1.3 TYPE OF RADIOACTIVE NUCLEAR WASTE

Natural radioactivity is found everywhere, but “radioactive wastes” have higher radio activity levels than normal. These wastes include spoil produced from mines; materials contaminated by the use of radionuclides in medicine, industry, and research; and contaminated and activated materials from the operation and decommissioning of nuclear power stations and from the production or dismantling of nuclear weapons.

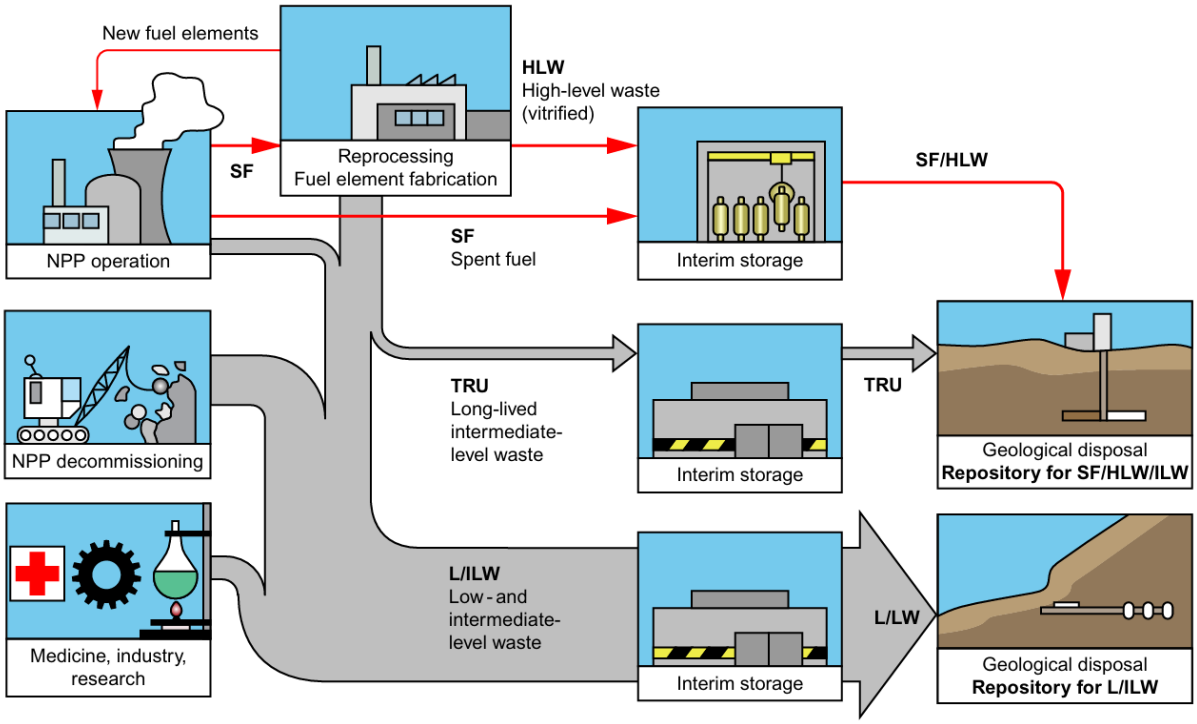
Even though the quantities are rather small, concern is usually focused on the most toxic and longest lived “spent fuel/high-level waste (SF/HLW),” which is so radioactive over the first few hundred years that the resultant heat production has to be taken into account.

SF—spent fuel rods from nuclear reactors conditioned for direct disposal.

HLW—high-level waste resulting from the reprocessing of spent fuel rods (vitrified waste).

TRU or ILW—this waste is classified as intermediate-level waste (low heat production) but contains significant concentrations of long-lived radionuclides; may include reactor internals and reprocessing waste.

L/ILW—low/intermediate-level waste; very wide diversity of radioactive materials from the nuclear power industry and users of radionuclides in medicine, industry, and research. Conditioned in a solid form (usually cement) for disposal.



The used or burnt bundles of nuclear pallets and rods are generally known as "spent nuclear fuel." This spent nuclear fuel is full of plutonium and uranium, which is reprocessed to extract usable uranium and plutonium in reprocessing plants.

During reprocessing, the spent nuclear fuel is dissolved in acid and under goes different stages of processing. After the completion of reprocessing and extracting the uranium and plutonium, the liquid is left.

The extracted uranium and plutonium is used again as fuel in bundles after forming pallets. The leftover liquid, however, contains long-lived radioactive waste known as "high-level radioactive waste." It includes plutonium, strontium, cesium, uranium, etc.

Out of all these, strontium and cesium are highly active and main sources of heat. Efforts are being made to increase the density of this radioactive waste by extracting

water to reduce the volume of nuclear waste. Liquefied HLW waste is difficult to handle. Therefore, it is solidified by mixing glass matrix or ceramics or polymer.