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Status of Used Nuclear Fuel and Radioactive Waste Long-term Management Programs in Canada

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In Canada, used CANDU (CANada Deuterium Uranium) nuclear fuel from the operation of 22 current and former nuclear power reactors, as well as several prototype and demonstration reactors, is stored in water-filled pools for about seven to ten years before it is transferred to licensed dry storage containers at the nuclear reactor sites. Although safe, this storage practice requires continuous institutional controls such as security, safeguards, monitoring and maintenance.

In November 2002, the Canadian Parliament passed the Nuclear Fuel Waste Act (NFWA). It required the major owners of used nuclear fuel in Canada to establish the Nuclear Waste Management Organization (NWMO). The initial phase of the mandate was to perform a three year study of suitable approaches for the safe, long-term management of used nuclear fuel, and to recommend a preferred approach to the Government of Canada. The study, which included extensive dialog across Canada with elected officials, specialists and the general public, was completed and the report with a recommendation was submitted to the Government in November 2005.

In June 2007, the Government of Canada approved the recommended Adaptive Phased Management (APM) approach. It is consistent with long-term management best practices adopted by other countries with nuclear power programs. The NWMO was given the mandate to implement APM.

APM is both a technical method and a management system. The end point of the technical method is the centralized containment and isolation of Canada's used fuel in a Deep Geological Repository (DGR) in an area with suitable geology and an informed and willing host community. APM also involves the development of a transportation system to move the used fuel from the facilities where it is currently stored to the new site.

The management system involves realistic, manageable phases, each marked by explicit decision points. It allows for flexibility in the pace and manner of implementation, and fosters the sustained engagement of people and communities throughout its implementation.

APM is also designed to meet rigorous safety standards throughout all aspects of its design and implementation. As per this approach, the used fuel will be isolated and contained in a DGR located in a stable crystalline or sedimentary rock formation at a nominal depth of 500 m below ground surface in a willing and informed host community.

The DGR concept contains multiple engineered barriers to safely contain and isolate the used fuel over the long-term. The geosphere enclosing the repository provides a natural barrier to protect the waste form and EBS, and to mitigate repository releases at time frames relevant to repository safety.

This presentation focusses on the current status of the APM program but will also briefly discuss the status of other long-term radioactive waste management activities in Canada.

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