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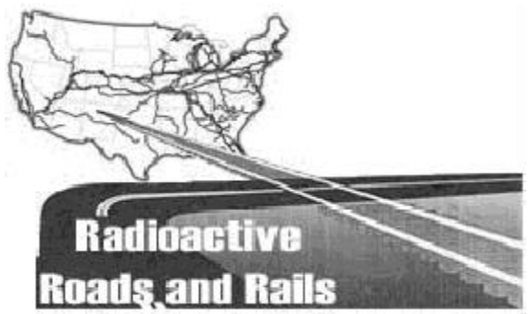
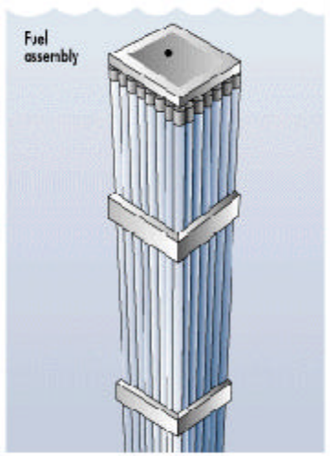


Get the facts on HIGH-LEVEL RADIOACTIVE WASTE!

High-Level Radioactive Waste

The vast majority of high-level radioactive waste is the fuel from the hot core of commercial nuclear power plants. These irradiated fuel rods are the most intensely radioactive material on the planet, and unshielded exposure at close range gives lethal radiation doses in seconds or minutes.

Irradiated fuel accounts for 95% of the radioactivity generated in the past 55 years of the Nuclear Age from all sources, including nuclear weapons production. Uranium is processed into fuel rods and loaded into nuclear power reactors where it undergoes the nuclear fission reaction.

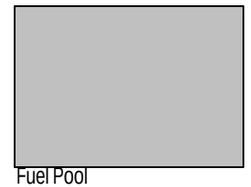


Here, radioactivity is increased when fission products, such as cesium and strontium, are formed because of the physical splitting of uranium-235 atoms.

When it is removed from the reactor core, the fuel is about one million times more radioactive than when it was loaded.

Current Waste Storage

At most reactors, on-reactor-site fuel pools hold the cumulative total of high-level waste that has been generated by the reactor since starting operations. However, fuel pools were not designed for more than temporary storage, so many utilities have consolidated the fuel more densely to fit more in the pool. There are many hazards associated with fuel pools, including the potential for loss of coolant which could result in a meltdown and catastrophic radiation release to the environment.


Fuel Pool

More and more reactors are reaching pool capacity and are installing on-site dry cask storage. These concrete and metal containers had no full-scale testing prior to their first installation. A number of cask problems from shoddy construction, as well as the intense heat and radiation from the waste, have raised concerns about this storage technology. Although problems have developed right away or after a short few years in some casks, dry casks are initially licensed for 20 years, and can ultimately be licensed for up to 100 years with U.S. Nuclear Regulatory Commission review and approval.

Radioactive Waste Classification

Radioactive waste classification in the U.S. is misleading and badly needs reassessment. Generally speaking, radioactive waste is classified as high or low level because of how it was produced, and not because of how dangerous it is. Therefore, a relatively innocuous-sounding classification can represent highly irradiated materials. Below is a table showing the main classifications for radioactive waste.

Waste Class	Definition
High Level Waste (HLW)	"Spent Fuel" (highly irradiated fuel from the reactor core) and Reprocessing Waste
Transuranic Waste (TRU)	Wastes with atomic numbers greater than that of uranium. No transuranic elements occur in nature.
Low Level Waste (LLW)	Definied by what it is NOT. Anything that is not high-level, spent fuel, or transuranic is LLW. LLW has four categories, listed below.
Class A LLW	Primarily contaminated with short-lived radionuclides; generally speaking, contains the least radioactive materials in the LLW classes.
Class B LLW	Greater amounts of short-lived radionuclides than Class A.
Class C LLW	May be contaminated with greater amounts of long-lived and short-lived radionuclides than Classes A or B.
Greater Than Class C (GTCC)	Most radioactive of LLW classes.

Politics vs. Science

The term "disposal" simply cannot be applied to materials that will remain hazardous virtually forever. There is no place on Earth where one can confidently predict that radioactive waste could remain safely isolated from the environment for hundreds of thousands or millions of years.

Yucca Mountain, Nevada, is the site that was singled out for study as a possible nuclear waste repository in 1987 when Congress amended the Nuclear Waste Policy Act (NWPA).

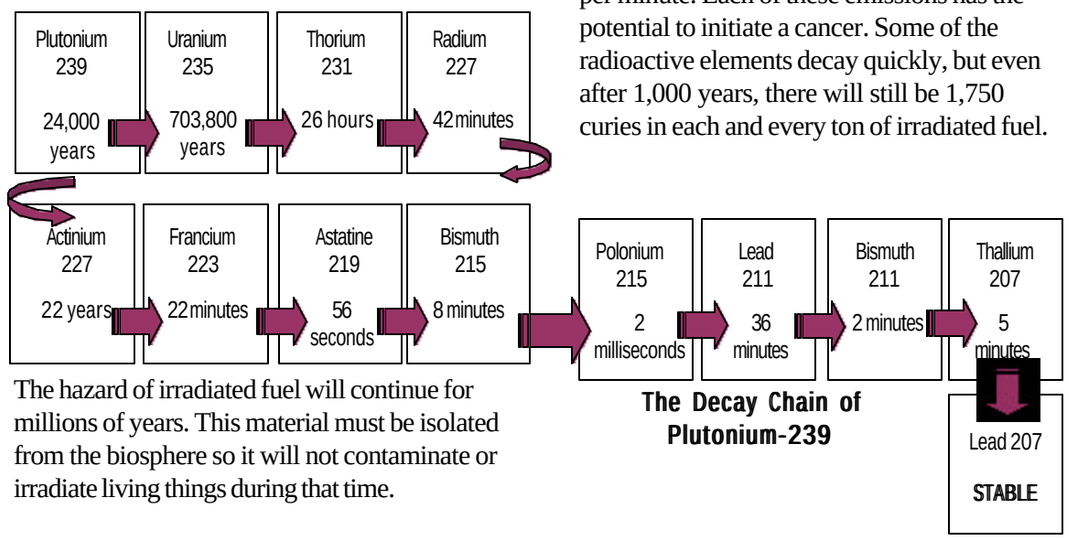
Since that time, science has shown that Yucca Mountain is less than ideal as a site for nuclear waste storage. In December, 1998, 220 environmental and public interest groups from across the U.S. and overseas petitioned the Secretary of Energy to disqualify Yucca Mountain from any further consideration for the national repository because water flowing through Yucca Mountain violates the Department of Energy's (DOE) own site suitability guidelines. In addition, Yucca Mountain is in the highest risk category for earthquakes, and sits atop a major aquifer shared by a nearby farming community and dairy which ships milk daily to Los Angeles.

Now, rather than disqualify the site, DOE is simply changing its own guidelines so that the Yucca Mountain project can go forward. Politics, and not science, is driving this project. Nevada is a state with only 4 Members of Congress and lots of federal land.

Half Life and Hazardous Life

The "half-life" of a radioactive element is the amount of time it takes for one-half of the quantity of that element to decay—either to a stable form, or to another radioactive element in the "decay chain."

Generally 10 to 20 half lives is called the "hazardous life" of the waste, the length of time it is hazardous to humans and other living beings. Example: Plutonium-239, which is in irradiated fuel, has a half-life of 24,000 years. It is dangerous for a quarter million years, or 12,000 human generations. During Plutonium's first half life, it decays and Uranium-235 is generated. Uranium's half-life is 703,800 years, during which time it generates Thorium-231, and so on, until it finally stabilizes as Lead-207, itself a toxic heavy metal.



The Decay Chain of Plutonium-239

The hazard of irradiated fuel will continue for millions of years. This material must be isolated from the biosphere so it will not contaminate or irradiate living things during that time.

Volume vs. Radioactivity

Irradiated fuel makes up only about 1% of the total volume of all radioactive wastes generated in the U.S., but it contains about 95% of the radioactivity. As of 1999 there was a cumulative total of over 40,000 metric tons of irradiated fuel from commercial nuclear power generation in the U.S. If all U.S. reactors continue to operate through their current license period, the inventory of high-level irradiated fuel will more than double to a total of 85,000 metric tons in coming decades.

This fuel contains tens of billions of curies of radioactivity. A curie is a large unit: 2,224,000,000,000 (over 2 trillion) radioactive emissions, or 'counts,' per minute. Natural radiation measured with a simple Geiger counter is typically between 2 and 20 counts per minute. Each of these emissions has the potential to initiate a cancer. Some of the radioactive elements decay quickly, but even after 1,000 years, there will still be 1,750 curies in each and every ton of irradiated fuel.