

# BULLETIN OF THE ATOMIC SCIENTISTS

## OPINION

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## Informed consent: What communities need to know about interim nuclear waste storage

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The US Department of Energy is planning to use a [consent-based approach](#) to select sites for the storage and disposal of spent nuclear fuel and high-level radioactive waste. The [strategy](#) for these sites includes a pilot interim storage facility, consolidated interim storage facilities, and two permanent geologic disposal facilities—one for commercial spent nuclear fuel and the other for defense spent nuclear fuel and high-level waste.

The 2012 [Blue Ribbon Commission report](#) on the nation's problem of spent nuclear fuel disposal recommended the consent-based approach, but no one knows exactly what it entails. What we do know is that, even with local support, [state opposition](#) effectively stymied efforts to obtain authorization to construct the geologic waste disposal at Yucca Mountain in Nevada, and [blocked](#) a proposed interim storage site at Skull Valley, Utah. The Energy Department held meetings this year around the country seeking public input on the consent-based process—including a meeting in Boise, Idaho, that I attended. On September 15, the department will hold a two-hour [meeting](#) on the siting process in Washington, DC, including a 25-minute summary of the more than 10,000 comments received from the public.

The majority of spent nuclear fuel in the United States is from commercial electricity generation at nuclear power plants. As of 2013, there were **70,000 metric tons** of uranium from spent nuclear fuel, **enough to fill** the stymied Yucca Mountain repository. The inventory is expected to **roughly double** as the existing fleet of US nuclear reactors operates for its expected life. Utilities have **won** more than \$5 billion in compensation from the Energy Department because of its failure to provide a disposal facility as required by the Nuclear Waste Policy Act of 1982.

The Energy Department is seeking communities to host consolidated interim storage facilities, and **two companies** hoping to convince communities to serve as hosts have already expressed interest: Waste Control Specialists near Andrews, Texas; and Holtec International, with a proposed location near the Waste Isolation Pilot Plant east of Carlsbad, New Mexico. While hosting a facility can bring money and jobs, communities need to seek independent experts to help them understand the issues before signing on.

**Interim might be forever.** The first thing a community needs to understand is that “interim” could mean storage for an indefinite period—perhaps forever—if a permanent disposal facility is not opened. Even if a date for opening a permanent repository is stated, it can be as meaningless as the Energy Department’s broken promise to have a repository open by 1998. The department is pressing for legislative changes to loosen the Nuclear Waste Policy Act, which currently **prohibits** construction of an interim storage facility unless the construction license for a permanent repository has been obtained.

The pilot interim storage facility could help the Energy Department cope with its most pressing **legal liabilities**, but is not slated to have repackaging capabilities should a waste canister develop a leak or approach the end of its design life due to delay in shipping to a permanent repository. The word “pilot” could make it easier for the federal government to weasel out of a 1995 **settlement agreement** stipulating that military spent nuclear fuel stored in Idaho be among the first fuel shipped to an interim facility.

**Understand the safety risks.** A consolidated interim storage facility will include dry storage in concrete casks, possibly wet storage in pools, and repackaging facilities—and will require transportation of spent nuclear fuel from the power plants where it is currently stored. Communities need to understand the hazards from these operations in terms of the potential radiation dose to the public if an accident were to occur, as well as potential economic and land-use losses. Communities should review the many reasons for a viewpoint expressed prevalently at the Boise meeting that there is a **lack of public trust** in the Department of Energy.

Transporting waste to an interim facility will require vastly improved infrastructure that will take decades to build and will be costly. Despite the federal government’s refrain that transportation is safe, train accidents involving fires that are more severe than current regulations require casks to withstand have become common

occurrences. With the high number of shipments required to fill an interim or permanent storage facility, an accident is bound to occur. All communities expecting shipments through their state should not only require that emergency responders be properly trained and equipped to aid evacuation, but should also require a streamlined process for paying fair compensation for loss of life or property. The damage from nuclear waste shipping accidents is generally not insurable except by the taxpayer-funded Price-Anderson Act.

**Review the record.** Communities should scrutinize the department's safety record, starting with the reasons for two accidents at the Waste Isolation Pilot Plant (WIPP) in New Mexico, a salt mine where defense transuranic waste is stored. Until the two unrelated accidents in 2014—one in which a truck caught fire underground, and another in which a drum of waste burst—the Energy Department had insisted that WIPP was operated safely. Subsequent investigations of the **fire** and **radiological release** found a multitude of serious safety problems and deemed both accidents preventable.

Communities should study the Department of Energy's record on worker protection, including the **payout** of billions of dollars to workers made ill by radiation exposure. Communities should also examine the department's environmental record. The department has long assured communities that rigorous monitoring was being conducted and that its practices were not harmful, all the while creating a multitude of Superfund sites around the country. And despite years of costly cleanup efforts, much of the contaminated soil and water at sites such as the **Idaho National Laboratory** will never be remediated and will require isolation indefinitely.

Communities should examine the experience at low-level radioactive waste sites overseen by the Energy Department and Nuclear Regulatory Commission, and the **efforts** to find a disposal site for the nation's long-lived greater-than-class-C radioactive waste—which is the most hazardous type of low-level radioactive waste and remains dangerous for more than 500 years.

Whether the Energy Department chooses to build an interim storage facility and select an operating contractor to run it, or chooses to contract with a company that owns and builds the facility, communities should examine the department's experience at other federal facilities and **privatized uranium enrichment plants** to understand how private companies may reap profits and then disappear, leaving behind a mess. Communities should examine the way contractor turnover, contractor

bankruptcy, and secrecy have helped contractors escape liability for harm to workers, the public, and the environment.

**Impacts on future generations.** Despite the Department of Energy's **statement** that "many locations around the country offer potentially suitable geological conditions for a disposal repository," a community considering whether to become a host must understand that a permanent repository remains more elusive today than when it was first recommended in 1957. That recommendation was based on the reality that continuing to repackage waste forever would be an enormous burden—and that the failure to repackage nuclear waste in new dry-storage containment systems as old ones degrade would allow the release of a devastating amount of toxic, carcinogenic, and mutagenic material to the environment. There is a big difference between putting waste in a repository—something engineers already know how to do—and ensuring its isolation. Geologic disposal has not been shown to provide adequate isolation of radioactive waste for the time frame that the waste remains toxic.

Despite the Energy Department's emphasis on how quickly the decay heat in spent nuclear fuel declines, **vast quantities** of long-lived and mobile radionuclides remain long after significant cooling of the fuel has taken place. Years of research on the proposed Yucca Mountain repository yielded surprising findings about how quickly radionuclides from weapons testing had migrated through the dry soil. The prediction of contaminant migration, then, involves estimating what fraction of the waste will migrate, how quickly the waste would reach watersheds, and what concentration of contaminants people might ingest annually. As they weigh current financial incentives against the fate of future generations, communities near disposal facilities need to understand the uncertainties involved in estimating contaminant concentrations in groundwater over millennia.

At the July meeting in Boise, the Energy Department continued to tout bedrock boreholes as a potential option for high-level waste disposal. Posters for borehole disposal omitted the fact that, months earlier, both states slated for research on this option—North and South Dakota—adamantly refused to allow the research to be conducted, fearing it would lead to nuclear waste disposal in their states.

**Shaky pillars.** The NRC's recent **rulemaking efforts** for low-level radioactive waste disposal attest to the federal government's inability to reliably predict waste migration or to determine whether the resulting concentrations will, at least periodically, exceed levels known to be harmful. This inability may be masked by

jargon that makes the proposed facility sound protective, even though the disposal site may not necessarily be designed to ensure that future radiation ingestion doses and exposures to people will remain low.

Despite the Department of Energy's insistence that its radiation protection standards safeguard human health, epidemiology continues to find elevated cancer risk in **radiation workers** and medically exposed children and adults. The Energy Department and NRC have so far refused to tighten worker radiation protection standards or to admit that public health radiation protection standards are inadequate, especially regarding beginning-of-life **exposure**. A community considering hosting an interim storage or permanent disposal site should understand that adverse health effects are not limited to the increased risk of solid cancers and leukemia but also include **other adverse effects**, including transgenerational effects.

The two most important criteria for establishing the safety of nuclear waste disposal are the prediction of migration of radionuclides from a repository, and human radiation protection standards. But neither of these pillars rests on firm scientific bedrock.

Without thorough and independent examination of what the Energy Department says—and deliberately does not say—at best, communities will give “misinformed” consent. And the agency will go on pretending that producing unlimited quantities of radioactive waste is sustainable.