

Radioactive Waste Shipments

Q: What are spent nuclear fuel and high-level radioactive waste?

Spent nuclear fuel – or “used” nuclear fuel – results from producing electricity at nuclear power plants or from operating other reactors such as research reactors. Nuclear fuel is considered “spent” when it no longer gives off enough energy (in the form of heat) to produce electricity efficiently. The fuel is most commonly in the form of solid ceramic pellets, with each pellet approximately the size of a pencil eraser, secured inside an assembly of strong metal tubes. The tubes containing the pellets are bundled together to form assemblies. These pellets, tubes, and assemblies are specifically designed and manufactured to contain radioactive materials during use in a reactor and during long-term storage. In addition, as a ceramic material, spent nuclear fuel pellets are solid — not in a liquid or gaseous form — and therefore, spent nuclear fuel will not spill, evaporate, burn, or explode.

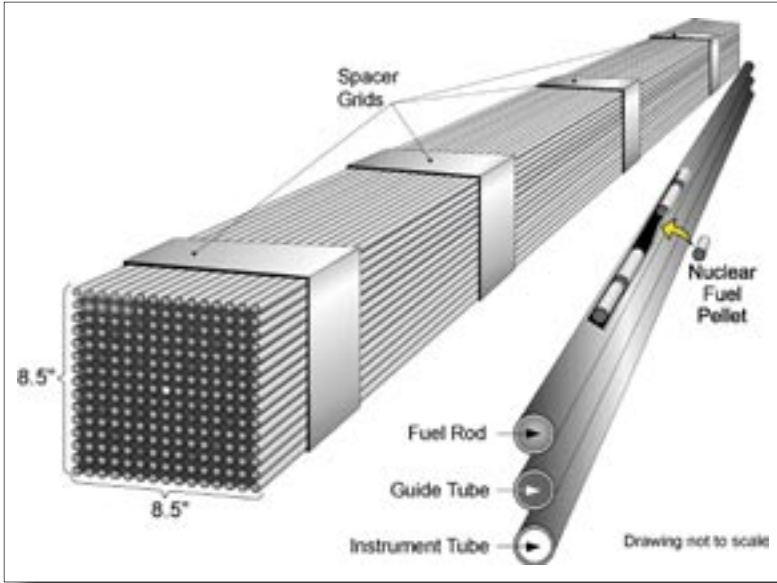
Commercial spent nuclear fuel is now being temporarily stored in pools of water, above-ground vaults, or concrete or steel casks at power plants. Government-owned spent fuel from test or research reactors is stored at various DOE sites. Spent nuclear fuel will be transported to a repository in specially designed packages called “casks.”

High-level radioactive waste that would be disposed of at the Yucca Mountain repository is radioactive waste containing byproducts from past processing of spent nuclear fuel for defense needs or other radioactive material that requires permanent isolation.

High-level radioactive waste resulting from defense programs is stored temporarily in underground tanks and vaults at government sites. High-level radioactive waste will be solidified in glass (some waste has already been solidified), packaged in stainless steel canisters, and placed in shielded casks for transport to the repository for disposal.



Spent nuclear fuel storage pool.



Spent nuclear fuel is most commonly in solid ceramic pellet form, about the size of a pencil eraser, secured inside an assembly of strong metal tubes.



Actual size of fuel pellet.



High-level radioactive waste is made solid by mixing it with glass-forming chemicals in stainless steel canisters and then subjecting it to heat. The result is a hard glass-like substance.