Radiation Safety

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Canada has been producing nuclear energy since the early 1960s. Nuclear power plants in Canada are subject to strict health and safety regulations and are routinely inspected to ensure they meet or exceed rigorous safety and environmental standards established by the Canadian Nuclear Safety Commission and international organizations.

Protecting People and the Environment

Canada's nuclear industry is subject to some of the **strictest radiation safety standards** in the world. The Canadian Nuclear Safety Commission regulates the life cycle of nuclear plants and has a team of technical experts and onsite inspectors to maintain rigorous oversight of plant operation. Nuclear power plants adhere to rigid radiation protection regulations under the Nuclear Safety Control Act, as well as recommendations from international organizations such as the International Atomic Energy Agency (IAEA) that provide global safety standards for radiation exposure.

Minimizing radiation releases.

Nuclear power plants have control and safety systems in place to minimize radiation releases. During normal operations, they release very small amounts of radiation into the air and water. These releases come from the reactor and its system and from waste management activities.

In order to reduce airborne releases, highly efficient filters and radiation monitors are installed as part of the ventilation systems. Filters remove more than 99% of the radiation from the air before it is released to the environment.

Used Nuclear Fuel.

After nuclear fuel has been used in a reactor, it is removed and stored securely in a water-filled pool for a period of 7 to 10 years. The water in the pool continues to cool the fuel and provides shielding against radiation. All of Canada's fuel pools are built in ground, in separate buildings at the nuclear power plant, and are designed to withstand earthquakes.

After 7-10 years, the bundles are placed in dry storage containers, silos or vaults. After 50 years, the life of the container could be extended, or the used fuel could be repackaged. The Nuclear Waste Management Organization has announced their selection of the Wabigoon Lake Ojibway Nation-Ignace area in Ontario as the site for Canada's deep geological repository for used nuclear fuel. Learn more at nwmo.ca.

Safety Measures in Canadian Nuclear Plants

Canadian nuclear power plants are equipped with multiple, independent **robust control and safety systems** designed to prevent accidents and mitigate the effects should an accident occur. The systems perform three fundamental safety functions: controlling the reactor, cooling the fuel and containing radiation.

Containment Structures.

These are thick concrete walls designed to isolate the radioactive materials inside the reactor. Even in the unlikely event of an accident, the containment structures are built to prevent radiation from spreading.

Radiation Shielding.

Materials such as water, concrete and lead are used to absorb radiation and protect workers and the surrounding environment.

Monitoring Systems.

Continuous radiation monitoring systems are in place inside and outside the plant. These systems ensure that radiation levels remain within strict safety limits, both for plant workers and the nearby community.

A Safe and Sustainable Future

Nuclear power is one of Canada's safest and cleanest energy sources and offers one of the best ways to meet Alberta's constant and growing electricity demands.

Reliable & Consistent.

Nuclear power plants can operate 24/7providing a constant, stable and affordable source of electricity that is readily scalable.

Zero Emissions.

Nuclear energy produces virtually zero greenhouse gas emissions during operation, making it a critical tool in combating climate change.

Energy Security.

In an increasingly volatile global energy market, nuclear power offers a path to energy independence by reducing reliance on imported fossil fuels.

Understanding Radiation

We are exposed to natural and man-made sources of radiation in our daily lives every day. Radiation is energy that travels through space in the form of electromagnetic waves or particles.

Ionizing Radiation.

This type of radiation has enough energy to break an electron away from an atom causing that it to become charged. It is the type produced by nuclear power plants and x-ray machines.

Non-Ionizing Radiation.

This type, such as visible light or radio waves, does not have enough energy to affect atomic structure. It is the type produced by microwaves and Wi-Fi.

Naturally Occurring Radiation.

Radioactive elements like potassium-40 and carbon-14 are a part of the world around us. Potassium-40 is present in the foods we eat, like bananas and potatoes. Carbon-14 is found in the atmosphere and makes its way into us through the food chain.

Ionizing radiation is produced during nuclear fission, the process that powers nuclear reactors. The use of nuclear power in clean energy production is tightly regulated and monitored to ensure the highest standards of public and environmental safety.

Workers in a nuclear power plant are exposed to far less radiation than what you'd experience from a single medical X-ray. Stringent safety protocols, advanced shielding and state-of-the-art monitoring ensure that radiation exposure for plant workers remains extremely low – often comparable to the natural background radiation we're all exposed to daily.