

NWMO Workshop on Nature of the Hazard

A Participants' Statement on Characterizing the Hazard of Used Nuclear Fuel

A workshop addressing the question "what is the nature of the hazard from used nuclear fuel" was held in Toronto on the 10th of February, 2005. The workshop involved 16 experts and other persons knowledgeable on various technical, environmental, health, social and ethical aspects of used nuclear fuel. This statement is the result of that workshop.

The Context

Note: This short section is written to reflect the wide-ranging discussion during the first session of the workshop in the morning, in so far as it provides context for the statement. Topics raised included:

Participants had differing views on the role of nuclear power in Canada.

Management solutions need to take account of possible changes in technology over time.

Prior informed consent is important to apply, including for Aboriginal communities.

There are three lines of inquiry when it comes to understanding the hazard. These are:

- *What is the inherent hazard of used nuclear fuel?*
- *How dangerous is it to human health and the environment?*
- *How can NWMO recommendations best protect human health and the environment from the hazards of used nuclear fuel?*

Inherent Hazard

Hazard can be considered generally as a source of danger or a possibility of being harmed.

The inherent hazards of used nuclear fuel are primarily its radiotoxicity and its chemical toxicity.

Used nuclear fuel is inherently hazardous to human health and the environment. Maximum hazard exists in the short-term, and while it does diminish over time, for practical purposes some hazard remains for an indefinite time.

The concept of indefinite time is in keeping with the premises of traditional knowledge and the need to ensure the health of all living beings. It reflects a recognition that there is scientific uncertainty. There is a view among workshop participants that the containment and isolation of used nuclear fuel cannot be guaranteed for an indefinite period.

April 20, 2005

Pathways

The radiological hazard inherent in used nuclear fuel can negatively impact the health of humans, other organisms and ecosystems if it enters into the environment. It can then have impacts through external exposure to the body, or through internal exposure by lesions, ingestion or inhalation. The chemical hazard inherent in used nuclear fuel can impact humans, other organisms and ecosystems through dispersal and uptake into living organisms. Radiotoxicity and chemical toxicity depend on dose received.

The main potential pathways for internal exposure are through groundwater flow and subsequent entry into the food chain. A potential pathway for both external and internal exposure is through airborne transport of material.

Control and Protection

Used nuclear fuel needs to be contained and isolated as a response to the hazard it poses.

There remain different scientific interpretations of the health impact of low doses and dose rates of ionizing radiation. While experts differ over what may constitute a safe level of radiation exposure, it is consistent with international practice to act, in a conservative manner, as if there are health risks from any exposure to radiation.

Some experts say it may be useful to study the characteristics of natural uranium deposits to ensure long-term protection of life from the hazards of used nuclear fuel.

There is an established international system for radiation protection to regulate radiation exposure resulting from human activity. This has been used for several decades to protect workers and the public.

Participants suggest that NWMO make reference to the International Atomic Energy Agency documentation of this system based on recommendations of the International Commission on Radiological Protection (ICRP) and scientific reviews carried out by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR).

Participants suggest NWMO make reference to a table on external radiation from used nuclear fuel as a function of time. They further suggest that NWMO prepare some form of simple graphic information on potential health hazard from used nuclear fuel.

Some participants suggest that the NWMO make reference to recommendations of the European Committee on Radiation Risk (ECRR 2003) related to the health effects of ionizing radiation exposure at low doses for radiation protection purpose.

Some participants suggest that the NWMO make reference to the draft 2005 Recommendations of the International Commission on Radiological Protection (ICRP).

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Security

Security is required for used nuclear fuel because of the possibility that saboteurs could try to defeat the security measures of facilities and use the material to cause harm to people and the environment. Security concerns also relate to the diversion of used nuclear fuel toward the making of weapons.

Regulation, Standards and Oversight

Any approach that the NWMO recommends will need to provide confidence that its implementation will meet or exceed regulatory requirements established by Canadian authorities, including the Canadian Nuclear Safety Commission, and it should be consistent with internationally recognized approaches. Canadian regulations generally follow international practices but Canadian law takes precedence.

Participants agree that the NWMO should include a short statement on the ethical and social framework which it has applied to its work, and on the perspectives of Aboriginal peoples.

Uncertainty

Much is known about the hazard associated with used nuclear fuel and its implications for long-term management approaches. However, given the long time periods involved, there are limitations to our knowledge and uncertainties associated with the environmental and human activity aspects of management approaches. NWMO should apply a precautionary approach to its recommendations on the management of used nuclear fuels.