

## Securing nuclear wastes

Radioactive wastes are secured so as to prevent them from being stolen. No such material under safeguards has ever been diverted from civilian to military use. Nuclear power plants actually help eliminate warheads from military programmes by burning their fissile material in electricity-generating reactors. Today, nuclear power produces 20% of US electricity and half of this nuclear fuel comes from dismantled Russian and US warheads.

The nuclear industry routinely provides data to the nuclear safety authorities about its waste; this then becomes part of publicly accessible national reports on the inventory of radioactive waste. The nuclear industry is committed to open and transparent decision-making and to building consensus on waste management with extensive public consultation. Recent experience shows that public acceptance of sound nuclear waste management techniques can be achieved in a democratic way.

For more information please see the WNA Position Statement 'Safe Management of Nuclear Waste and Used Nuclear Fuel' available at [www.world-nuclear.org](http://www.world-nuclear.org)

## A remarkably clean technology producing small amounts of manageable waste

Nuclear power is a remarkably clean technology because of its energy intensity. It produces huge quantities of energy from small quantities of fuel and creates correspondingly small amounts of manageable waste materials.

## Managing nuclear waste responsibly

All nuclear energy producing countries take full responsibility for safely managing all the radioactive wastes produced by their nuclear operators. In these countries, radioactive wastes amount to less than 1% of the total national toxic industrial wastes. Whereas other wastes remain permanently toxic, radioactive wastes become less hazardous over time because of the natural phenomena of radioactive decay; most of the radioactivity in nuclear waste disappears within a few decades of its creation.

The cost of managing all these wastes is factored into bills paid by consumers of nuclear generated electricity and represents only a few percent of the total cost of nuclear power generation.

Human health, safety and environmental protection are paramount when dealing with radioactive waste. From point of origin to disposal, waste is safely controlled, securely isolated and managed under the oversight of independent regulators and in accordance with strict international, regional and national standards and regulations.



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## What is nuclear waste?

Like all industries, waste is produced at various stages of the nuclear fuel cycle (which is the process of producing electricity from nuclear materials). The fuel cycle is often split into two parts - the 'front end' which stretches from mining through to the use of uranium in the reactor - and the 'back end' which covers the removal of used fuel from the reactor and its subsequent treatment and disposal.

Radioactive waste is categorized by its radioactive content and heat emissions into; low-, intermediate- and high-level waste, which are usually referred to as LLW, ILW and HLW.

### Percentage shares of radioactive waste (worldwide)

	By Volume	By Radioactive Content
<b>High Level Waste</b>	3%	95%
<b>Intermediate Level Waste</b>	7%	4%
<b>Low Level Waste</b>	90%	1%

Used fuel can either be managed as HLW or can be reprocessed (recycled). About 97% of used nuclear fuel can be reprocessed and used again in a nuclear power reactor. When fuel is reprocessed this is referred to as a 'closed' fuel cycle; conversely, when fuel isn't reprocessed it is referred to as an 'open' fuel cycle.

Some liquid effluents and gas emissions, resulting from activities such as cleaning and maintenance, containing very low levels of radiation are discharged into the environment but only after being treated, controlled and monitored in accordance with strict standards and regulations.

Worldwide, over 100 electricity-generating reactors have reached the end of their operational lives and are being decommissioned. Nine of these sites are now fully clear of nuclear materials.

### How different categories of waste are generally treated worldwide

	Low Level Waste	Intermediate Level Waste	High Level Waste
<b>What's in it</b>	Items from hospitals, laboratories and industry such as paper, rags, tools and clothing	Components and materials from power plant maintenance and decommissioning. Residue from treating liquid radioactive waste	Waste from reprocessing used fuel
<b>How it is treated</b>	Compacted to reduce its volume, encapsulated and placed in specially designed sealed containers	Solidified, encapsulated, and placed in specially designed sealed containers	Cooled in ponds, vitrified and placed in specially designed sealed containers, stored to cool
<b>What happens to it</b>	Buried in specially designed waste vault a few meters below surface level	Buried underground in specially designed vaults or placed in shielded purpose built stores	Deep geological disposal in highly engineered vaults within dry, stable geological formations about 600m below ground