that the terms of reference also established that the Seaborn Panel must assess the concept of deep geological disposal without siting the concept to a specific location. Wilson raises issues with the separation of the concept of deep geologic disposal, the design model, and the reality of which community will host the actual waste management facility. Although the concept may generally be considered acceptable, the design model may be seriously flawed and no community may be willing to host the waste management facility. In Wilson's assessment, the design model signifies the concept in action, and therefore it is logically problematic to separate the concept from the design model, and consider one acceptable but the other not, as they are essentially the same. There are also many issues raised in finding a host community, ranging from the fairness of the selection process to alternatives if a host community is not found. Many of the panel participants concluded that assessing a concept was nearly impossible. The Government of Canada decided that no other conceptual assessments would take place in environmental assessments¹⁰.

The results of the Panel's eight-year proceedings were both unexpected and groundbreaking, diverging with the opinion held by Canada's nuclear energy community and altering the manner in which future environmental assessments would be conducted in Canada¹¹. The Seaborn Panel arrived at two conclusions. The first was that broad public support is the foundation for ensuring the acceptability of any concept for nuclear waste management, which the deep geological disposal concept did not have¹². Second, safety must be viewed from two

¹⁰Wilson, 8.

¹¹ "In essence, the panel broke out of the constraints imposed on them by the terms of reference and redefined the nature and scope of what constitutes an environmental assessment....In a very real sense, the panel vindicated the basic position advanced by the public interest and local community constituencies who opposed the 'technical fix' mentality." Murphy & Kuhn, 254.

¹²Wilson, 113.

complementary perspectives, technical and social, adding that the concept for deep geologic disposal did not demonstrate adequate safety from a social perspective¹³. Arriving at these conclusions necessitated a re-evaluation, a clarification, and an expansion of the terms of reference guiding the Seaborn Panel. These changes resulted in the decreasing influence of technical knowledge as the dominant tool for assessment, and the inclusion of input that is more concerned with social and value perspectives¹⁴.

Assessing the Formation of the NWMO

The federal government responded to the Seaborn Panel report first by a written response, then through the legislation of Bill C-27 (*The Nuclear Fuel Waste Act*) which led to the creation of the NWMO in November 2002. The NWMO's mandate is to evaluate and recommend to the federal government the most viable method of managing Canada's spent nuclear fuel.

Since its creation, several commentators have challenged the ability of the NWMO to fulfil its mandate. Contrary to the recommendation of the Seaborn Panel, the NWMO is not completely at arm's-length from nuclear energy producers. The Board of Directors consists entirely of representatives from nuclear energy producing corporations in Ontario, Quebec and New Brunswick. Although there are several oversight mechanisms in place to oversee and contribute to the actions of the NWMO, such as the Advisory Council, the composition of the Board of Directors remains problematic for several stakeholders. This reduces the appearance of

¹³ It is important to note that public support and safety from a social perspective are not synonymous terms. Wilson differentiates between the two terms through a clarification of safety from a social perspective, which recognizes the division that exists in Canadian society in its assessment of the safety of any method of nuclear waste management. She states that an essential component of safety from a social perspective consists of assessing "that technology with respect to our deepest values as well as the historical safety records of all components."

¹⁴ Murphy and Kuhn, 263. The authors note that this change occurred through the inclusion of a wider range of constituents which permitted a broader review, altering the focus of the Seaborn Panel proceedings from a technical exercise to a more socially-focused environmental assessment.

the NWMO as a body existing independent of the influence, though financed by, the nuclear industry. This could contribute to a lack of trust in the NWMO by stakeholders.

Wilson also assesses the language of *The Nuclear Fuel Waste Act*, which she claims endorses continued production of nuclear energy. Wilson is concerned that the federal government's policy regarding continued NFW production is not being overtly stated and incorporated into NFW management assessments: "It is obvious that amongst the highest government priorities of all in this situation is to keep the high quality engineering expertise located in AECL going and to make the nuclear option work.¹⁵" This implicit endorsement could affect levels of public trust in the NWMO's ability to assess waste management options in an impartial and open manner, particularly if this implicit endorsement is not examined and noted in the NWMO's assessments.

The issue of NFW management is complex, and there exist many misconceptions about nuclear energy in the general community. Although the NWMO has embarked on an ambitious plan for informing Canadians about the issue of NFW management, ensuring that Canadians are informed about the choices will be challenging. NFW is perceived as a technical issue about which most people do not have the expertise to provide meaningful commentary, and this renders citizens hesitant to participate. There is also a great deal of indifference about NFW, as it is not something most people are directly confronted with in their daily lives. The scope of the issue is truly enormous, and the enormity of it may prove to be daunting for those first exposed to the problem.

There are also many firmly entrenched views regarding NFW and nuclear energy generation, which could prove difficult for the NWMO to overcome in its search for input. These views include the belief that deep geologic disposal is the only waste management option taken

¹⁵ Wilson, 127.

seriously¹⁶ in the NWMO's assessment, because it has historically been given prominence amongst all other waste management options under consideration.

There is also the matter of addressing the continued production of NFW. Although the NWMO has not initiated raising the issue in its discussions, the NWMO has claimed it will note when the issue is raised by discussion participants. For some participants, such as Nuclear Waste Watch, this approach is insufficient.

A constant theme in the NWMO's assessments is the requirement to work in collaboration with Canadians in order to decide upon a management option for recommendation to the federal government. Obtaining this collaboration necessitates that participants be well-informed and willing to engage on the issue. This, in turn, requires a high degree of public confidence in the NWMO.

Does the NWMO enjoy the trust of Canadians? One of the most important factors in public trust is the perception of the NWMO as independent and at arm's length from the interests of the nuclear industry. The interests of the nuclear industry may be in conflict with the values of Canadians with regards to NFW management, especially where the selection and implementation of a waste management option could affect future production of nuclear energy. The NWMO must be viewed as an independent organization capable of effectively making the decisions which reflect the interests of Canadians.

The issue of the future production of NFW is reflected in these concerns regarding the limitations of the NWMO. Although this may be an uncomfortable topic for the nuclear industry, it has been advanced countless times in the Seaborn Panel proceedings and in the NWMO discussion documents. This issue could prevent the NWMO from being perceived as objective and independent. The future production of NFW has also been raised as an issue which is

¹⁶ NWMO Ethics Roundtable. Meeting Notes: September 5th, 2003.

directly related to ensuring that Canadians are well-informed and engaged in the discussion regarding NFW management. The future production of NFW is a very complex topic in the waste management discussion, and an issue which the NWMO needs to address.

The Problem of Decoupling NFW Management from the Indefinite Future Production of NFW

Many advantages have been offered for decoupling future NFW production from NFW management. These advantages emphasize stakeholder concern that a decision be reached, insofar as a NFW management option is selected by the NWMO for recommendation and submitted to the federal government for approval. It is possible that including the issue of the future production of NFW would complicate the assessments and stall the process, to the extent that nothing would be decided. This would be very much unfair, particularly as NFW has generally been agreed upon as a serious problem in need of a management solution. This would also be unfair to expect that those stakeholders currently living with NFW in their communities continue to live with this waste in temporary storage without any sort of direction being suggested and implemented for its more permanent management.

It is also possible that expanding discussion to include the future NFW production would serve only to slow assessment proceedings by attempting to frustrate the nuclear industry. The nuclear industry currently plays an influential role in the NWMO's assessments, both as an important stakeholder and in a leadership role with the NWMO. Some members of the NWMO Ethics Roundtable advances the possibility that "some groups do not want to see any solution to the waste question, because they want to see nuclear power phased out¹⁷."

¹⁷ NWMO Ethics Roundtable. Meeting Notes: January 17th, 2004, 6.

Although these are valid concerns, they do not stand as reason to exclude future NFW production from the assessment process. A decision is likely to be made by the NWMO, which has a clear mandate and is legally required to submit its recommendations by November 2005. If there are any problems in selecting a NFW management option, these could result in the federal government's assessment of the NWMO's recommendation and in its choice whether or not to adopt and implement the NWMO's recommendation.

The NWMO Ethics Roundtable, in its assessment of the influence of stakeholders who do not want a solution to the waste question, appears to suggest that any solution to the waste management problem will entail continued production of NFW far into the future. Depending on how the NWMO approaches the issue of future NFW production, this need not be the only outcome in the implementation of a waste management option. Many stakeholders would be interested in seeing a solution implemented for the problem of NFW management, but only if this solution addresses their concerns regarding Canada's continued reliance on nuclear energy. Future NFW production is a critical contextual issue surrounding NFW management which has been repeatedly raised by stakeholders, and consideration must be given to including it in the assessment of NFW management options.

The decoupling of NFW management from the continued production of NFW is an issue which has challenged many of the recent proceedings regarding waste management. The future production of spent nuclear fuel is an issue which has officially been excluded from terms of reference, as in the case of the Seaborn Panel. It also has not been given a prominent role in the NWMO's discussions. However, participants in both proceedings have repeatedly raised this issue and expressed frustration with its exclusion.

The idea has been advanced that any assessment of management options must take into account whether or not NFW will continue to be produced indefinitely into the future. There is a

reciprocal relationship between NFW production and NFW management, where any changes in one area will significantly affect the other. For example, increasing energy production increases the level of wastes to be dealt with. Projecting energy production increases into the future indicates that waste levels will also increase, and therefore any management facility will have to be flexible enough to cope with the increased wastes.

In turn, selecting a waste management option also affects future NFW production levels. This comes in the form of recommendations for the future direction of energy production, depending both on the physical capacities of the type of management option selected, and the ethical implications of the management option.

The recommendation of a management option for present accumulations of spent nuclear fuel will affect future levels of production. Depending on the management option selected for recommendation, this could occur in four ways. The first is through tacit endorsement of continued production at present levels, or even increased production of spent nuclear fuel. The second is that continued production, either at present levels or at increased levels, could also be achieved through explicit endorsement made by the NWMO as a result of the selection of a waste management option. In the third, an explicit condemnation of continued nuclear fuel waste production would lead to a decrease in levels of waste production or a gradual phase-out of nuclear energy generation by not extending the life-span of current reactors - possibly until no nuclear fuel waste resulting from power generation would be produced. In the fourth possibility, non-explicitly expressed condemnation might influence the future production of spent nuclear fuel in terms of decreased output, or gradual phase-out. However, with the amount of support the nuclear industry receives, Canadians' reliance on nuclear power generation as a source of energy, and a projected increase for energy consumption in Canada, it is possible that unless

continued nuclear fuel waste production is explicitly condemned, or a phase-out is recommended by the NWMO, production levels would not decrease.

Other arguments have been advanced favoring the linking between present accumulations and the future production of NFW. These arguments also advocate prioritizing this link in decision-making factors. These arguments are based on technical grounds, in terms of effectively creating scenarios in order to adequately design facilities that will be able to cope with the wastes, amounts both actual and projected. If a community is considering hosting a waste management facility, these are facts which they will want to know. For example, hosting already-existing wastes might seem more acceptable than agreeing to host an unspecified amount of waste:

The question of the future of nuclear power and how best to manage used nuclear fuel intersect. It makes a substantial difference if the waste management question is focused on dealing with the waste that exists now, or focuses on wastes from an industry with a long future¹⁸.

In this instance, recommending a waste management option would necessitate an exact statement on the amount of NFW requiring management, which would indicate the direction in terms of waste output the nuclear industry would have to adopt.

One other related issue is that the selection of a waste management option could tacitly endorse a future direction for the nuclear industry without that direction having general social approval. The selection of a waste management option could be used to justify continued NFW production, arguing that because a solution for the problem of waste management has been found, it is appropriate to continue producing the waste. This is a real risk if the future of nuclear energy generation in Canada is not a subject examined in association with waste management options.

¹⁸ NWMO Ethics Roundtable. Meeting Notes: September 5th, 2003, 5.

NWMO Ethics Roundtable and NFW Production

The NWMO Ethics Roundtable was appointed the president of the NWMO, Elizabeth Dowdeswell. The Ethics Roundtable consists of six ethics experts recognized for their contributions in varying fields, such as law, professional ethics, and Aboriginal issues.

The group's purpose is to ensure that ethical considerations are being integrated into the development and application of the assessment framework which the NWMO will use in examining NFW management options. This group has met several times to assess the work completed by the NWMO and to provide feedback to the NWMO. The Ethics Roundtable has also produced a Social and Ethical Framework to help guide the NWMO in its assessments.

In its Social and Ethical Framework, the Ethics Roundtable has advanced that a distinction exists between ethically-optimal waste management options and least-unacceptable waste management options. The ethically-optimal waste management option would, at the very least, enjoy broad public support as the most viable NFW management option. The least-unacceptable, on the other hand, would be recognized as the recommended management option resulting from numerous trade-offs between stakeholders in assessing NFW management options, and for this reason would not have the same level of support as the ethically-optimal waste management option. As the problem of NFW must be dealt with in a swift manner, the NWMO would be ethically justified to select a waste management option that is least-unacceptable, if there were no ethically-optimal waste management options. However, the future production of NFW would not be ethically justifiable under a least-unacceptable option, as it would be under an ethically-optimal option¹⁹.

¹⁹ NWMO Ethics Roundtable. Ethical and Social Framework, 1.

This is an important distinction, both in its comparison of waste management options from an ethical perspective, and for its direct referral to the future production of NFW as a critical component for assessing waste management options. It is also a relevant distinction at this juncture, as the NWMO has advanced the possibility that no ideal waste management solution is likely to be found. However, this raises an important question: how would the NWMO assess the differences between the ethically-optimal and the least-unacceptable waste management solutions?

The problem of whether it is fair to determine that a solution for a problem has been found without addressing the root of the problem has also been raised. This also relates to the suggestion advanced questioning whether an issue can adequately be dealt with, without examining the context in which the issue exists. NFW management is situated within a social, political, economic and environmental context, where the future production of NFW plays an influential role. Due to this influence, many stakeholders hold that nuclear energy production is directly linked to NFW management:

It may be important to discuss the conditions for which implementation of a particular waste management solution is appropriate. And these conditions may include the future of nuclear energy²⁰.

Nuclear Waste Watch and the Context of NFW Management

Nuclear Waste Watch is an environmental watchdog group for nuclear fuel waste management, composed of many provincial- and national-level groups, such as the Sierra Club of Canada and the Conservation Council of New Brunswick . The aim of Nuclear Waste Watch is to provide a public interest response to the activities of the NWMO.

²⁰ NWMO Ethics Roundtable. Meeting Notes: January 17th, 2004, 6.

In its position statement, Nuclear Waste Watch raises many concerns dealing particularly with the decision-making process of the NWMO, and also with deep geologic disposal as a waste management option. Nuclear Waste Watch raises issues related to the process undertaken in assessing and selecting a waste management option. This group holds that NFW management must be situated within the wider context of the nuclear fuel cycle, in order for a proper assessment to be made.

Specifically, Nuclear Waste Watch states that the three important principles of waste management are reduce, reuse, and recycle. As NFW is impossible to recycle, and challenging to reuse, one of the best methods for waste management is reduction at the source²¹. For Nuclear Waste Watch, the context in which NFW is produced must also be assessed in order to determine the best possible method for NFW management. This is a popular environmental practice which could risk not being recognized and considered due to a decoupling of present accumulations of NFW and future production of NFW in the NWMO's discussions. These arguments all raise very important issues which should be considered in assessing waste management options. These points indicate that the future production of NFW must be examined in conjunction with assessing waste management options, both for practical and ethical reasons.

The Relationship Between Values, Decision-Making and Technology

The relationship between present accumulations of NFW and future production of NFW touches upon values central to how individuals seek to shape their lives. This issue forces people to consider these values, and their relative position within the hierarchy of values shaping their lives. Considering this relationship raises questions about valuing the technology which produces

²¹ Nuclear Waste Watch. <http://www.cnp.ca/nww/position.html>

the energy we rely upon over other considerations, such as the environmental sustainability of such technological practices, and their possible deleterious effects of the health of communities and future generations. There is also the question of which technologies are valued over others, such as alternative energy sources like solar- and wind-generated energy, and why. It raises the question of where we would like to see society go in terms of its energy policy, because these policies have very real social and environmental repercussions.

The relationship, examined in the context of the NWMO as a decision-making organization, also raises questions about how meaningful individual input and personal decision-making can truly be with regards to such a huge issue. The relationship between waste management and the future production of NFW is a significant issue, and includes the participation of very large and influential stakeholders (the federal government, the nuclear energy generating companies, AECL, an indifferent populace) who appear to prefer continued reliance on nuclear energy production. It appears that citizen input, although solicited, in fact may not have much impact. This is an important contextual issue regarding meaningful citizen participation in decision-making, which is highlighted by the relationship between present accumulations of NFW and the future production of NFW. This issue must be addressed by the NWMO.

The relationship between present accumulations of NFW and future production of NFW reflects the politically-charged relationships in the assessment of waste management options. The organizations with substantial investments in the continuation of NFW production would not be willing to entertain future scenarios deleterious to the nuclear industry. This is not just to protect financial and human investments, but from sincere beliefs in nuclear technology as a “clean” source of energy, and that nuclear technology can indeed benefit humanity.

The ambiguous approach of the NWMO regarding the future production of NFW is a very real limitation in its mandate, as assessed by the NWMO Ethics Roundtable and Nuclear Waste Watch. This limitation affects the level of public confidence and trust in the NWMO as the organization responsible for fairly assessing NFW management options. For the NWMO to effectively fulfil its aims and incorporate Canadian input in its assessments, it must alter its approach in order to address these complexities in the NFW management issue.

Strengths of the NWMO's Assessments

The NWMO is undertaking a challenging project of enormous scope and magnitude by means never before employed in assessing NFW management. In general, it is laudable that the NWMO has focused a considerable degree of effort on assessing stakeholder and public views, particularly where these views reflect values rather than assessments of technical concepts. The targeted stakeholder groups are also quite varied, and encouraged to participate via different means and media, such as written submissions to the NWMO's website, participation in discussion sessions, responding to surveys, and through responding to direct requests for feedback.

It is also commendable that the NWMO has sought to receive feedback on the creation and the use of assessment framework for the methods of waste management it has been mandated to survey. This attempt at assessing and including values indicates a commitment on the part of the NWMO to truly determine public sentiments regarding waste management, rather than to build consensus, or to undertake a practice that would exclude the public by limiting discussion to technical matters. The NWMO has also consulted with a broad range of experts in

its application of ethical principles and in assessing social values, such as the formation of the Ethics Roundtable.

The NWMO's mandate and procedures reflect many of the issues raised throughout the Seaborn Panel proceedings. Many aspects of the NWMO appear to indicate that some key recommendations made by the Seaborn Panel have been adopted in the NWMO's assessment plan. In particular, the NWMO has incorporated at least three waste management options for a thorough comparison of all feasible options, rather than focusing on one alone. None of the options have been sited to specific areas. As the Seaborn Panel has demonstrated, it is difficult to discuss waste management in conceptual forms. However, it is likely that incorporating specific siting at this juncture in the assessment process would be polarizing for stakeholders and threaten to overwhelm the assessments before a specific management option has been selected.

There is much to respect and commend in the NWMO's work. However, there are some shortcomings in the NWMO's structure and processes which are directly related to the decoupling of waste management from the future production of NFW. These shortcomings threaten the ability of the NWMO to ensure that any option presented to the federal government in fact would have broad public support.

Limitation of the NWMO's Assessments: Proximity to the Nuclear Industry

The legislation creating the NWMO did not follow all of the Seaborn Panel's recommendations. In particular, *The Nuclear Fuel Waste Act* does not legislate that the NWMO must be at arm's length from the nuclear industry, specifically nuclear energy producers and AECL. This is apparent in the composition of the Board of Directors, made up entirely of representatives from energy producers in Ontario, Quebec and New Brunswick. This runs the

risk having the NWMO appear, at the very least, predisposed to the interests of the nuclear industry and therefore not in a position to act in an impartial and objective manner. Wilson also raises the point that a more diverse Board of Directors would ensure a wider degree of social input:

During our deliberations we concluded that the issue before us is not simply technical, but contains important social and ethical considerations as well. People expert in those disciplines would add richly to decision-making. The intent of the Panel was to improve participatory mechanisms and value input from non-industry experts and the public²².

Lois Wilson also expresses concern with implied federal support for continued NFW production. She notes that in the government response to the Seaborn Panel's report, it was advanced that implementing a waste management option would further support the nuclear industry²³. The nuclear industry receives a large amount of support from the federal government, therefore the government would be interested in maintaining its investments and continuing use of nuclear technology in electricity generation²⁴. This is a position which must be acknowledged and assessed in examining the selection process and the content of NFW management options. This would ensure that where the interests of Canadians and the interests of the federal government collide, the interests of the federal government are not the overriding ones without any sort of consultation with the Canadian public. This would ensure that the federal government cannot act without including the views of Canadians.

²² Wilson, 129.

²³ Wilson, 127. Murphy & Kuhn also raise this issue of implied federal support for nuclear energy production, and question the view that implementing a waste management program would serve as an endorsement for continued waste production. These authors all hold that this federal support for the nuclear industry must be assessed and taken into consideration when assessing waste management options.

²⁴ Martin David & David Argue, "Nuclear Sunset: The Economic Costs of the Canadian Nuclear Industry", 1996. Available at: <http://www.ccnr.org/sunset1.html>. 12 February 2005.

Limitation of the NWMO's Assessments: Degree of Inclusion of Native Stakeholder Knowledge and Values

Many stakeholders, particularly those who do not have the power and influence of the federal government and the nuclear industry, have criticized the NWMO's attempts to incorporate the values of less influential stakeholders in the assessment framework. In particular, several Native groups and commentators have been critical of the NWMO's attempts to incorporate Aboriginal Traditional Knowledge (ATK) and values in the NWMO's work.

Concern has been expressed by the Assembly of First Nations that native knowledge is treated in a patronizing manner by the NWMO. ATK is consistently referred to as "values" and "insight", rather than as knowledge proper²⁵. This diminishes the contribution of native groups, particularly in contrast with information more highly valued and held to be "true" knowledge, such as scientific and technical information. Native knowledge also tends to be referred to as "traditional" knowledge. Murphy et al. have raised the point that Native input includes more than what could be considered traditional, such as familiarity with land under consideration for potential waste management facilities and a vast array of experience with all aspects of nuclear fuel cycle, such as the mining of uranium²⁶.

Concern was also expressed with the processes undertaken by the NWMO in soliciting Native participation. The Assembly of First Nations is critical of the primacy of web-based activities, which disadvantages Natives who do not have access to this technology. Many NWMO documents are also not made available in Native languages, such as Cree and Ojibway. As the NWMO seeks to include Native perspectives in its dialogues, the inability of many Natives to access and understand important information documents is problematic.

²⁵ Assembly of First Nations. First Nations Nuclear Fuel Waste Dialogue Group. Meeting #2 Report.

²⁶ Assembly of First Nations. First Nations Nuclear Fuel Waste Dialogue Working Group. Meeting #2 Report, 10.

Funding is not distributed for interveners who would like to participate in the NWMO discussions. To date, input has largely been gathered via random sampling of Canadians who may not be as well-informed or interested as other groups, such as Native associations, community groups and non-governmental organizations. These groups, in turn, may not be in a financial position to travel and participate in the NWMO dialogues. In Murphy et al's estimation, this favors stakeholders with more money and access to information, such as the nuclear industry and varying levels of government. Although the NWMO seeks to incorporate the values and beliefs of all stakeholders, the unequal footing on which stakeholders participate taints the process with unfairness, especially where these groups, particularly Native groups, represent key stakeholders in the discussion.

Of important concern is the lack of concrete mechanism for the inclusion of Native knowledge. Although Native input is sought, it is not clear how this input will be included in the NWMO's assessments. There is also no specifically Native representation on the Board of Directors, nor in the Advisory Council, to advance Native views and ensure that what has been presented by Native groups in dialogue is not misinterpreted.

There are also specific examples of how Native knowledge and values could only be incorporated into the NWMO's assessments with great difficulty. ATK values the earth, and views the environment in a holistic manner. The idea of isolating the waste from the environment is impossible; because it exists, it will necessarily influence and be influenced by its surroundings, no matter how it is to be managed:

Even a basic understanding of ATK (Aboriginal Traditional Knowledge) would reveal that it is impossible to isolate something from the environment. Whether the waste is stored in warehouses, at nuclear reactor sites, or in the Canadian Shield, it is still part of the environment²⁷

²⁷ Assembly of First Nations. First Nations Nuclear Waste Dialogue Working Group. Meeting #1 Report, 5-6.

Most importantly, from this perspective, it makes no sense to focus solely on waste management options without examining how this waste came to exist and what it was used for. This perspective advances a view which advocates not decoupling NFW management in the present from the future production of NFW. Due to the composition and some of the practices of the NWMO, this critical insight risks not being granted the consideration it deserves.

Complacency in the Canadian population

Another challenge facing the NWMO's work is a general level of disinterest and complacency amongst the Canadian population regarding nuclear fuel waste management. Many reasons exist for this disinterest. Although the NWMO has attempted to find ways to encourage participation in discussing this important issue, these efforts have not always borne the most fruitful results.

As Murphy et al. note, the NWMO's solicitation of input, excluding recent public meetings to discuss the second discussion document, has not been entirely public and transparent:

In fact, we have noted that the NWMO's "public engagement" techniques (for example, opinion polls, conversations about expectations, and current focus groups held by the CPRN) favour methodologies which select for individuals who are uninformed about NFW management, and the history of the policy process, while seeming to avoid those informed and active groups who have participated and been aware of the process all along²⁸.

This supports the impression that the NWMO could be seeking to build consensus for a pre-determined solution rather than assess whether consensus exists, particularly where

²⁸ Murphy et al., 4.

uninformed participants are selected to participate rather than those who have been following the issue for a long period of time. It could also appear that the NWMO is seeking to avoid participants aware of the many complexities of the debate which could challenge the views of highly-involved stakeholders, such as the nuclear industry. Holding public forums to solicit feedback on the discussion documents released to date is a responsible information-seeking act, but it may not be sufficient to ensure that all views are incorporated, and that a certain level of incorporation is evident.

NFW management is a complex issue, and it is a challenge to envision and comprehend all aspects of the debate. It is not an issue with a high profile in Canada, and it is often viewed as a technical issue outside the purview of social values and ethics. The NWMO itself has noted that citizen participation in the discussion has been limited²⁹. It is exceedingly difficult to assess the social values Canadians hold regarding NFW management if they are not interested at all in discussing or learning more about the issue.

Participation in Decision-Making

Ultimately, however, one of the largest criticisms resides in the extent to which Canadian citizens participate in the actual decision-making. The NWMO's insistence on including the values of Canadians in its framework, and its attempts to obtain stakeholder feedback on its discussion documents, are to be commended. The NWMO has attempted to gauge Canadians' views via a variety of means, such as polling, random sampling, soliciting commentary for the on-line library submission, and convening information groups to discuss the release of the second discussion document, "Understanding the

²⁹ This was noted in the NWMO Ethics Roundtable Meeting Notes (January 17th, 2004), where very few requests had been made for copies of the first discussion document, "Asking the Right Questions?" and very few submissions offered regarding the discussion document. However, many more submissions have been archived in the on-line submissions library on the NWMO website.

Choices”. Although drawbacks have been expressed with the emphasis placed on web-based activities and the small number of public sessions, the NWMO has made an effort to reach out to Canadians with their project.

Although feedback from Canadians is being incorporated into the assessment framework, in many cases it is uncertain how this feedback will be weighted and incorporated in a concrete manner. It is also not clear how this feedback will concretely be used in selecting a waste management option for recommendation.

This raises an important question: what role do stakeholders play in actually selecting the waste management option to be recommended to the federal government? Some members of the Ethics Roundtable have articulated the difference between a process focusing on the right of the public to be heard and the right of the public to participate in decision-making. To date, it appears that the activities of the NWMO have been geared toward the public being heard, although the NWMO has stated that its intent is for the public to participate in decision-making³⁰.

The point has also been raised that the political process in which and through which the NWMO’s recommendations will be made and implemented must be made clear for stakeholders participating in the NWMO’s discussions. This could entail, at the very least, issuing a report describing the steps to be taken by the federal government in its decision-making. It could also include a list of ways in which stakeholders could continue to be kept up-to-date and informed during government deliberations.

Recommendations

In view of these challenges, there are at least two recommendations which could be made. The first is that the NWMO should actively include the future of NFW

³⁰ NWMO Ethics Roundtable. Meeting Notes: January 17th, 2004, 2.

production in Canada in its assessments. This could take several forms, and would not necessarily entail issuing a direct and separate statement on Canada's energy policy. Realistically, it may be too late to include it in the NWMO's assessments, and it is beyond the NWMO's mandate. However, the NWMO could recommend to the federal government that an independent assessment be conducted of the future of nuclear energy generation in Canada. This intent would be to determine, before implementing a waste management option, whether Canada should continue to produce NFW into the future³¹. This assessment would therefore be conducted by a specialized group, incorporating representatives of the important stakeholder groups, prepared to deal specifically with the future of NFW production.

The issue of Canada's continued production of NFW has been repeatedly raised throughout the public waste management assessments. The NWMO is committed to consulting with Canadians regarding their views on NFW management. Therefore, it does not make sense to completely disregard this issue in the final recommendation made to the federal government.

The second recommendation entails ensuring that Canadians are more actively involved in decision-making regarding an issue that will greatly affect the future environmental, economic and social status of Canada. The recommendation made by the NWMO should be further assessed before it is actually recommended. This could entail a form of citizen's panel selected to offer a final assessment of the recommendation before it is made to the federal government.

This could also include Parliament, rather than relying solely on the federal Minister of Natural Resources, in the final decision-making. This would allow Canadians to further advance issues which are important to them in NFW management, via their Members of Parliament. These issues would include the future of NFW production,

³¹ This was also recommended by the Seaborn Panel, and promised by the federal government in its response to the Seaborn Panel. However, this separate assessment was never undertaken.

which has not been mandated into the NWMO's project but which has shown to be of great importance in discussing the issue. This would also work toward ensuring that the waste management option selected has broad public support, and would render decision-making more transparent to stakeholders. This might also allow for increased attention to be focused on the issue of NFW management, and for closer scrutiny to be made of the recommendation.

Due to the scope and complexity of the issue, the polarization of stakeholders on the issue of future NFW production, and the ambitious plan the NWMO has instituted for assessing waste management options, concern has been expressed that no decision will be made. This would mean that NFW would continue to be stored temporarily on-site at nuclear generating stations. To force that situation on stakeholders, particularly those currently living in communities hosting reactors, would be unfair. Doing nothing due to institutional challenges is not an appropriate solution. However, for the NWMO to recommend that waste continue to be stored on-site at nuclear reactors is different from not making a decision. For example, NFW could continue to be stored on-site until more studies have been performed into the various means of NFW management, or until the future direction of nuclear energy generation has been clearly elucidated by the federal government and supported by the Canadian population.

It is believed that these recommendations would ensure that the interests of the Canadian population would continue to be placed at the forefront in assessing waste management options without overly complicating and confusing the search for a waste management option, nor by dragging out the decision-making process so that no decision is ultimately made.

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