Nuclear Waste Defined

We start by analyzing nuclear waste. Nuclear Waste is a gas, liquid, or solid material containing radioactive isotopes. These materials are used in nuclear power plants and atomic weapons. The nuclear waste is highly radioactive and dangerous from almost any perspective. Nuclear waste is created in several ways such as:

- Nuclear reactors.
- Medical waste.
- Research.
- Pharmaceuticals.
- Weapons.
- Other industries using radioactive materials.

As of 2003, the US accumulated 49,000 metric tons of nuclear spent fuel from nuclear reactors. To put this in perspective, if we were to take all the nuclear waste produced to date in the United States and stack it side-by-side, end-to-end, it would cover an area about the size of a football field to a depth of about ten feet.

Health Effects from the Exposure of Nuclear Waste

Nuclear waste contains elements that are unstable, the By-products change to become more stable, they are known as radiological waste products. There are many ways of delivering radiation to humans and animals, but the most common source is inhaled or ingested. Radiation is measured in how strong the dose of radiation. There are several types of radiation, and they give off invisible energy waves or particles called. These particles change to become more stable, they change into different elements.

Radiation from nuclear waste also causes DNA damage, which can lead to cancer. Low-level exposure symptoms are thyroid cancer, increased susceptibility to infection, and death. Low-level exposure symptoms are thyroid cancer, increased susceptibility to infection, and death.

Yucca Mountain: High-Level Nuclear Waste Site

by: Anthony Ricco
Urbs/Geog 515: Race, Poverty, And the Environment (Spring 2004)
Raquel Pinderhughes
Urban & Environmental Studies Programs, SFSU

Yucca Mountain is located 90 miles northwest of Las Vegas, Nevada. Geographically located in the mid-latitude desert, the climate is warm and dry, and there is an average of 4 inches of rain per year. Yucca Mountain is also in Nye County, the largest county in the U.S. The Federal government owns the majority of the county and the state of Nevada.

Objective

This presentation focuses on the environmental, social, and public health issues related to Yucca Mountain, high-level nuclear waste site in southern Nevada. It is designed to:

- Convey the Social Justice issues
- Convey the environmental impacts and risks of the site by explaining the problems
- Explain why Yucca Mountain was proposed as a storage site for nuclear waste
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- Explain the public health effects of nuclear waste
- Explain what nuclear waste is

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What is Yucca Mountain?

Yucca Mountain, an area in the Southern Nevada desert, was proposed as a site for nuclear waste storage over twenty years ago. Since 1987, Yucca Mountain has been the only site looked at for a final permanent depository site for high-level nuclear waste. The Department of Energy plans by the end of the year (2004) to seek an operating license, build, and entomb the nation’s most highly radioactive waste. The DOE planners insist the project will meet safety standards, including the Environmental Protection Agency limits on the amount of radioactivity released from the site for the next 10,000 years. The correct name given to this type of site by the Environmental Protection Agency is the Waste Isolation Pilot Plant, otherwise known as WIPP.

Why was Yucca Mountain proposed as a storage site?

So why was Yucca Mountain proposed as the final place for high-level nuclear waste? The first reason was that all scientists agreed that it was safer to dispose of the waste deep underground, in one location. Currently, nuclear waste is stored in above-ground pools, scattered across the U.S. in 77 various sites. There were a few other reasons for why Yucca Mountain was proposed. It is a remote location and a long distance from any big population centers. Has a dry climate (rain and water can corrode containers), and finally because it has an extremely deep water table that is at least 800 to 1,000 feet below which they would keep the waste.

Problems: Water Contamination

The Department of Energy’s “Viability Assessment” report showed that water moves very rapidly through the rocks of Yucca Mountain, meaning that if the canisters begin to fail, radioactive waste will get into the groundwater and contaminate the whole water table in the region. The water table is 1,000 feet below the repository.

Problems: Climate Change

“It was wet 10,000 years ago in the Nevada desert when the federal government plans to bury the nation’s nuclear waste, and climate change could make it wetter again in about 600 years.” Geologists and climatologists say there will be a change in the climate in about 600 years, so there will be a change in the amount of water delivered to Yucca Mountain. Known that the climate will change, they cannot predict how much or when or how the climate will change. They are concerned that it could affect the water table. It is also noted, “If we had no indication that it would not be a safe system, then we wouldn’t be going forward.”

Problems: Air Pollution

Early on, scientists were able to come up with the conclusion that portions of rock in Yucca Mountain will allow radioactive gas to escape as the waste decomposes. The primary gas released would be carbon-14, and it is estimated that “global impact over time will result in 25,000 additional cancers”, as stated by the Nuclear Information and Resource Service.

Problems: Earthquakes

Earthquakes have also been a big concern with Yucca Mountain. The area were Yucca Mountain resides is “laced with faults”, but scientists say that the faults have not been active in at least one million years. In 1992, a magnitude 5.6 quake struck not far from Yucca Mountain. The quake registered 2,000 aftershocks (Spotts, 2002). These aftershocks came because they too can affect the long-term storage. (Spotts, 2002)
**Problems: Volcanic Activity**

Crater Flat, a volcano, is located 10 miles southeast from Yucca Mountain. Crater Flat along with Yucca Mountain is said to be part of a huge volcanic field that is in the area. This field has been relatively quiet recently, but the period could be near the end.

**Problem: Transportation**

There are a lot of problems dealing with transportation of the waste to Yucca Mountain. The main way the nuclear waste would be transported would be by rail or by truck. Accidents can occur during transportation and radioactive waste can contaminate homes, neighborhoods, agricultural areas, and major business areas. Dangerous chemicals can also go into the air and people can impact those county levels of different health effects. Waste will be transported from around the U.S., traveling through dozens of hugely populated metropolitan areas like Denver, Colorado and Sacramento, California.

**Problem: Terrorism**

Terrorism could also be a concern and a problem with the site and the transportation of the waste to the site, especially after September the 11th. That is the reason why transportation data is kept secret and guards are used during shipments and to guard the site.

**Transportation**

The state of Nevada is fighting the transportation plan in federal court, in an attempt to stop the project in Congress. Gary Lanthrum, director of the DOE’s office of National Transportation, testified that since the 1960’s, the Energy Department has safely moved about 3,000 shipments of spent nuclear fuel a combined 1.7 million miles with no injuries because of release of radioactive activity. It is said that it will take 10,500 truck trips or 3,000 trainloads to get the nuclear waste to Yucca Mountain.

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Yucca Mountain is called “Serpent Swimming West” in the Shoshone Native Indian language, which grew out of the fact and evidence that the area is one of the most seismically active and is moving. Yucca Mountain is a place of deep spiritual and religious significance to the Western Shoshone and Pauite tribes. It is the place where the Shoshone people have gathered and continue to gather traditionally in the spring and fall to worship. This area is as sacred to these people as the Vatican is to Christians.

www.ocrwm.doe.gov

Yucca Mountain is located within “Newe Sogobia, the sovereign territory of the Western Shoshone as recognized in the 1863 Treaty of Ruby Valley.” (www.honorearth.org) “The Nevada Test Site was carved out of their territory and today, the Western Shoshone Nation is the most bombed nations on earth. The United States has detonated more than 1,200 atomic bombs in their territory. High rates of cancer and illness related to atomic fall-out plague the people, who suffer from this historic injustice without any governmental health assessment, rectification or medical aid” (greenaction.org)

Western Shoshones Joe Kennedy, left, and Ian Zabarte stand inside the exploratory tunnel in Yucca Mountain with Kami Sue Miller of the Moapa Band of Paiutes. Photo by Gary Thompson.

The Department of Energy had to get some answers because they were receiving a lot of heat from environmental groups and the general public. So, the Department of Energy decided to hire a research team to answer the question for once and for all. After lots of research and nearly $7 million dollars of federal money spent, the research team responded, “Yucca Mountain’s performance may be beyond the analytic capabilities of any scientific and engineering team.” This means that the question cannot be answered. Only predictions can be made about what will happen to the site over tens of thousands of years. They can’t predict things like the changing of the rocks’ chemistry in the mountains, fault activity, volcanic activity, or seepage. “The challenge for modeling Yucca Mountain is equal to modeling climate change.” (Spotts, April 18, 2002)

Politics Continued

Politicians believe that the question of Yucca Mountain should be determined by the Department of Energy. “But in the end, it’s our elected officials who must make a judgement on how much uncertainty is acceptable. What is “safe” and “when do we have enough information?” are questions scientists cannot answer.”

The groups and organizations associated with the research team hired by the Department of Energy tried to lobby the Secretary of Energy. The groups were determined to lobby for changes to The Suitability Guidelines.
A concern brought up by the Environmental Protection Agency, was that there needed to be a way to warn and date traces in the future to enter the site and therefore the waste was left there. An EPA concern was also an idea of a way to safely and better understand the site. They included: an information center, the Futures panel and the Markers panel to examine the waste and trace the wastes. The EPA also came up with a way to warn and inform future generations and to come up with ways to communicate and warn them. The EPA committed to placing special signs on the site to warn humans in the future from entering the site and to hold the waste for a long period of time. There are still other solutions out there, but only technology will get us these. I think that Yucca Mountain should never be opened and I believe it is not safe. This huge problem is just like any other environmental problem; it can never be avoided completely, just reduced. I also think it was smart of the EPA to think about the future production of nuclear waste.

There are few solutions that are possible. Solutions would be to reduce radioactivity levels, and this will decrease the unnecessary shipments. Waste could remain on-site or waste it was processed. With time, the waste radioactivity will go down, the overall temperature will start cooling, it is easier to deal with and a little bit safer. Solutions exist to deal with and a little bit safer.

Politically, the state of Nevada is suing the EPA, because they failed to follow standards of the Nuclear Waste Policy Act, the Energy Policy Act, and the Nuclear Regulatory Commission. This decision was the worst violation of any project history, took environmental impact analysis from the Environmental Protection Act history, took environmental impact analysis from the state and to local governments affected by the proposed plans. Yucca was rejected by both the Senate and House of Representatives. This was the worst violation of any project history. This was the worst violation of any project history.

REFERENCES

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For more information about Yucca Mountain visit the following sites:
Yucca Mountain Project: www.ymp.gov
Nuclear Regulatory Commission: www.nrc.gov
Nevada's Agency for Nuclear Waste: www.state.nv.us/nucwaste