

NUCLEAR *facts*

What about nuclear waste? What is it?

THE TERM “NUCLEAR WASTE” TENDS TO BE APPLIED TO ALL RADIOACTIVE MATERIAL THAT MUST BE MANAGED OVER THE LONG TERM AFTER USE IN A NUCLEAR POWER STATION OR OTHER NUCLEAR FACILITY.

This can include a variety of items, from slightly contaminated clothing, instruments and equipment, to the highly radioactive spent fuel from nuclear reactors. In a slightly different category are the tailings from uranium mines (see *Nuclear Facts* - “How do we protect the environment in uranium mining?”). The common factor is radioactivity.

Almost all manufacturing and industrial activities produce “waste”. The use of nuclear energy is no different, except that the amount of waste is small and, while potentially hazardous, it is very well managed.



Radioactive waste is generally divided into three categories: low, intermediate and high, depending on the level of radioactivity.

Low-level waste includes slightly contaminated clothing and items that could come from various activities, such as hospital departments of nuclear medicine, research laboratories, as well as nuclear power plants. Most nuclear waste falls in this category.

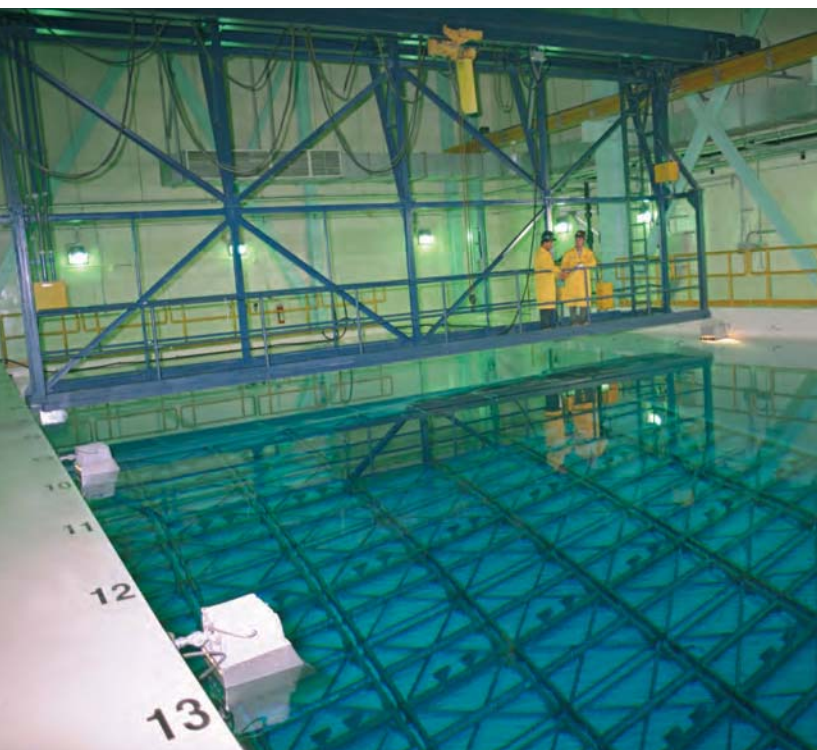
Intermediate-level waste is typically items such as ion exchange columns from the cooling system of a nuclear power plant, which contain a higher level of radioactivity.

High-level waste contains a large amount of radioactive material. The term is often used for spent fuel from a nuclear reactor. This is somewhat of a misnomer since the spent fuel has considerable potential energy, which many countries recognize by reprocessing the fuel from their nuclear power plants to be used again.

How is nuclear waste managed?

Some low-level waste, such as that from hospital nuclear medicine departments, contains only small amounts of radioactive materials that have short half-lives. This means the radioactivity decays away in hours or days. After holding it until the radioactivity has decayed, the waste can be treated like ordinary garbage.

Low-level waste from facilities other than nuclear power plants, contaminated with long-lived radioisotopes above a very low amount, is shipped to a special disposal site, such as that operated by Atomic Energy of Canada Limited (AECL) at its Chalk River Laboratories. Typical disposal facilities for this type of waste involve lined concrete bunkers.



Used nuclear fuel is stored in water bays within each of Canada's nuclear power stations. Here the used fuel can be monitored and cooled.

Low and intermediate waste from the nuclear power plants in New Brunswick and Quebec is stored on-site in special structures of concrete and other materials. Low and intermediate waste from Ontario Power Generation's plants at Darlington and Pickering is shipped to a dedicated facility located adjacent to the Bruce nuclear generating stations near Kincardine, Ontario.

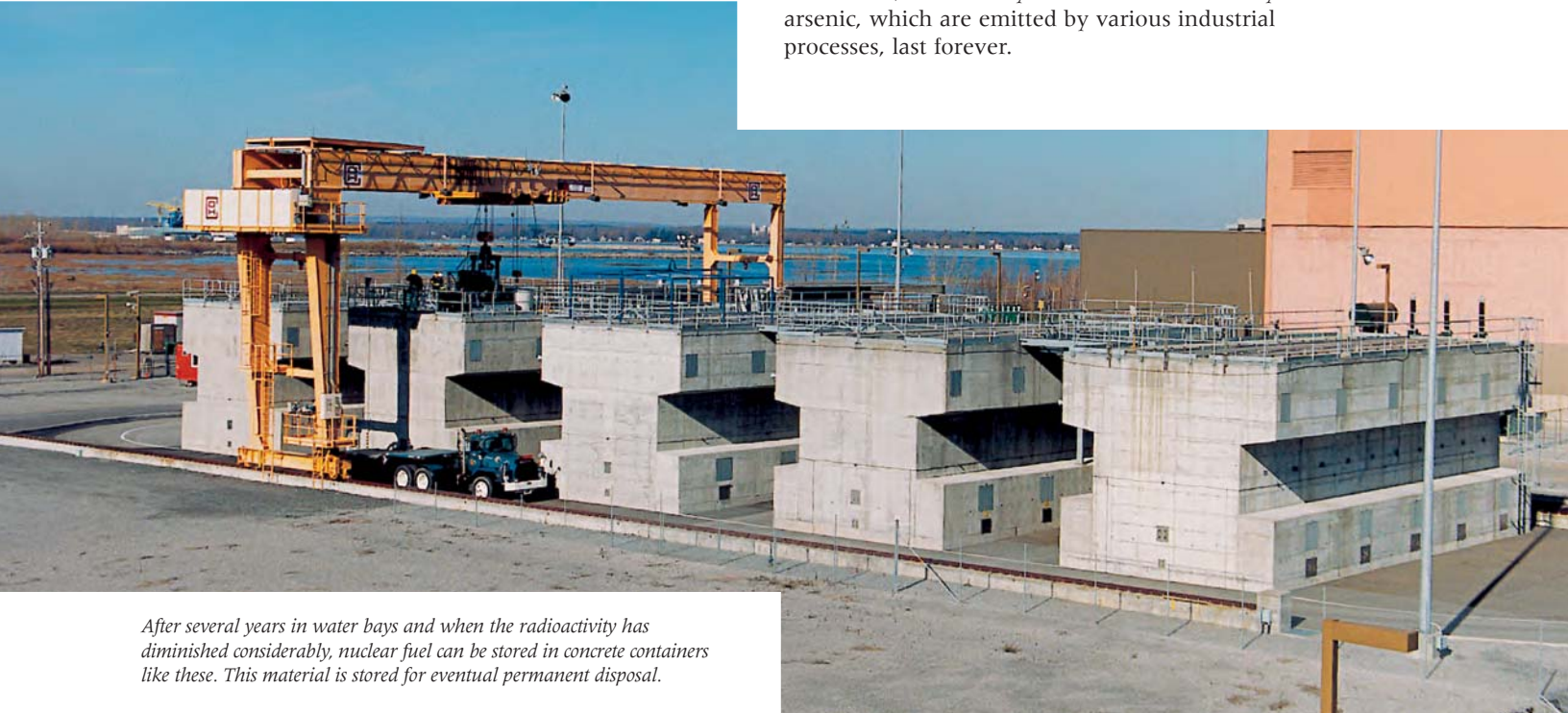
Spent nuclear fuel from nuclear power plants is initially stored extremely securely in large water-filled pools at the stations. The water provides shielding from the radiation and cooling to remove the heat generated by the radioactive material in the spent fuel. After several years, when the radioactivity (and associated heat) has diminished, the fuel is transferred to concrete silos on the

Is nuclear waste dangerous?

The radiation from high-level radioactive waste can be dangerous. That is why it is handled remotely and stored in suitable, monitored facilities. However, the danger is no worse than that from the toxicity of many chemicals and heavy metals.

Some people are concerned about the long-lived radioactivity of used nuclear fuel. It is true that some of the radioactivity will continue for thousands of years. However, most of the radioactive fission products in used fuel have shorter half-lives. Because of this, the radioactivity of spent fuel decays to the same level as that of the original uranium ore in about 500 years.

In contrast, toxic heavy metals such as mercury and arsenic, which are emitted by various industrial processes, last forever.



After several years in water bays and when the radioactivity has diminished considerably, nuclear fuel can be stored in concrete containers like these. This material is stored for eventual permanent disposal.

site of the nuclear power plant.

Canada has developed designs for a deep underground repository for both used nuclear fuel and for low and intermediate wastes.

The federal Nuclear Waste Management Organization (NWMO) was established in 2002 to collaboratively develop with Canadians a managed approach for the long-term care of Canada's used nuclear fuel. It is also seeking regulatory approvals, on behalf of Ontario Power Generation, for the construction of a Deep Geologic Repository for the long-term management of intermediate and low level nuclear wastes. For the most up-to-date information, visit the website of the NWMO: www.nwmo.ca.

Is nuclear waste controlled?

Facilities for handling of nuclear waste must be licensed by the Canadian Nuclear Safety Commission and conform to all of the pertinent regulations and licence conditions. Licences must be renewed regularly. Staff of the Commission conduct periodic inspections.

Radioactive waste facilities are monitored by the licensees and by provincial and federal authorities, and they are kept extremely secure. Health Canada periodically issues reports on the results of the monitoring.

Updated: November 2009



Canadian Nuclear Association

130 Albert Street, Suite 1610
Ottawa, Ontario K1P 5G4
Tel. (613) 237-4262
Fax (613) 237-0989
www.cna.ca

