

Public Understanding of Waste Classification DRAFT FAQ

Public Involvement Committee Meeting, Hanford Advisory Board
Wednesday, September 4, 2013 at the Red Lion - Columbia Center

Waste Classification

The better the public understands how wastes are classified, the more informed they will be when weighing in about Hanford cleanup.

Here are some frequently asked questions about different waste forms and how they are classified.

Q. How are radioactive wastes classified?

A. Wastes are classified primarily by definition in a series of laws (the Atomic Energy Act, the Nuclear Waste Policy Act, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and others).

Nuclear waste is broadly divided into four main categories: spent nuclear fuel, high-level waste, transuranic, and low-level waste, which are defined below.

The U.S. Nuclear Regulatory Commission (NRC) classifies low-level wastes further in four categories: A, B, C, and Greater Than Class C (GTCC). The U.S. Department of Energy (DOE) uses a similar scheme with Class 1, 3 and Greater than Class 3 (GTC3) wastes. There is no Class 2 (corresponding to NRC category B waste) in the DOE system.

Q. Who determines what concentrations or levels of wastes are regulated?

A. A number of parties play roles:

- U.S. Environmental Protection Agency (EPA) regulations set limits on levels and concentrations of radioisotopes in air and drinking water.
- NRC regulates source material, special nuclear material (enriched plutonium and uranium, tritium and other bomb materials), and byproduct materials from reactors and uranium mining.
- DOE also sets standards for radioactive materials independently of EPA and NRC. Both regulations apply separately.

Q. Which laws play a role in classifying/regulating wastes?

A. Many federal and state laws are involved, including the Atomic Energy Act, CERCLA, RCRA, the Model Toxics Control Act (MTCA), the Hazardous Waste Management Act (HWMA) and the Toxic Substances Control Act (TSCA). When radioactive materials and hazardous materials are both involved, the wastes may be referred to as mixed waste and this may be included in the acronym (e.g. MLLW). Treatment and disposal of these wastes must satisfy the requirements of each of the applicable regulations.

Q. What is Spent Nuclear Fuel (SNF)?

A. (SNF) is nuclear fuel that has been irradiated in a nuclear reactor. U.S. law prescribes deep geologic disposal for SNF, though there is not currently an operating deep geologic disposal facility for SNF.

Q. What is High Level Waste (HLW)?

A. High-Level Waste (HLW) is the concentrated waste from reprocessing SNF (known as “first cycle raffinate”). U.S. law prescribes deep geologic disposal for HLW, though there is not currently an operating deep geologic disposal facility for HLW.

Q. What is Low-Activity Waste (LAW)?

A. LAW or immobilized LAW (ILAW) is high-level waste that has enough of the highly radioactive constituents removed (principally cesium 137) to allow workers to work near the waste. DOE intends to dispose of ILAW in shallow surface burial at Hanford. They will need to demonstrate to the NRC that the highly radioactive constituents have been removed, and demonstrate other characteristics as well, to receive NRC approval to allow shallow burial.

Q. What is Transuranic Waste (TRU)?

A. TRU waste is waste that contains elements that are higher than uranium on the periodic table and meet certain concentration limits. TRU is generated by research and production of nuclear weapons and by operating nuclear reactors. TRU waste typically remains radioactive for tens of thousands of years or much more. TRU waste is principally hazardous due to the emission of high energy alpha particles as the waste decays. It is primarily a hazard through ingestion or inhalation. U.S. law prescribes deep geologic disposal for TRU. There is an operating deep geologic disposal facility for TRU, located near Carlsbad, New Mexico.

Q. What is Low-Level Waste (LLW)?

A. LLW is waste that is not HLW, SNF or TRU that has been contaminated with radioactivity or that has become radioactive (other than naturally occurring, accelerator produced or similar wastes called out in other laws). LLW often includes contaminated cleaning supplies and uniforms, laboratory animal carcasses, reactor parts, and a variety of other wastes.

Q. What are Class A, B, C and Greater than Class C Wastes?

A. These are classes of LLW which are determined by a combination of how quickly the radioactive elements decay and their mobility. The letter system roughly corresponds to the level of hazard, where A is the least hazardous and GTCC is the most hazardous.

With the exception of GTCC waste, LLW can be disposed of in shallow surface burial, but the classification levels influence disposal precautions. For example, class A LLW may **or may not**

need to be segregated from other wastes for disposal. Class C LLW, on the other hand, must conform to more rigorous segregation and must be treated to prevent accidental intrusion and to prevent contamination of groundwater. Finally, GTCC waste, though technically LLW, is not considered safe for near-surface disposal like the other LLWs. Instead, U.S. law prescribes that it should be disposed of in a geologic repository similar to HLW. DOE as noted above has a similar set of definitions for the wastes it generates where Class 1 and 3 waste roughly correspond to NRC Categories A and C and DOE Greater than Class 3 waste corresponds to NRC Greater than Category C waste.

Q: How/where is LLW disposed?

A: Defense-related LLW is disposed in shallow burial grounds at Hanford, the Nevada National Security Site (formerly the Nevada Test Site), and at commercial facilities in Utah and Texas. Commercial LLW is disposed at four sites across the country; in Washington state, South Carolina, Texas and Utah.

Q. How much of each type of waste is there?

A. According to the U.S. Government Accountability Office, there are 13,000 tons of defense-related SNF and HLW and 70,000 tons of commercial SNF, an amount that grows each year.

Q. Is there a public process for providing input on how wastes are classified?

A. Partly. The majority of the classification is spelled out in laws written by the Congress. Where the Congress has provided authority to the agencies to add or modify waste classification, the agencies typically follow a public process for revision of their rules that allows for public input into the decisions.

Q. Why is radioactivity terminology different across agencies like EPA, DOE, and NRC? (Example: Class C waste, why isn't it called class C waste by everyone?)