NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

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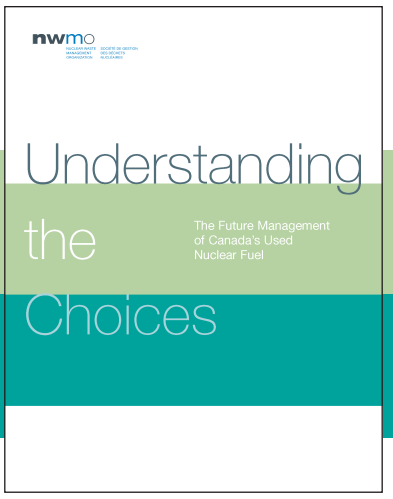
Facilitator's Report

Facilitator's Report on NWMO Workshop on The Nature of the Hazard of Used Nuclear Fuel

Stratos



Discussion Document 2: Understanding the Choices

The NWMO has committed to using a variety of methods to dialogue with Canadians in order to ensure that the study of nuclear waste management approaches reflects the values, concerns and expectations of Canadians at each step along the way.

A number of dialogue activities have been planned to learn from Canadians whether the elements they expect to be addressed in the study have been appropriately reflected and considered in Discussion Document 2. Reports on these activities will be posted on the NWMO website. Your comment is invited and appreciated.

21 April 2005

NWMO Workshop on
The Nature of the Hazard of Used Nuclear Fuel

This report is a *summary* of discussions from the NWMO workshop held in Toronto on the 10th of February 2005. Where possible, the report has highlighted areas of common understanding, as well as areas where there were divergent views.

The primary objectives of the workshop were:

- To assist the NWMO to describe the types of hazard which need to be managed, for how long, and why – in terms which can be understood by the public and decision-makers
- To identify implications of this description to NWMO recommendations on the management approach for used nuclear fuel
- To contribute to a balanced and scientifically sound portrait of the hazard presented by used nuclear fuel that is germaine to NWMO's mandate to recommend a management approach for Canada's used nuclear fuel

Welcome and Introduction

The workshop began with opening remarks from Elizabeth Dowdeswell, who thanked the participants for attending, and provided a brief overview of NWMO's activities to date. Of particular note, Ms. Dowdeswell indicated that there had been a varied public response to NWMO's earlier description of the hazard, which in turn led to the need for additional discussion and clarification.

Ms. Dowdeswell also noted the changing nature of the NWMO as it moves towards the latter stages of its mandate. The organization will shift from being a learning and non-judgmental forum to one that takes a stand on particular issues. As part of this transition, the organization must clearly articulate the nature of the hazard and communicate this to the public in terms that they will understand. NWMO must also make clear to the public where there are still uncertainties or lack of agreement on particular issues. She finished by saying she was looking forward to receiving advice from the workshop on the nature of the hazard from used nuclear fuel and how this can be communicated to the public.

Introductory Roundtable

An Aboriginal elder opened the meeting with a prayer, calling on members of the group to seek understanding and learning.

Before addressing the items on the agenda, participants were given the opportunity to introduce themselves and present their expectations for the meeting. The roundtable session revealed the diversity in perspectives within the group, and set the stage for a fruitful and informative discussion.

Participants recognized that safe management of used nuclear fuel implies a long-term responsibility. The group generally agreed that for the public to make informed and considered decisions they need to have access to information that is credible, presented in plain language, and available in a format that is understandable to the target audiences – including the informed public and decision-makers. Information also needs to be of both a technical and non-technical nature, and to include the uncertainties. It was also suggested by one participant that information on the

nature of the hazard from used nuclear fuel should be presented on a comparative basis (e.g. compared to hazards posed by other industrial activities).

Most participants agreed that there should be greater consideration of environmental, social, economic and ethical aspects – including as they relate to Aboriginal communities. It was also recognized that the broader context, including the future of nuclear energy and technology as part of Canada's energy future, will influence how the public views the hazard, and how it should be managed.

Some participants indicated that the public has often felt excluded from consultation and decisions related to used nuclear fuel and nuclear technology. Some suggested that the public is at times intimidated by the scientific nature of the discussion; other participants, however, disagreed and suggested that the public has been involved in consultations and decision-making, and have been provided with the necessary information to make informed decisions.

One participant suggested that although improvements in communications are desired, the most important aspect is attainment of *public trust*, which comes down to three things:

(a) Competence – Do those involved in managing used nuclear fuel have a demonstrated track record of competence?
(b) Well intentioned – Have they clearly demonstrated that they have the public's best interest at heart?
(c) Dialogue – Do they listen to people, and are they prepared to change in response to their concerns?

Most (but not all) participants agreed that public communications should not understate the hazards associated with used nuclear fuel. It was also noted that transfer of knowledge between generations will be important for ensuring ongoing understanding of the nature of the hazard.

Other views included:

Managing the production of nuclear waste
Canada's environmental organizations have taken a unified position on the management of nuclear waste: At this time they do not accept any of the three options proposed by the NWMO for managing Canada's used nuclear fuel. The fundamental principle put forward is that the most effective form of waste management is controlling the production of waste at the source (i.e. not creating this waste in the first place). The focus of nuclear waste management should therefore be on managing existing waste, and reducing (eliminating) the production of additional waste. This position is a restatement of their long-standing opposition to the use of nuclear energy. The moderator emphasized that the NWMO is concerned only with options for the management of used nuclear fuel.

Social, Ethical and Economic Considerations
There is a range of social and ethical considerations that should be incorporated into the NWMO's assessment of management options. In particular, Prior Informed Consent is very important to Aboriginal Peoples, and as such it is unethical to proceed with activities that will impact Aboriginal lands without Aboriginal participation and input. Siting decisions should take into consideration impacts on Aboriginal land and culture, and should respect the contributions made by traditional knowledge and knowledge holders.

Transportation options for used nuclear fuel should also take into consideration impacts on Aboriginal land and culture, as well as the potential economic impacts at the destination site. It should also be noted that there could be accidents during transport, as well as in other parts of the process. There is a full system to respond to accidents during transport; a "design basis" accident has been used to establish requirements for response plans, gear, training and response times.

What Needs to be Managed?

The facilitator re-emphasized that the purpose of the workshop is not necessarily to achieve consensus, but to identify areas of common understanding, differences in views and interpretations, and areas of uncertainty. To give some structure to the open discussion, participants' inputs are organized in the following format:

(a) Issue
(b) Range of View Points
(c) Areas of Common Understanding
(d) Uncertainties
(e) Implications for NWMO

One participant provided an overview of the hazard associated with used nuclear fuel that served as a good technical introduction to this discussion. According to this participant, public communications concerning the nature of the hazard should include logical guidance in the form of the following questions:

(1) What is the inherent hazard of used nuclear fuel?
(2) How can it be hazardous to me?
(3) What will NWMO do to ensure that I'm protected from this hazard?

This line of questioning addresses aspects associated with dose levels, response rates, and pathways; it also simplifies the discussion of the nature of the hazard and helps the public to make an informed decision about the actual risk posed by used nuclear fuel.

Participants generally agreed that in describing the hazard it would be useful to focus on what is distinct about used nuclear fuel, and recommended use of the term "inherent hazard" to identify the potential for causing harm. This is independent of actual risk, which includes consideration of the danger of being harmed, or actual risk of exposure.

It was agreed that the *inherent* hazards of used nuclear fuel are primarily its radiotoxicity and its chemical toxicity.

Radiological Hazard

Participants generally agreed that ionizing radiation from used nuclear fuel is inherently hazardous for human health and the environment. It was also agreed that there are dangers associated with both external and internal exposure to ionizing radiation, and that these dangers and resulting impacts from exposure need to be more clearly identified and described in NWMO's public communications. Participants also agreed that the greatest inherent radiological hazard exists in the short-term (e.g. hazard is highest when the fuel bundle is first removed from the reactor, and then decreases over time), and while it tends to decrease over time, it

remains a hazard for an indefinite period. Several participants cited examples of information on the inherent radiation hazard that could be useful in public communications, including examples found in the NWMO's Nature of the Hazard Background Document and other key documents.[1]

While some participants suggested that the management timeframe for used nuclear fuel should be ten thousand years, others indicated that used nuclear fuel should be managed *indefinitely*. It was also suggested by one participant that many natural uranium deposits have been discovered on earth, and that these deposits contain radioactive materials almost identical to those in used nuclear fuel (in the long term following use of this fuel in reactors). The participant suggested that it is possible to emulate the characteristics of natural uranium deposits to ensure long-term protection of life from the hazards of used nuclear fuel. Others, however, argued that because of the inherent hazard of uranium ore, it should not be used as a measure of safety, and noted the importance of the drinking water information on radio-toxicity and chemical toxicity of uranium and the external exposure hazard found in the Background Document.[2] Still others suggested that nuclear fuel should be managed until it reaches a level that is deemed 'safe' and 'acceptable' to the public, or until it meets all Canadian regulatory standards.

While it was generally agreed that high doses from radiation can be harmful or even fatal to human health and other living organisms, there was disagreement over the effects of low doses of radiation. One participant suggested that exposure to low level doses of radiation can be *beneficial* to human health, whereas others suggested *there is no safe level of exposure to additional ionizing radiation*.

It was noted that the International Commission on Radiological Protection (ICRP) guidelines identify 1mSv/year as the annual radiation dose limit for the general public. This limit does not include the general exposure rate of the Canadian public from background radiation, which is typically 3 mSv/year. One participant suggested that 1mSv/year level is an action point, and suggested that 0.3mSv/year is an appropriate level to account for uncertainties. It was acknowledged that the NWMO must establish management systems to meet Canadian regulations, which at this point include maximum exposure rates of 1mSv/year for the general public, and 20mSv/year for nuclear energy workers when averaged over a 5-year period.

While the science surrounding radioisotopes contained in used nuclear fuel continues to evolve, uncertainty remains around individual responses to ionizing radiation. Both the ICRP and the European Committee on Radiation Risk (ECRR) have released reports that include a good description of the non-universal responses to radiation doses. As NWMO must work with regulated radiation dose limits, it must be aware that there is active research in this area, and that flexibility in the management approach is required to meet regulatory changes over time.

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[1] Table 3 in the Nature of the Hazard Background Document provides a good overview of external radiation from used nuclear fuel and exposure time for public dose limits as a function of time

Figures 4 and 11 from Mehta et al. (1991) give an approachable graphic representation of internal Potential Health Hazard over time

Figure 2 in the Nature of the Hazard Background Document provides a graph of the total activity of used nuclear fuel as a function of time; recommended that time extend beyond 10^6

[2] For more information, see Table 2 and pages 5 and 7 in the Nature of the Hazard Background Document

Management systems for used nuclear fuel currently allow for re-packaging, both to prevent containment breaches, and to allow access in the event that Canada chooses to reuse or recycle used nuclear fuel. One participant noted that the current on-site management system is only designed for a few more decades of storage. The long-term storage management options are designed for access; however, for the option of deep geological disposal in post-closure, the feasibility of access is in question. Most participants agreed that management approaches should be designed to meet Canadian regulatory requirements under the Nuclear Safety and Control Act.

One participant indicated that used nuclear fuel is not hazardous when it is sealed in its robust containers, because it cannot deliver a harmful dose of radiation or chemicals to living organisms. However, other participants stated that used nuclear fuel is a chemically toxic, radioactive substance that is inherently hazardous regardless of how it is contained.

While one participant suggested that a credible scenario for the release and delivery of harmful doses is a prerequisite for declaring used nuclear fuel to be a significant hazard, another indicated that the industry now uses design-basis accidents, along with requirements to establish response capacity. It was suggested that it cannot be assumed that everything designed will work perfectly, and as such it is important to discuss the possibility of accidents, as well as how this possibility will shape long term storage.

Another perspective is that of Aboriginal Peoples. For example, elders are noting differences and changes in nature over time that have direct relevance to nuclear energy issues.

Summary:

(a) Range of View Points

- There is no safe level of exposure to radiation
- Exposure to low level doses of radioactivity can be beneficial to human health
- No one should be exposed to more than 1mSv/year (consistent with ICRP guidelines); nuclear energy workers should be limited to 20mSv/ year.
- Used nuclear fuel should be managed until it matches the characteristics of natural uranium ore
- Used nuclear fuel should be managed until it reaches a level that is safe and acceptable to the public

(b) Areas of Common Understanding

- NWMO should define the hazards associated with both *external* and *internal* exposure to radiation, after discussing the inherent hazard of irradiated nuclear fuel (INF).
- High doses and dose rates to radiation are harmful; effects of low doses and dose rates are uncertain
- The inherent radiation hazard of used nuclear fuel diminishes over time, but the hazard remains indefinitely
- Science surrounding radioisotopes contained in used nuclear fuel continues to evolve, but some aspects are still not well understood
- Individuals do not respond in the same way to radiation (see ICRP and ECRR reports that describes non-universal responses to radiation dose levels)
- Used nuclear fuel will remain radioactive well beyond 10,000 years (in actual fact, for billions of years)

- For the purpose of regulations, it is consistent with international practice (ICRP) to suggest that there are health risks associated with all levels of radiation exposure
- Ionizing radiation can have a negative impact on both human health and ecological integrity; therefore, safety should refer to both human exposure and environmental exposure.
- Used nuclear fuel must be managed in a way which meets Canadian regulatory standards for exposure.

(c) Uncertainties
- There is not sufficient evidence to show that there is a universal dose response among individuals exposed to low doses of radiation (see ICRP and ECRR reports)
- It is impossible to predict the stability of the engineering solution, the environment, future civilizations or society in general
- It is unclear what the future energy market will look like, what will be the role of nuclear power in Canada's energy mix, or if there will be a future market for used nuclear fuel

(d) Implications for NWMO
- Used nuclear fuel must be contained, but management must also allow for monitoring, retrieval and re-packaging to ensure that there have been no containment breaches. There must also be a way to address the possibility of engineering failure
- Proposed long-term management solutions must give reasonable assurance that they are consistent with Canadian regulatory requirements under the Nuclear Safety and Control Act for protecting the health and safety of humans and the environment.
- Better technology may exist in the future to recycle used nuclear fuel in a cost-effective manner (technology exists today, but it leaves High Level Waste which would still need care). As such, we should ensure that future generations have access to this material
- Prior Informed Consent is important to Aboriginal Peoples.

Chemical Hazard

There are two primary hazards associated with used nuclear fuel: radiological toxicity and chemical toxicity. While it was generally agreed that chemical toxicity is of secondary concern in the short term (radiological toxicity being the primary focus), the primary hazard in the long term is considered by some participants to be chemical toxicity, as this hazard persists indefinitely.

As well as having a general discussion on the inherent chemical hazard of used nuclear fuel, specific concerns were also raised about the toxicity of uranium, plutonium and polonium. It was noted that the NWMO should present information on the inherent chemical toxicity of used CANDU nuclear fuel that identifies the main contributors to that hazard over time.

The primary risk to human health and the environment is from breach in containment, which could result in localized high doses or low-dose, long-term exposure (e.g. through ingestion of contaminated groundwater). Internal ionizing radiation hazard and chemical toxicity share the same pathways of exposure and they are both significant hazards for the long-term. There are currently measures in place to protect human health and the environment from containment breaches, but

it is difficult – if not impossible - to ensure the same level of protection for an indefinite period.

It was also suggested by one participant that used nuclear fuel is unlike non-radioactive wastes because of its changing chemical composition over time; some felt that the changes in chemistry are well understood, whereas others questioned this understanding.

One participant added that some types of chemical toxicity can be neutralized through chemical or physically induced effects. However, there is not any reasonable way to remove the characteristic of radioactivity.

Uncertainty exists around the human dose response to chemical toxicity. Although the NWMO has accepted the linear approach that is consistent with the international community, a universal dose response rate has not been established, as individual response rates to chemical toxicity can vary. It was noted by one participant that the dose-response curve is a graphic representation of the quantitative relationship between the level of exposure and the intensity or occurrence of a resulting adverse health effect.

Management of used nuclear fuel should address the chemical hazard that is inherent in the substance, and should include emergency response plans to respond to unanticipated events (i.e. spills, slow leaks through rock fissures, etc.).

Summary:

(a) Range of View Points
- After 1000 years the primary hazard associated with used nuclear fuel is chemical toxicity
- Chemical hazards are of secondary concern; primary focus in the short-term should be on radiological hazards associated with used nuclear fuel
- Chemical toxicity and internal radiotoxicity share the same pathways of exposure and are both hazards for the long term
- Used nuclear fuel is unlike non-radioactive wastes because of its changing chemical composition over time
- The primary hazard results from low-dose, long-term exposure; however, exposure could also be localized and high dose

(b) Areas of Common Understanding
- The chemical hazard from used nuclear fuel will persist indefinitely
- The management system should address directly the chemical hazard inherent in the substance, and should include emergency response plans (e.g. to respond to spills, etc.). This is the same for radiation hazards.
- Containment is required to minimize risks to human health and the environment

Security

Participants generally agreed that used nuclear fuel poses some form of security risk. However, not all participants agreed that the NWMO should be making public the specifics of some risks such as those related to the use of plutonium in weapons

manufacturing, both because it may increase vulnerability to terrorist attacks, and because it may unnecessarily raise fear in our society.

One participant noted that security is a national responsibility, and that the Government of Canada carries both the authority and the means to sustain protection of used fuel storage facilities. Internationally, it is the present policy of the IAEA that the geological repositories containing used nuclear fuel will remain under IAEA safeguards. Canada supports this policy.

Most participants felt that realistic security risks should be identified by NWMO, for example potential risks from sabotage at existing storage facilities. Some felt that the possibility that plutonium and uranium from the used nuclear fuel could be processed and used in weapons manufacturing should be identified. Others said that theft of highly radioactive plutonium is not a realistic concern; however, some participants felt that there is a realistic concern for use in dirty bombs (traditional explosives used to distribute used nuclear fuel over a sensitive area).

One of the greatest challenges for the NWMO is striking a balance between security and access. Access is required to monitor and maintain containment, and to mitigate problems should they arise, and there might also be economic value in re-use of spent fuel. However, allowing such access leaves the fuel vulnerable to undesired use in the future.

How Long Does Used Nuclear Fuel Need to be Managed?

Most participants agreed that used nuclear fuel is inherently hazardous for a very long time, and that in practical terms, the hazard associated with used nuclear fuel can be considered to persist indefinitely.

Range of View Points

- Used nuclear fuel is inherently hazardous for an indefinite period of time
- Used nuclear fuel should be contained and controlled for at least 1 million years
- Used nuclear fuel should be managed for 10,000 years (this was the timeframe arbitrarily established in USA, and was based on the assumed ability to conduct meaningful quantitative safety assessments of management procedures; quantitative assessments extending beyond the 10,000 year timeframe are more uncertain and should be complemented with qualitative analyses and other reasoned arguments)
- Compliance with protection requirements should extend beyond 10,000 years (The 10,000 year compliance period was removed by the Court in USA because it was "not based upon or consistent with recommendations of the National Academy of Sciences," who rejected limiting compliance to 10,000 years)[3]
- The timeframe for protection should be determined by consideration of the waste as if it were unprotected at the earth's surface[4]

- [3] The National Academy of Sciences rejected limiting compliance to 10,000 years, and the US Court removed the 10,000-year compliance period (from the court decision July 2004: **V. CONCLUSION** In sum, we vacate 40 C.F.R. part 197 to the extent that it incorporates a 10,000-year compliance period because, contrary to EnPA section 801(a), that compliance period is not "based upon and consistent with" the recommendations of the National Academy of Sciences.)

[4] Page 7 of *The Nature of the Hazard Background Document* states that "uranium ore, fresh nuclear fuel or million-year old used nuclear fuel would be a potential external exposure health risk if left uncontrolled at the surface."

Public Communications

In addition to developing a statement, it was also suggested at the workshop that an additional explanatory text or preamble be developed by NWMO. This contextual piece would precede the NWMO statements, and would help to provide additional clarity and understanding of the nature of the hazard. The explanatory text would include items such as the following:

a. a definition of the word 'hazard', allowing both for inherent hazard and how that hazard can be "actualized".
b. identification of the management timeframe
c. a discussion of where NWMO management efforts should be focused in both the near- and long-term
d. a discussion of the inherent radiation hazard of used nuclear fuel for external exposure and for internal exposure in humans, and the inherent chemical toxicity of used nuclear fuel.
e. comparison of hazard from used nuclear fuel to other radiological uses and other industrial hazards (note: this was not supported by all participants)
f. a discussion of dose and exposure pathways, and of the health and environmental impacts associated with different exposure pathways and scenarios (note: environmental impacts include both biotic and abiotic components)
g. an overview of the current regulatory environment (including standards), and of how used nuclear fuel is currently managed in order to meet these standards
h. identification and recognition of uncertainties and knowledge gaps
i. recognition of the contribution of traditional knowledge as well as western science
j. be prepared to discuss accidents or potential engineering failures
k. identification of key security concerns, including dirty bombs, and access to waste stored on the surface as opposed to underground.
l. links and references to additional information sources.

Revision of NWMO Statements

This section provides a summary of discussions that contributed to the revision of NWMO's proposed statements, and is intended to provide insight into the range of views presented. Revised NWMO statements were circulated to participants prior to dissemination of this report; as such, this section will serve only as a summary version of discussions during the workshop's afternoon session.

NWMO Statements:

Proposed:
The main hazards from used nuclear fuel are from exposure to its radiation and from its chemical toxicity.

Discussion:

- The inherent hazards from used nuclear fuel are from exposure to its radiation and from its chemical toxicity.
    - OR: The inherent hazard has nothing to do with exposure. As an example, Avian influenza A (H5N1) has a significant inherent hazard, whether you catch it or not.
- Radiation hazards are a first order priority, with chemical hazards being a second order priority.
- It is consistent with international practice to suggest that there is no safe level of radiation exposure; should NWMO make a blanket statement that there is NO safe level of exposure?
- There are three lines of inquiry when it comes to understanding the hazard. These are:
    - What is the inherent hazard of used nuclear fuel?
    - Can its potential be quantified? How hazardous is it to human health and the environment?
    - How can implementation of NWMO management recommendations protect human health and the environment from the hazards of used nuclear fuel?
    - Can the ability to quantify the hazard be useful in this implementation?
- One participant presented the following views (note: this is the opinion of one individual; some members strongly disagreed):
    - Used nuclear fuel is not a hazard when it is sealed in its robust containers because it cannot deliver a harmful dose of radiation or chemicals to living organisms. A credible scenario for the release and delivery of harmful doses is a prerequisite for declaring used fuel to be a significant hazard.
    - It is an inherent principle of toxicology that it is the dose, not the substance (chemical) or the agent (e.g. radiation), that determines the hazard.
    - The response of living organisms to a chemical or radiation exposure is biphasic. Small doses have a stimulatory (beneficial) effect on their damage-control systems, while large doses have an inhibitory (harmful) effect.
- In contrast, another participant commented that:
    - In toxicology, the dose *and* the specific substance or agent are required since the hazard of a given dose of one substance can be very different than it is for the same dose of another substance. For an agent such as ionizing radiation, if the dose is given in the unit *gray (Gy)* then further information on the *type* of ionizing radiation needs to be specified in order to determine the biological hazard.
    - Organisms do not have a universal dose response. Hormesis, the beneficial effect of very low doses of a toxic agent, has been reported. However, studies also indicate that very low doses can have very harmful effects, greater than predicted by the linear dose response model. Also, the biphasic dose response usually refers to the increasing magnitude of response at very low doses followed by a decreased response (linked to the death of the more sensitive cells or individuals) and then the increasing magnitude of response again with greater doses (linked to the increasing negative impact on the less sensitive cells or individuals).

Proposed:

The material is a hazard to human health and the environment for a period of approximately one million years.

Summary of Discussion:

- 'one million years' is meaningless from a waste management perspective
- Some participants suggested that used nuclear fuel is a hazard to human health and the environment indefinitely; others suggested that a better management timeframe is 10,000 years
- There is a need to make a distinction between short-term risks and long-term risks
- Management solutions need to account for possible changes in technology and possible failures in the solutions proposed, including accidents in transport and in storage
- Containment cannot be guaranteed for an indefinite period
- Use of the word 'indefinite' is in line with traditional knowledge
- Must recognize that there is scientific uncertainty regarding absolute timeframes
- Must also recognize that there is not sufficient evidence to show that there is universal dose response among all that are exposed.

Proposed:
Used nuclear fuel also poses a security risk in that it contains plutonium and other materials.

Discussion:

- The question of security should be addressed in the explanatory text that will precede the NWMO statements, rather than be presented as a separate statement
- Security concerns include theft, plutonium enrichment and other processes for the purposes of making weapons including dirty bombs, regime change and resulting instability, and conventional sabotage of used nuclear fuel storage sites.
- One participant provided the following viewpoints (note: this is the opinion of one individual; some participants strongly disagreed):
    a. The concern about the security of containers of used nuclear fuel is inappropriate because a realistic scenario has not been presented for their sabotage.
    b. Scenarios regarding diverting used fuel and separating plutonium from it to make weapons are not credible.

Proposed:
The NWMO recognizes that there are differing views and expert opinion on the questions of longevity of the hazard from used nuclear fuel and risk to human health and the environment.

Discussion:

- To build and maintain credibility, the NWMO should clearly indicate that some aspects of the hazard from used nuclear fuel are well understood, and other aspects are not well understood.
- The explanatory text should clearly identify where there are uncertainties. Acknowledgment of uncertainty should also be referenced throughout NWMO's communications.

Proposed:
Any approach that NWMO recommends will need to provide confidence that it will perform in a way which:

- *Meets regulatory standards for protecting public health and safety (e.g., exposures below 1mSv/year) and protecting the environmental (e.g., exposures below no effects value; meet water quality guidelines for protecting aquatic life)*
- *Meets ethical standards e.g. returning the material to background levels, natural uranium ore, other*
- *Meets or exceeds relevant management standards adopted by other jurisdictions with long-term management plans for used nuclear fuel*

Discussion

- Primary objective should be to meet all Canadian regulatory requirements
- a statement on ethical standards should include a reference to Aboriginal relationships
- reference should be made to the existing ethical and social framework
- Objective should be to meet or exceed management standards established by Canadian authorities, while taking into consideration international standards

References:

Mehta, K., G.R. Sherman and S.G. King. 1991. Potential health hazards of nuclear fuel waste and uranium ore. Atomic Energy of Canada Limited Report AECL-8407. Chalk River, Ontario.

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