



Licensing of Yucca Mountain as a Geological Repository for Used Nuclear Fuel and High-Level Radioactive Waste

The American Nuclear Society (ANS) supports the expeditious processing of the Yucca Mountain geologic repository license application in an open, technically sound manner. ANS believes the completion of the Yucca Mountain licensing process would convey a number of valuable benefits, including:

- Demonstrating progress in the management and disposal of Used Nuclear Fuel (UNF) and High-Level Radioactive waste (HLW)^a
- Providing insight into the feasibility of the regulatory process for geologic disposal facilities
- Helping to address criticism that there is no solution to the problem of the waste produced by the generation of electricity using nuclear energy
- Providing some return to the nation's electricity customers and taxpayers, who have invested billions of dollars in characterizing and licensing Yucca Mountain
- Fully informing and providing transparency into the ultimate decision whether or not to proceed with development of the nation's first geologic repository for UNF and HLW at Yucca Mountain

UNF is a byproduct of nuclear reactor operation and its radioactivity poses a potential health hazard if not appropriately managed. Similarly, if UNF is reprocessed the resulting HLW contains long-lived radionuclides that could be harmful if released. The issue has been studied for more than 60 years, going back to a 1957 National Academy of Sciences recommendation that HLW can be safely isolated from the environment underground in stable geologic formations while most of the radioactivity decays away¹. An international consensus has developed behind disposal of UNF and HLW in geologic repositories (underground facilities designed to isolate the material from the biosphere) and several nations are making substantial progress developing them. Reflecting this consensus, the Nuclear Energy Agency of the Organisation for Economic Cooperation and Development^b supports geologic disposal of UNF and HLW as the preferred method for ultimate disposal².

To date, the United States has licensed only one geologic repository: the Waste Isolation Pilot Plant (WIPP) in New Mexico. WIPP houses long-lived transuranic wastes^c from government defense work and research, development, and demonstration activities. The proposed Yucca Mountain repository would primarily store UNF from commercial nuclear power plants, with about ten percent of

a. Most of the United States inventory of UNF comes from commercial nuclear power plants; the remainder is from defense, research and educational applications in the United States and abroad. High-level radioactive waste consists of radioactive fission products produced by reprocessing UNF. The liquid waste stream is vitrified (solidified in glass form) prior to disposal. In the United States, most high-level radioactive waste was produced as a result of national defense activities – nuclear weapons production and naval propulsion.

b. Member countries operate most of the nuclear power plants in the world today.

c. Transuranic waste is not UNF or HLW but it contains radioactive elements heavier than uranium (e.g., plutonium and americium).

the total repository capacity reserved for government-owned UNF and HLW. Yucca Mountain is located on federal land in Nye County in southern Nevada, an arid region of the southwestern United States approximately 90 miles northwest of Las Vegas. The U.S. Nuclear Regulatory Commission (NRC) is required by federal law to evaluate the safety of the proposed Yucca Mountain geologic repository.

The U.S. Department of Energy (DOE) conducted scientific investigations to investigate the suitability of the Yucca Mountain site, developed a design for the proposed geologic repository and submitted an application to the NRC in 2008 for authorization to construct a disposal facility at the site. The NRC completed its staff review and issued the final volume of its Safety Evaluation Report (SER) for Yucca Mountain in 2015³. The NRC safety review was based on a thorough evaluation of the DOE construction authorization application as well as decades of independent analysis and review of the characteristics of Yucca Mountain.

Volume 3 of the SER concluded that a geologic repository at Yucca Mountain would meet the stringent EPA safety standards⁴ and isolate radioactive wastes for at least one million years. However, upon completion of the entire SER the NRC staff recommended that the Commission not authorize construction of the repository because (i) DOE had not met certain land and water rights requirements identified in Volume 4 of the SER and (ii) a supplement to DOE's Environmental Impact Statement (EIS) had not been completed. The NRC completed and issued the EIS supplement in 2016⁵.

The next step of the Yucca Mountain licensing process is to resolve the contentions that were submitted by parties with standing and admitted by Atomic Safety and Licensing Board judges. ANS supports Congress providing the NRC and DOE with the funds necessary to hold adjudicatory hearings and complete the Yucca Mountain licensing process, consistent with the requirements of the Nuclear Waste Policy Act, as amended^{6,7}.

References

1. Publication 519, "The Disposal of Radioactive Waste on Land," National Academy of Sciences – National Research Council, September 1957.
2. NEA No. 6433, "Moving Forward with Geological Disposal of Radioactive Waste – A Collective Statement of the NEA Radioactive Waste Management Committee," Nuclear Energy Agency, Organisation (sic) for Economic Co-operation and Development, 2008. <https://www.oecd-nea.org/rwm/reports/2008/nea6433-statement.pdf>
3. NUREG-1949, Volumes 1-5, "Safety Evaluation Reports Related to Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada," August 23, 2010 through January 29, 2015.
4. Title 40 of the Code of Federal Regulations, Part 197 (40 CFR 197), Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada, U.S. Environmental Protection Agency, October 15, 2008.
5. NUREG-2184, Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, May 2016.
6. Nuclear Waste Policy Act of 1982, Public Law No. 97-425 (January 7, 1983).
7. Nuclear Waste Policy Act Amendments, Public Law 100-203, Title V, Subtitle A (December 22, 1987).



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