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Radioactive Waste and Calvert Cliffs Nuclear Power Plant

"Electricity is but the fleeting byproduct from atomic reactors. The actual product is forever deadly radioactive waste." ---Michael Keegan, Coalition for a Nuclear-Free Great Lakes

How Hazardous Is It? High-level radioactive waste (HLRW) refers to the nuclear fuel rods removed from a reactor core post irradiation. HLRW is a million times or more radioactive than "fresh" uranium fuel rods. At close range without radiation shielding, for a thousand years or more, HLRW can deliver a lethal dose of gamma radiation (like X-rays) within seconds or minutes, depending upon how long it has radioactively "cooled down" (undergone decay). Even after that, however, HLRW contains radioactive isotopes that remain hazardous to inhale or ingest for an incredibly long period of time. For example, Plutonium-239 has a 24,400 year half-life, and thus a 240,000 to 480,000 year hazardous persistence. Iodine-129 has a 15.7 million year half life, and thus a 157 to 314 million year hazardous persistence. HLRW must be isolated from the living environment virtually forevermore.

How Much Is Where? By a year from now, 63,000 metric tons of commercial irradiated nuclear fuel will already exist in the United States. Almost all is stored on-site at the reactors that generated it in the first place. There are currently 104 operating reactors, and around 25 permanently shut down reactors, located at around 65 sites in over 30 states. 63,000 metric tons is the legal limit, under the Nuclear Waste Policy Act, as amended, for how much commercial waste can be buried in the first national repository – at least until a second national repository is opened. Of this amount, about 1,080 metric tons are stored on-site at the Calvert Cliffs nuclear power plant (see "You Think There's a Lot of High-Level Radioactive Waste Stuck at Calvert Cliffs Right Now? How about Twice as Much?!"). These irradiated nuclear fuel rods are mostly stored in Calvert Cliffs packed-to-the-gills indoor storage pool. However, Calvert Cliffs has one of the oldest, and largest, dry cask storage facilities in the country as well. As newly removed irradiated fuel is off-loaded into the pool for at least five years of cooling and decay, older HLRW is transferred to yet more outdoor metal casks, emplaced in a bunker-like concrete enclosure that provides radiation shielding for workers and passers by.

What Can Be Done With It? In 1957, the U.S. federal government made the unprecedented promise to the electric utilities that if they opened atomic reactors, it would take care of the HLRW. That year, the National Academies of Science recommended deep geologic disposal, specifically that HLRW be buried in salt formations. A salt formation in Lyons, KS was targeted for a dumpsite in the late 1960s/early 1970s, but nearby resource extraction had already compromised the local geology. Recently, it has been recognized that HLRW's thermal heat precludes its burial in salt.

Repositories: Yucca Mountain, and "Plan B" The Nuclear Waste Policy Act (NWPA) was passed in 1983. It set up a scientific site search in the East and West for suitable geologic repositories. However, for purely political reasons, by 1986 the Eastern site search was indefinitely suspended. In 1987, the "Screw Nevada Bill" amendments to the NWPA singled out Yucca Mountain as the only site to be further studied. Over the past 25

years, over $10 billion of ratepayer and taxpayer money has been spent studying Yucca. By 1992, it was clear that Yucca's gaseous radioactivity releases would kill more people downwind than allowed by Environmental Protection Agency regulations; Congress and George H.W. Bush responded by ordering EPA to write site-specific Yucca regulations, the first of many "double standard standards" to follow. By the mid-1990s, it was clear that fast flow pathways for water existed at Yucca, virtually guaranteeing massive radioactivity contamination of the underlying drinking water supply over time; in 2001, George W. Bush responded by doing away with the Dept. of Energy's 17 year old Site Suitability Guidelines, paving the way for his thumbs up that Yucca was suitable, despite 300 unfinished major scientific studies. The State of Nevada, Western Shoshone Indian Nation (whose land Yucca is by the Treaty of Ruby Valley of 1863), and over a thousand environmental groups across the country have continued to resist the dump's opening for decades. Although DOE rushed an incomplete application to the Nuclear Regulatory Commission (NRC) for a construction and operating license in 2008, President Obama has clearly indicated that Yucca is not an option. Obama's current budget allows the licensing proceeding to continue, but his Energy Secretary Steven Chu is establishing a "blue ribbon commission" to re-evaluate HLRW management policy. In Dec. 2008, DOE reported to Congress and the President on the need for a second repository. DOE stated that every state has appropriate geology to serve as a repository, including Maryland, Virginia, and other Chesapeake Bay watershed states as possibilities.

Centralized Interim Storage & Reprocessing The nuclear power establishment now promotes centralized interim storage and reprocessing as radioactive waste "solutions." Centralized interim storage has most often targeted Native American reservations in the West, raising serious environmental justice concerns. DOE sites and nuclear power plants have also been floated as potential hosts for centralized interim storage, also known as "parking lot dumps." These indefinite surface storage facilities would have the same risks as on-site dry cask storage, only more so given the concentration of waste in one location. Reprocessing risks nuclear weapons proliferation, environmental devastation, and astronomical costs for taxpayers. It also does not eliminate the need for a repository. Areva of France, which hopes to supply the new reactor at Calvert Cliffs, also hopes to win the lucrative taxpayer-funded reprocessing contract in the U.S. But Areva's reprocessing plant in France costs the French public a billion dollars per year to operate. It also discharges 100 million gallons per year of liquid radioactive waste into the English Channel. And France still lacks a repository, just like every other country on Earth with HLRW. Finally, any away-from-reactor proposal, be it a repository, centralized interim storage, or reprocessing, introduces HLRW transport risks on the roads, rails, and waterways (see "The Yucca Mountain Dump Plan Would Launch Up to 326 Barges of Deadly High-Level Radioactive Waste Onto the Waters of the Chesapeake Bay").

What Are the Risks? NRC reports that 25,000 people could suffer fatal cancers from an accidental radioactive waste pool fire, such as caused by the drop of a heavy load into the storage pool. Such a fire could also result from intentional terrorist attack. These dire findings have been confirmed by independent analysts (Alvarez et al., 2003), as well as by the National Academies of Science (2005-6). Dry casks were also not designed to withstand terrorist attack (see "Armor Piercing Missile Perforates High-Level Radioactive Waste Storage/Transport Cask In U.S. Army Aberdeen Proving Grounds Test"). An interim safeguard against such risks of accident or attack is "hardened on-site storage" (HOSS). Over 150 national, regional and local grassroots environmental groups have called for HOSS as a needed security upgrade at nuclear power plants. In conclusion, the only real solution to the HLRW problem is to not create any more in the first place.