

Beyond Nuclear

working for a world free from nuclear power and nuclear weapons



Maximizing Health and Environmental Protection: Permanent Geologic Disposal versus Surface Storage of Nuclear Waste

No human strategy can guarantee permanent isolation of highly radioactive nuclear waste for the millions of years it will be hazardous to humans and the environment. However, deep disposal in a permanent geologic repository, if carried out equitably and according to stringent scientific requirements, would be vastly more effective than surface storage of highly radioactive nuclear waste.

Deep Geologic Disposal	Surface Storage
Passive features: Nuclear waste disposal casks placed in a mined repository 250-1,000 meters below the earth's surface. Disposal system relies on a combination of human-made and natural geologic barriers designed to last a million years without need for human maintenance.	Active features: Highly radioactive nuclear waste storage in casks placed at the earth's surface or slightly below (<i>i.e.</i> , within tens of meters). Storage system relies entirely on human-made engineered barriers that must be maintained and replaced at least every 100 years. Therefore, storage requires investment and maintenance, governmental stability, and oversight for as long as the hazard persists (<i>i.e.</i> , a million years).
Inaccessible: Location in deep mined geologic repository makes access to nuclear waste extremely difficult. Therefore, this waste has a low probability of theft, re-use, or accidental exposure and release.	Accessible: Location at or near the earth's surface permits inadvertent or intentional intrusion into containers after emplacement. Surface or near-surface location makes nuclear waste more accessible and therefore more vulnerable to theft, re-use, or accidental exposure and release.
Long-term isolation: Federal regulatory standards require a repository to provide effective isolation of nuclear waste out to a million years, without requiring any human intervention.	Short-term effectiveness: NRC licenses storage casks for renewable 40-year terms and assumes that casks will be replaced "approximately once every 100 years." ¹

¹Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel, Vol. 1, page xxxi (NRC NUREG-2157, 2014).

Deep Geologic Disposal	Surface Storage
<p>Intergenerational equity: Designed to protect future generations who did not benefit from the nuclear reactors that generated the nuclear waste. Ideally leakage would be prevented until the long-lasting waste decays significantly. Costs paid by nuclear reactor licensees through the Nuclear Waste Fund, collected during years of reactor operation. A deep geological repository could provide maximum protection against theft of plutonium for production of nuclear weapons.</p>	<p>Intergenerational inequity: Burdens future generations with the responsibility, costs, liabilities, and risks of maintaining protective barriers against exposure to radioactive toxins, even though they never enjoyed one megawatt-hour of electricity generated by the irradiation of reactor fuel. Surface location provides relatively ineffective long-term protection against theft of plutonium for weapons production.</p>
<p>The U.S. Congress supports permanent disposal of nuclear waste through the NWPA. The federal NWPA makes siting and licensing of a repository a high priority, and ensures that U.S. taxpayers will not assume liability for nuclear waste until a repository is ready.</p>	<p>Federal ownership of nuclear waste at consolidated ‘interim’ storage sites is illegal under the NWPA. Yet the nuclear industry is asking federal regulators to help them evade federal law by issuing licenses that contemplate illegal federal ownership of the waste at two proposed storage facilities. These illicit licensing actions are now on appeal in federal court.²</p>

The Most Serious and Inevitable Risk if the U.S. Government Takes Ownership of Nuclear Waste Before a Repository Opens: Consolidated Interim Storage Will Become Consolidated Permanent Storage, i.e., De Facto Above-Ground Permanent Disposal

*To ensure that nuclear waste eventually gets to a permanent deep geologic repository, Congress **must** have a comprehensive strategy that keeps the U.S. on the road to a repository and precludes premature quick-fixes. If the federal government undertakes consolidated nuclear waste storage before it knows the location and characteristics of a repository, it may not have the resources or political will for long-term logistical and financial planning and execution. Given the high costs of packaging and transportation necessary for interim storage, money may run out before the significant additional expense of a repository is undertaken. **In those circumstances, nuclear waste will become stranded at near-surface storage facilities.***

²*Beyond Nuclear, et al. v. NRC* (U.S. Court of Appeals for the D.C. Circuit, Nos. 20-1187, 20-1225, 21-1104, 21-1147 (consolidated)) (proposed ISP facility in western Texas); *Don’t Waste Michigan, et al. v. NRC* (U.S. Court of Appeals for the D.C. Circuit, Nos. 21-1048, 21-1055, 21-1056, 21-1179 (consolidated)) (proposed Holtec facility in southeastern New Mexico).