



# Radioactive Waste

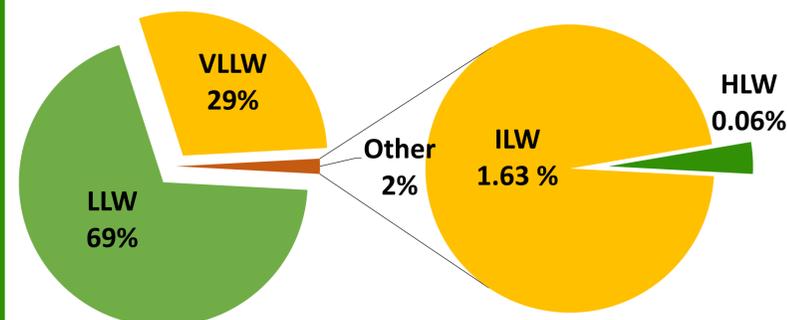
## What is radioactive waste?

Radioactive waste is a by-product of nuclear power generation or nuclear technology, such as research and medicine. These materials are dangerous to the environment, and there are many regulations about their safe transportation, handling and processing. Radioactive waste can occur in different physical and chemical forms and the concentration of radionuclides depends on the applied technology.

## Types of radioactive waste

Radioactive waste can originate from the nuclear fuel cycle (uranium production, enrichment, fuel fabrication and reprocessing). Other sources include medical (diagnostics, therapy) and industrial wastes, as well as naturally occurring radioactive materials (NORM) that can be concentrated as a result of the processing or consumption of coal, oil and gas, and some minerals. Nuclear weapon testing and demonstration also result in radioactive waste.

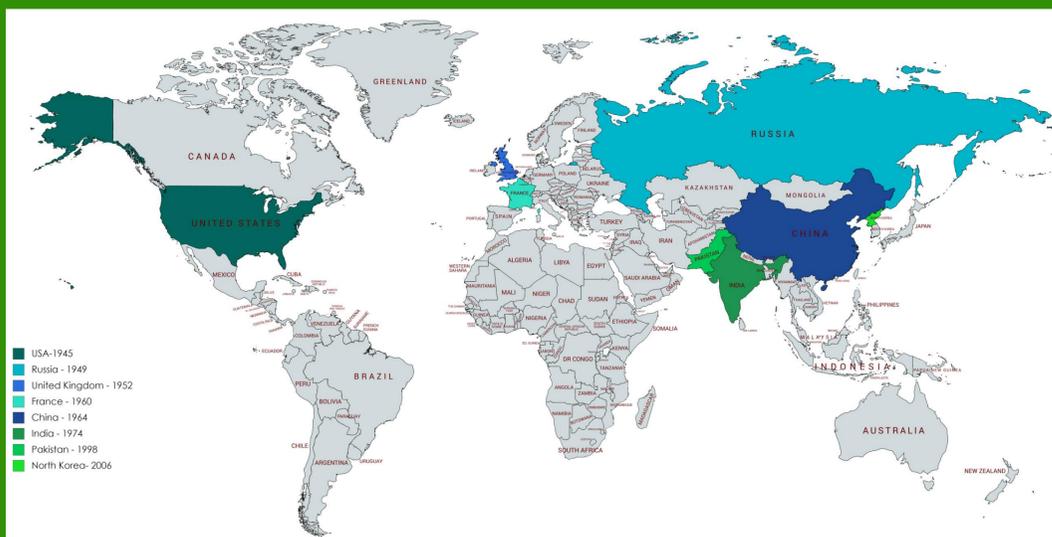
## Total waste volumes in storage and disposal



The total quantity of nuclear waste per person per year (all categories) is 0.5 kg, i.e. the volume of just one large can of soda. The quantity of highly radioactive waste is 5 grams per person per year,

**!** There are currently 451 operable civil nuclear power plants around the world and 58 further facilities under construction.

## Countries with nuclear weapons



First nuclear weapon tests: The United States (1945), Russia (1949), United Kingdom (1952), France (1960), China (1964), India (1974), Pakistan (1998), North Korea (2006)

## Classification of waste

Radioactive waste can be divided into three main groups according to the level of radioactivity.

- Low level waste (LLW)
- Intermediate level waste (ILW)
- High level waste (HLW)

## Disposal methods

LLW and ILW are stored at the site of origin until further processing when radioactivity is lower. LLW is disposed in near surface repositories such as trenches or concrete vaults. ILW generally contains significant amounts of long lived radionuclides and therefore requires disposal at depths that provide isolation. HLW can be stored by deep geological burial or dry cask storage.

**!** In diagnostic nuclear medicine a number of short-lived gamma emitters are used. Many of these can be disposed as normal waste after a short time due to their half-life time.

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## Acknowledgements & references