

## Rational Ethical Justification Magazine Article

### Waste Disposal Ethical Dilemma

The following article deals with the environmental ethics of choosing places to discard of nuclear waste. The people, places, and facts are all real. Read the article and think about the questions. Be prepared to discuss both.



#### Yucca Mountain: Never in a Million Years

What would you do with a container of waste marked “Contents Deadly: Do Not Dispose of Anywhere, Ever”? Furthermore, imagine you were required to guard the waste around the clock so that no one could steal or misuse it.

That’s the situation that the U.S. nuclear power and defense industries are facing with the disposal of their spent nuclear fuel and other high-level radioactive wastes. Spent nuclear fuel is extremely dangerous, not only to those living today but to their descendants many generations down the road.

The spent fuel is also a national security threat because poorly secured waste could be stolen and used to build nuclear weapons. The lack of an adequately secure, safe way to dispose of this waste is one key argument against building nuclear power plants.

To address this concern, the U.S. Congress passed the Nuclear Waste Policy Act in 1982. This law made the U.S. Department of Energy (DOE) responsible for finding, building, and operating a deep underground disposal site, called a geologic repository. The Reagan Administration later approved three sites for further intensive study, but in 1987, Congress amended the Nuclear Waste Policy Act, directing the DOE to focus study on just one site: Yucca Mountain in Nevada.

Located about 75 miles northwest of Las Vegas and adjacent to the Nevada Nuclear Test Site (where the government tested nuclear weapons in the 1950s), the Yucca Mountain site was approved by Congress and President George W. Bush for long-term disposal of nuclear waste in 2002. What followed was a hornet’s nest of political controversy involving infighting government agencies, conflicting scientific assessments, and a flurry of lawsuits.

DOE still plans to submit a permit application for the underground repository to the Nuclear Regulatory Commission (NRC), but the long, complex application will be incomplete because it lacks a legal radiation standard to protect humans from radiation exposure during the millennia that the waste will remain hazardous.

At issue is the U.S. Environmental Agency’s (EPA) compliance standard of 10,000 years as the cap for radiation exposure. In 2004, the U.S. Court of Appeals in Washington DC ruled against the standard, saying that 10,000 years is much too short a time frame. The exposure cap should be based on when exposure to the waste is likely to occur, or about 1 million years from now, according to the court, which based its opinion on a 1995 National Academy of Sciences (NAS) study. One million years is about 25,000 human generations—an astonishingly long period of time, for which the EPA felt it could not assess the risk in any scientifically meaningful way. The court, however, was not persuaded with EPA’s argument.

The time issue underscores an important ethical dilemma: What is our responsibility to ensure the health and safety of future generations? Some of the wastes will be there essentially forever. For example, two of the radionuclides in the waste, iodine-129 and neptunium-237, have half lives of 17 million and two million years, respectively.

The court decision also highlighted the sheer amount of the waste, which could grow to 135,000 metric tons (300 million pounds, or the weight of about 3,700 fully loaded tractor-trailers) in the next 40 years. Many scientists and policymakers say it is practically criminal to leave such a large, enduring quantity of waste as a problem for people not yet born.

“If we won’t consent to bear the burdens of nuclear waste today, we have no grounds to believe future generations will—especially without benefits or compensation,” says Kristin Shrader-Frechette, University of Notre Dame professor of biological science and an authority on the ethics of nuclear issues. “One generation cannot transfer its mortgage or its debt to a generation unborn.”

Not surprisingly, others disagree. “If we spend large amounts of our political capital and our wealth to ensure that not one molecule of current nuclear waste is harmful 10,000 or more years from now,” says Milton Russell, an economics professor and former assistant administrator for EPA, “we will use up this generation’s and the next’s potential investments and consumption. We can’t be stewards for people far into the future.” He emphasizes, “We don’t know what life they will live or what science and technology they will have.”

In the meantime, other technological, scientific, and political issues continue to plague the multi-billion dollar project. Controversy surrounds the durability of the storage containers proposed to hold the

#### **What Is NIMBY?**

When people are faced with the prospect of a waste disposal site in their neighborhood, a frequent response is “Not in My Backyard!” This reaction, called “NIMBY” for short, is understandable. People fear for their families’ health and comfort, the appearance of the neighborhood, and the maintenance of their property values.

Acting under the NIMBY reflex, community groups often petition their state and federal government to prevent waste disposal facilities from locating in their neighborhoods. In many cases, they file lawsuits and are successful.

“Yucca Mountain is dead. It’ll never happen. There is a reason we have fought this project for more than two decades. It is impossible to open this kind of nuclear waste repository and still guarantee the health and safety of Nevadans.”

—Senator Harry Reid (D-Nevada)

waste, the condition of the geologic formation in which the waste will be buried (particularly in regard to future changes in the water table), the safety of transporting the waste to the site, and a host of other difficulties.

Foremost in the minds of many Nevadans is the question of why they were stuck holding the nation’s nuclear waste bag. Local citizens and many Congressional opponents of the project think the selection of the Yucca Mountain site was driven more by politics than science.

The most powerful political opposition to date has come from Nevada’s delegates in the U.S. Congress and the Nevada state government, headed by former governor Kenny Guinn, who has since been replaced by the highly controversial Republican Jim Gibbons.

Nevada Senator Harry Reid, speaking of the 2004 Court of Appeals ruling, said, “I’ve never believed Yucca Mountain would open, and today it could not be more clear that’s true. The court’s ruling is a significant blow to the DOE and the Yucca Mountain project and I believe enough to kill the project.”

In 2006, Harry Reid, a Democrat, became the Senate Majority Leader and was in a very strong position to influence the outcome of the project. In 2008, Congress reduced the Yucca Mountain project’s annual funding to \$386 million (down from \$445 million in 2007).

The Natural Resources Defense Council is also present in the legal battle, representing a large coalition of environmental groups and public citizens. Many Native American groups oppose the project for

health and safety reasons and because the Yucca Mountain area is part of Paiute and Shoshone holy lands.

The ultimate fate of Yucca Mountain is still in the hands of Congress and the federal courts. But the spate of lawsuits is unlikely to ebb anytime soon. As soon as EPA issues a new radiation regulation in response to the 2004 court challenge, both Nevada officials and environmental groups claim they will sue. The state of Nevada also intends to initiate as many as 500 individual challenges to DOE's license application once it is filed.

Currently, the nation's approximately 70,000 tons of nuclear waste is being stored at the nuclear power plants and defense facilities where it was generated. In 1982, Congress promised the nation that a repository would operate by 1998 so, legally, the waste can't stay at its present locations. In the meantime, the country's electrical utilities and their customers are footing the bill for storage of wastes that are accumulating daily.

Although scheduled to open in 1998, it appears the Yucca Mountain repository will not begin receiving wastes until at least 2020, if ever. So far the project has cost taxpayers about \$9 billion. DOE Director Ward Sproat, testifying before the U.S. House of Representatives, says that for each year beyond 2017 that the repository's opening is delayed, U.S. taxpayers may have to pay the electrical utilities and other contract holders who have paid into the Nuclear Waste Fund approximately \$500 million. "This will be in addition to the estimated current potential liability of approximately \$7.0 billion due to the DOE's not beginning removal of spent nuclear fuel in 1998 as required by contract," he said.

According to the Environmental News Service, reporting in 2004, about 1.2 million documents totaling some 5.6 million pages related just to the DOE's license application were searchable online. This does not include the probable mountains of published studies, reports, and legal documents generated before and since. The application alone, when submitted, is estimated to be some 8,000 pages long.

Those with sufficient interest and ample reading time can begin their research at [www.ocrwm.doe.gov](http://www.ocrwm.doe.gov). By the time you finish, the Yucca Mountain repository may be ready to open. Of course by then, the radioactive waste may have already decayed to the point where it is harmless—say in about a million years.

### Questions to Consider

- 1) It's important to make ethical decisions based on reason and fact rather than on emotions. This is particularly difficult in cases involving scary terms such as "radioactive" or "hazardous waste." One way to get past your emotions is to ask yourself whether you have the facts. In this case, does the article tell you exactly what the risks are? For example, what will happen to a person exposed to this radioactive waste? How does a person become exposed?
- 2) The Yucca Mountain facility is adjacent to the Nevada Test Site, where the government has tested thousands of nuclear weapons over the last 60 years. Does this fact make the location of the repository more appropriate or less appropriate? Why?
- 3) The story locates Yucca Mountain in terms of Las Vegas but it's actually closer to Death Valley in a desolate tract of land nearly the size of Connecticut. Does this fact change your thinking about the situation? Why or why not?
- 4) What do you think of the argument that radioactive waste should be stored in the places where the uranium and other radioactive ores were mined in the first place? That way, the people who got the

most economic benefit out of the mining operation would bear the environmental cost of the waste's long-term storage. Discuss whether or not this line of thinking is practical or fair.

- 5) Another way to deal with nuclear waste would be to disperse it as widely as possible. Suppose that this results in minor health risks for large numbers of people. Would that be ethically better than storing it in a location that might cause serious health problems for a relatively small group of people? Why?
- 6) In the article, Professor Kristin Shrader-Frechette is quoted as saying "One generation cannot transfer its mortgage or its debt to a generation unborn."
  - a) What is your opinion about this statement? Can you think of an example in which Americans are already transferring their debt to the next generation? What is it?
  - b) We sometimes hear people say that we owe this or that thing to our children or to future generations. The concept of debt implies that someone got something from a creditor (someone issuing a loan). To say we owe something to future generations seems to imply that we got something from them. But what? We didn't get permission to use the earth's resources from them. After all, people who don't exist can't own real estate and mineral rights. Can you owe something to someone who does not even exist yet and about whom we know almost nothing? Why or why not?
- 7) The 2004 decision of the U.S. Court of Appeals implies that it is our responsibility to safeguard the nuclear waste for hypothetical people living 1 million years in the future.
  - a) One million years ago, modern humans did not exist. In that interval, vast ice sheets have advanced and retreated at least four times, and the climate of Nevada has alternated between lush woodland and desert. Species once thriving in North America, such as giant ground sloths, mammoths, mastodons, and saber-toothed cats, have come and gone.
    - i) Do you think science can predict what will happen in the next million years? Why or why not?
    - ii) Should such speculation be a part of scientific discussion involving policy decisions? Discuss.
  - b) Do you think people will even be around in a million years? If so, speculate what they might be like. Consider the following:
    - i) Is it more ethically desirable to protect a defenseless group of cave people or a super advanced technological society? Why?
    - ii) What is the average lifetime of a species on earth? If it's well under 1 million years, does it make any more sense to protect human beings 1 million years from now than it would to enact a law that protects your personal health when you are 200 years old?
    - iii) Even if humans are extinct in 1 million years, do we still bear responsibility for the safety of the plants and animals living at that time? Why or why not?
    - iv) Is the concept of ethics only meaningful in relationship to human society? In other words, would ethics even *mean* anything when humans are no longer around? Discuss.

## References

- Associated Press. "Delay on Yucca Mountain Waste Site Could Cost Taxpayers Billions." July 12, 2004.
- Department of Energy (DOE) Website. Yucca Mountain Repository. [www.ocrwm.doe.gov](http://www.ocrwm.doe.gov) (accessed May 21, 2008).
- DOE Yucca Mountain Project Website. About OCRWM. Budget and Funding. [www.ymp.gov](http://www.ymp.gov) (accessed June 2, 2008).
- Environmental Chemistry Website. Environmental Justice and the NIMBY Principle. [www.environmentalchemistry.com](http://www.environmentalchemistry.com) (accessed May 20, 2008).
- Fowler, C. *Native Americans and Yucca Mountain*. Cultural Resource Consultants: Reno, Nevada, 1991.
- Institute for Energy and Environmental Research Website. If Not Yucca Mountain, Then What? [www.ieer.org/factsheet/fm\\_basic.htm](http://www.ieer.org/factsheet/fm_basic.htm) (accessed May 20, 2008)
- Johnson, J. "The Forever Waste," *Chemical & Engineering News*. 2008, 86(18), 15–21.
- Oneworld.net Website. Court Orders EPA to Revise Safety Standard for Yucca Nuclear Repository. [us.oneworld.net](http://us.oneworld.net) (accessed May 19, 2008).
- Tetreault, S. "Yucca Mountain: DOE: Enlarge Repository," *Las Vegas Review-Journal*. October 5, 2007.
- U.S. Department of Transportation Federal Highway Administration Website. Questions and Answers about Vehicle Size and Weight. [vsw.fhwa.dot.gov](http://vsw.fhwa.dot.gov) (accessed June 2, 2008).
- World Nuclear Association Website. Waste Management. [world-nuclear.org](http://world-nuclear.org) (accessed May 20, 2008).