



EPA's Proposed Public Health and Environmental Radiation Protection Standards for Yucca Mountain

EPA standards are designed to protect public health from the risks of radioactive material if it is approved to be disposed at Yucca Mountain. In the 1992 Energy Policy Act, the U.S. Congress directed EPA to develop standards for a Yucca Mountain facility, based on the scientific findings and recommendations of the National Academy of Sciences (NAS). EPA first issued these standards in 2001.

In July 2004, the U.S. Court of Appeals ruled that the compliance period of 10,000 years in the 2001 EPA standards was inconsistent with the recommendations of the NAS, which stated that the compliance period should cover the time of peak dose. According to NAS, peak dose might occur several hundred thousand years into the future.

What is peak dose?

Peak dose is the point in the future when an individual would be at the highest risk from radiation from waste disposed at Yucca Mountain. The precise time and level of peak dose is determined by a combination of the level of radioactivity, the integrity of waste containers, future natural events that could affect Yucca Mountain, and the possible future locations of human populations.

EPA is revising the Yucca Mountain standard to extend the compliance period to cover the time of peak dose. The proposed standards retain the protections for the first 10,000 years from our 2001 rule and add new protections out to 1 million years, consistent with NAS advice. EPA's proposed changes were issued in the Federal Register on August 22, 2005 (70 FR 49014). EPA will consider public comments on the proposed approach to guide the development of the final revised standards. See EPA Yucca Mountain Fact Sheet #3 for more information on how to comment on the proposed standards.

How do EPA's standards protect humans and the environment?

EPA's public health and environmental standards are designed to protect human health and the environment at all times and by all pathways by limiting the amount of radiation the facility is allowed to release.

EPA's standards must be met not only for a long period of time but also under a wide variety of foreseeable conditions. EPA's proposed standards require that the U.S. Department of Energy (DOE) consider the potential effects of any event that has at least a 1 in 100 million chance of occurring in a year—including earthquakes, volcanic activity, and climate change. DOE must show that the facility will still meet the standards even if these events are considered. DOE also must show that Yucca Mountain can safely contain waste even if people accidentally drill into the waste containers thousands of years from now.

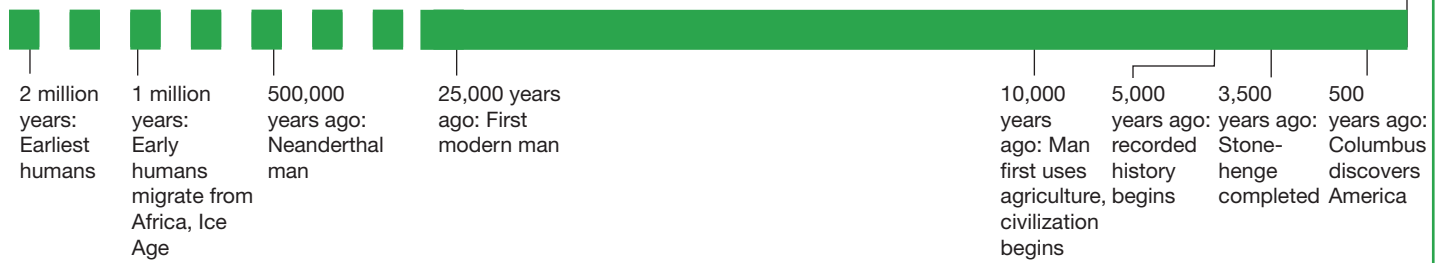
The Yucca Mountain facility will open only if the U.S. Nuclear Regulatory Commission (NRC) determines that DOE has demonstrated that it can meet EPA's standards.

What is EPA proposing?

EPA is keeping all the requirements its original 2001 standards. The revised standards now being proposed include additional requirements. The original standard addressed the first 10,000 years after the facility is closed. The amended standard would address the first 1 million years after the facility is closed.

For the first 10,000 years, the EPA's standards state that the facility may not emit more than 15 millirem of radioactivity per year. This limit is roughly equivalent to the amount of radioactivity received from one chest x-ray. The Yucca Mountain standards also limit contamination to ground water for the first 10,000 years at the same dose and concentration limits as EPA uses to protect drinking water today.

How long are 10,000 and 1 million years?



Sources: www.anthro.palomar.edu/homo and www.encyclopedia.com

Extending the Yucca Mountain standard out to 1 million years is an unprecedented scientific challenge. The U.S. and other countries have not previously established set standards for such a long time period, relying in the past on more flexible guidelines to account for the wide range of uncertainties inherent in such a long period of time. A number of international scientific and regulatory bodies and programs state that natural levels of radioactivity should serve as a point of comparison to establish standards over such extremely long lengths of time, and that is the approach taken by EPA.

For the period extending from 10,000 to 1 million years, EPA proposes to set the dose limit at 350 millirem per year, which would include all pathways of air, ground water, and soil. This limit ensures that people in the vicinity of the Yucca Mountain facility will not receive a total radiation dose any higher than the natural levels people live with safely in other areas of the country. The proposed 350 millirem standard is the difference between average natural radiation levels near Yucca Mountain (approximately 350 millirem per year) and those experienced by Colorado residents (approximately 700 millirem per year). This means that 1 million years in the future, even if they don't know the facility exists, someone living close to Yucca Mountain will be exposed to no more radiation than someone living in Colorado or numerous other areas throughout the U.S. today.

How do EPA's standards compare with approaches taken by other countries?

The proposed EPA standards are generally comparable and consistent with international standards and guidance. However, no two international regulatory programs for high-level waste exactly match each other or EPA's proposed approach in every respect – each nation has taken into account its own national priorities, regulatory processes, cultural factors, and site-specific information. Expert international organizations – such as the International Atomic Energy Agency and the International

Commission on Radiological Protection – have long recognized the scientific limits on projecting with any clarity the behavior of geologic and man-made systems extremely far into the future. They also recognize a responsibility to provide confidence that disposal systems for high-level waste can protect people over the long times during which this waste remains radioactive.

For these reasons, existing international programs for regulating high-level radioactive waste generally examine time frames out to about 1 million years. However, most nations have chosen to impose specific dose limits for between 1,000 and 100,000 years. For this initial period, EPA's dose limits for the first 10,000 years after closure are within the range of most other countries: 10-30 millirem per year.

Like EPA's proposed approach, many countries use different measures and approaches to judge safety beyond about 10,000 years. Over these extremely long times, for example, some countries allow higher radiation limits, or identify radiation doses that serve as targets or objectives, and are treated more flexibly than the dose limits applied at shorter times. Numerous international organizations agree that natural levels of radiation provide a legitimate source for setting long-term standards.

EPA's proposed approach protects future generations at levels comparable to those used in other countries for this type of radioactive waste. In many ways, EPA's standards are more strict for the million-year timeframe because we require both a specific dose for that timeframe and that all possible events be considered with a specific demonstration of how the facility can withstand these events and still meet the standard.

How much is 350 millirem?

Radioactivity is measured in units called millirem. The average dose to the U.S. public from all sources of radiation is approximately 360 millirem annually. This includes radiation from man-made and natural sources.

This figure shows the number of millirem from various sources.

Source: U.S. EPA, Radiation; Risks and Realities, www.epa.gov/radiation/sources

