



Categories of Radioactive Waste

In the UK radioactive waste is classified according to how much activity it contains and the heat that this activity produces. Categories are HLW, ILW, LLW and VLLW. Although the majority of radioactivity is associated with HLW, this waste category represents a very small volume relative to other categories in the 2019 Inventory. In contrast, very little radioactivity is associated with LLW and VLLW although these waste categories represent most of the waste volume in the 2019 Inventory.

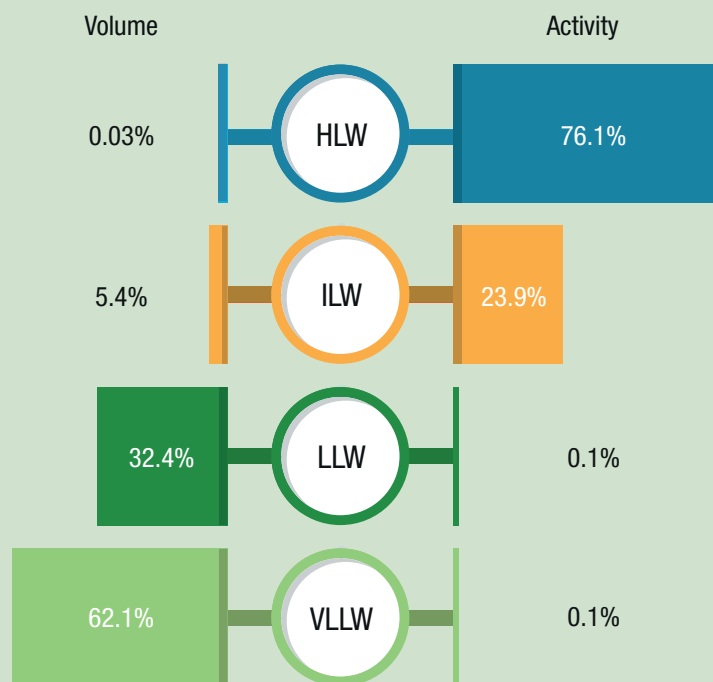


Figure: The relationship between volume and activity of radioactive waste in the 2019 Inventory

High Level Waste

Definition

Wastes in which the temperature may rise significantly as a result of their radioactivity, so this factor has to be taken into account in the design of storage or disposal facilities.

Characteristics

HLW is generated from reprocessing spent nuclear fuel at Sellafield. It is initially produced as a concentrated nitric acid solution containing waste fission products. The 2019 Inventory includes the nitric acid solutions awaiting conditioning in the Waste Vitrification Plant (WVP), some insoluble fission products that settle in the storage tanks, tank liquor heels, the glass product of conditioning, and small quantities of contaminated plant items from the WVP (mostly metal and ceramic).

Volume

~1,500 m³ total packaged

Level of radioactivity

~12,000,000 TBq at 2100
(dominated by shorter-lived radionuclides)

Intermediate Level Waste

Definition

Wastes exceeding the upper boundaries for LLW, but which do not generate sufficient heat for this to be taken into account in the design of storage or disposal facilities.

Characteristics

The major components are steels, graphite, concrete, cement and sand, sludges, ion exchange resins and flocculants. There is a wide range of steel items, including plant items and equipment, fuel cladding and reactor components. Most graphite is in the form of moderator blocks from final stage reactor dismantling at Magnox and AGR power stations.

The majority of waste reported as cementitious materials is cement associated with conditioned waste.

The remainder is mostly higher activity concrete from the decommissioning of buildings.

Volume

~500,000 m³ total packaged

Level of radioactivity

~1,000,000 TBq at 2100



Image: ILW Magnox fuel cladding swarf

Low Level Waste

Definition

Wastes having a radioactive content not exceeding 4 Gigabecquerels per tonne of alpha activity or 12 Gigabecquerels per tonne of beta/gamma activity.

Characteristics

The major components of LLW are building rubble, soil and steel items such as framework, pipework and reinforcement from the dismantling and demolition of nuclear reactors and other nuclear facilities and the clean-up of nuclear sites.

LLW also comprises miscellaneous contaminated wastes from the operation of nuclear facilities which is mainly scrap metal items, plastics and paper.

Volume

~1,280,00 m³ total packaged

Level of radioactivity

~140 TBq at 2100



Image: Drum of miscellaneous LLW

Very Low Level Waste

Definition

A sub-category of LLW, it comprises waste that can be safely disposed of with municipal, commercial or industrial waste, or can be disposed of at specified landfill sites (see box below for details).

VLLW comprises:

- high volume VLLW – wastes with maximum concentrations of 4 MBq (megabecquerels) per tonne of total activity that can be disposed to specified landfill sites. There is an additional limit for tritium in wastes containing this radionuclide.
- low volume VLLW - wastes that can be safely disposed of to an unspecified destination with municipal, commercial or industrial waste, each 0.1 m³ of material containing less than 400 kBq (kilobecquerels) of total activity, or single items containing less than 40 kBq of total activity. There are additional limits for C-14 and tritium in wastes containing these radionuclides.

Characteristics

The major components of VLLW are building structural materials (principally concrete, with brick, metal and other materials) from the dismantling and demolition of nuclear facilities.

There are also smaller quantities of excavated soil from construction and demolition activities.

Volume

~2,690,000 m³ total reported

Level of radioactivity

~11 TBq at 2100



Image: Demolition work