

Yucca Mountain: Nuclear Storage at the "Serpent Swimming West"

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In addition to their status as "the most-bombed nation on Earth," the Western Shoshone now find their ancestral lands proposed as the home of the United States' principal nuclear-waste storage facility at Yucca Mountain, which their language calls "The Serpent Swimming West". The Western Shoshone don't like the prospect, and neither do most of the rest of the people of Nevada. The U.S. Department of Energy has proposed to haul 77,000 tons of spent nuclear fuel rods and other high-level radioactive waste from 103 storage sites in 39 other states by road and rail to Yucca Mountain, the only site being considered for its permanent storage. (Energy Chief, 2002) Newe Segobia, the Shoshone's name for their homeland (meaning "earth mother"), guaranteed them by the Treaty of Ruby Valley (1863), includes Yucca Mountain.

By August, 2001, an estimated 43,000 metric tons of spent nuclear fuel was being stored in water pools and concrete casks at more than 70 nuclear-plant sites around the United States, awaiting burial at a geologic repository at Yucca Mountain in Nevada, about 90 miles northwest of Las Vegas. Yucca Mountain is also the proposed long-term home for 10,000 metric tons of high-level waste from U.S. military weapons programs, including the Navy's nuclear reactors, which was being stored government installations mainly in Idaho, Washington State and South Carolina.

The U.S. Congress designated Yucca Mountain as the principal site for a high-level waste facility in 1987. The Yucca Mountain repository may be licensed to hold nuclear waste for 10,000 years. Congress also directed the U.S. Department of Energy to determine whether the waste could be safely placed there, after which D.O.E. deployed teams of scientists to evaluate the site's geology, hydrology and geochemistry "in what is probably the most comprehensive and systematic assessment ever conducted of a piece of land anywhere on the planet" (Kolar, 2001, A-13).

By mid-2001, the D.O.E. had spent 14 years and \$7 billion assessing Yucca Mountain's suitability as a nuclear-waste storage facility (Wastell, 2001, 27). The D.O.E. found that Yucca Mountain meets its definition of a safe place to store nuclear waste. According to the D.O.E., Yucca Mountain is arid and geologically stable. The D.O.E.'s reports say that the chambers holding nuclear waste canisters would be at a safe distance from the underground water table. The site is, according to its advocates, "the perfect place for a nuclear burial ground" (Kolar, 2001, A-13).

Very few people in Nevada agree with the D.O.E.'s assessment. Hundreds of angry people showed up at D.O.E.-sponsored public hearings in Las Vegas, Carson City, Elko, and Reno on September 5, 2001 to express their objections to proposals to store nuclear waste in Yucca Mountain. The protesters included a broad array of Nevada residents, from Western Shoshone spiritual leaders to Governor Kenny Guinn and the entire Nevada Congressional delegation. According to several polls, roughly 90 per cent of Nevadans are opposed to the project.

Protesters paraded to microphones (some by satellite hookup from Washington, D.C.) until after midnight, overwhelming the few people who spoke in favor of establishing a nuclear-waste repository in the mountain, which the Western Shoshone and Paiute hold to be sacred. In Las Vegas about 450 people filled the Department of Energy's National Nuclear Security Administration's meeting room (twice its seating capacity), spilling into the hallway. Hundreds of other people in a nearby room watched the proceedings on television, of whom had attended the hearing despite its remote location, tight security, late hours, and a limit on comments of five minutes per person. A total of 132 people signed up to speak at the hearing that began shortly after 6 p.m. Fewer than three dozen people had spoken by 11 p.m.; the last person was heard at 2:10 a.m. (Rogers, 2001).

"This fight transcends party affiliations, transcends socio-economic class, race or gender, and galvanizes all Nevadans from every corner of the state in opposition," Governor Guinn said, to a standing ovation. "We in Nevada will not stand for it" (Lewis, 2001). Many Nevada residents objected to the projected cost of the project (as much as \$60 billion), as they argued that the safest and cheapest way to handle the spent nuclear fuel would be to put it in dry cask storage on the sites where it is generated. Dry cask storage was said to be good for 100 years, during which scientists could (according to the Yucca Mountain storage site's opponents) explore new nuclear-waste recycling technologies that might reduce the volume of the waste and the length of time it would be radioactive.

The crowd heckled and hissed at Gary Sandquist, a professor of mechanical engineering from the University of Utah, who advocated the proposed nuclear-waste storage site. "We must store the nuclear fuel somewhere," said Sandquist, who maintained that Yucca Mountain is the best place (Lewis, 2001). Las Vegas Mayor Oscar Goodman said he will personally arrest any driver of a truck bearing nuclear waste in that city. "Well, if they can't tell us that we're safe, how dare they even consider bringing this crap here?" Goodman asked (Lewis, 2001). Opponents of the Yucca Mountain storage site include many Las Vegas casino and hotel owners who complain that visitors will not vacation in a city if they believe they may be poisoned by nuclear waste. "People come to Las Vegas to gamble with their money, not their lives," said one gaming-industry source (Wastell, 2001, 27). "If they need support on nuclear power, they won't get it from Nevada," said Senator John Ensign (Wastell, 2001, 27). Nevada has no nuclear-power plants of its own.

Opponents assert that the Yucca Mountain site is not suitable for nuclear storage because it contains numerous earthquake-prone geologic faults. Opponents also believe that rapid water-migration pathways (some of them geothermal in origin) which lace Yucca Mountain will allow water to infiltrate waste containers, corrode them, and possibly carry radioactivity into the area's water table. The D.O.E. wants to store plutonium at Yucca Mountain until methods are found to make it useful in light-water nuclear reactors, perhaps in a half century.

Stored at Yucca Mountain, the plutonium will be a resource in waiting, not waste in storage by this reasoning. Harney fears that the plutonium could reach critical mass underground, setting off a nuclear reaction that would make local water unfit to drink. Plutonium has a radioactive half-life of 24,000 years.

"Yucca Mountain is not a safe place to put any kind of nuclear waste," Harney said. "It's not a mountain to begin with, like they've been telling us, it's [a] rolling hill. That's a moving mountain," he said. "There are seven volcanic buttes there. . . . Underneath it is hot water that's causing a lot of friction in that tunnel, and today they're telling you it's not dangerous. But how come, if it's not dangerous, many, many of my people have died from cancer caused by radiation?" (Lewis, 2001).

Harney said that at least 621 earthquakes have been recorded in the area (at magnitudes of 2.5 or higher on the Richter scale) during the last 20 years. A major earthquake at Yucca Mountain could cause groundwater to surge into the storage area, forcing plutonium into the atmosphere and contaminating the water supply (Yucca Mountain, n.d.) One earthquake, a 5.6 on the Richter Scale, at Little Skull, was eight miles from the proposed disposal site.

In addition to the geologic perils of Yucca mountain, project opponents assert that transport of nuclear waste over public highways and rails from across the United States creates potential for a "mobile Chernobyl" while the waste is on the road. (Yucca Mountain, N.d.) Environmentalists who oppose efforts to transport spent fuel to Nevada for storage at Yucca Mountain contend that people living along transport routes for the waste would be at risk if one of the canisters holding the highly radioactive material were to rupture. Once the Yucca Mountain site is operating, federal officials project that the Yucca Mountain site will receive six to seven shipments of highly radioactive waste daily. Waste will traverse 46 of the 50 states on its way to the site.

The Politics of Nuclear-waste Disposal

At the end of November, 2001, a Congressional report on Yucca Mountain's nuclear-waste potential that leaked to the press was very critical of the D.O.E.'s use of what it deemed as misleading and incomplete information on the site. The General Accounting Office's report recommended that D.O.E.'s site report be delayed indefinitely. Such a delay (which never occurred) probably would have effectively scuttled the plan for a nuclear waste dump at the site.

U.S. Representative Shelley Berkley of Nevada, a long-time opponent of the plans, said that "This report has potential to derail the Yucca Mountain project altogether. It details the shocking bias and mismanagement that Nevadans have been alleging for years. This is the smoking gun we've been looking for" (Leaked Report, November 30, 2001). Berkley and Senator Harry Reid, both Nevada Democrats, commissioned the report from the General Accounting Office, Congress's investigative office, after they received what they call "an anonymous whistleblower" (Leaked Report, November 30, 2001). Reid also has long been a fierce opponent of the Yucca Mountain project.

The draft report said that the D.O.E. "is unlikely to achieve its goal of opening a repository at Yucca Mountain by 2010 and has no reliable estimate of when, and at what cost, such a

repository could be opened" (Leaked Report, 2001). According to an *Environment News Service* report, "The report characterizes work to determine whether Yucca Mountain can safely contain spent nuclear fuel from the nation's 103 nuclear power plants as 'a failed scientific process' that has resulted in continual changes to the site suitability criteria" (Leaked Report, 2001). Senator Reid said that the report indicates that science has taken a back seat to politics at Yucca Mountain from the start. "This report could very well signal the beginning of the end of the Yucca Mountain project," he said.

Speaking for the Bush administration, which later approved the project, Energy Secretary Spencer Abraham called the preliminary G.A.O. report "fatally flawed" (Leaked Report, 2001). He said that the report's premature release destroyed its credibility. At any rate, said Abraham, Nevada's congressional delegation had ordered creation of a report that supported a "predetermined conclusion." (Leaked Report, 2001) Reid fired back: "The D.O.E. has wasted \$8 billion of taxpayers' money on this project, and still isn't using sound science as a basis for their recommendations. Apparently, the D.O.E. is actually suppressing science at the expense of the health and safety of Nevadans and all Americans" (Leaked Report, 2001).

The state of Nevada filed a lawsuit December 17, 2001 to halt the Yucca Mountain Project, "alleging that Energy Department ground rules for judging whether the site is suitable for nuclear waste storage are contrary to what Congress intended" (Energy Chief, 2002). Governor Guinn said the state has assembled a legal team including nuclear scientists, physicists and environmental experts, all with law degrees. "For the first time in 18 years," Guinn said, "we now have the wherewithal to enter into the judicial system with very competent attorneys and scientific people on their staff, and we're going to do everything we can to prohibit it from coming here no matter what decision he [Abraham] makes" (Energy Chief, 2002). The lawsuit, filed with the Federal District Court in Washington, D.C., asks that Secretary Abraham be prevented from making recommendations on Yucca Mountain until the ground rules are reviewed by the courts.

Abraham was met with protesters at the Las Vegas federal building as he toured the Yucca Mountain site January 7, 2002, as he preparing a recommendation on the site for President Bush. Nevada Governor Guinn and Abraham met for an hour during the visit, after which the governor said he had a chance to "reaffirm our adamant commitment against this project" (Energy Chief, 2002). A day after Abraham visited the site the D.O.E. recommended approval of Yucca Mountain as the national nuclear-waste facility. Abraham said that within 30 days he intended to recommend to President Bush that the Yucca Mountain site is "scientifically sound and suitable to hold radioactive waste" (Nevada Outraged, 2002). Furthermore, Abraham said the development of the Yucca Mountain storage facility "will help ensure America's national security and secure disposal of nuclear waste, provide for a cleaner environment, and support energy security. We should consolidate the nuclear wastes to enhance protection against terrorists attacks by moving them to one underground location that is far from population centers" (Nevada Outraged, 2002).

Governor Guinn replied tersely: "I told him [Abraham] that I am damn disappointed in this decision and to expect my veto," Governor Guinn said. "I explained to him we will fight it in the Congress, in the Oval Office, in every regulatory body we can. We'll take all of our arguments to the courts. This fight is far from over. I also told him that on behalf of all Nevadans, I am outraged that he is allowing politics to override sound science," the governor

said. I told the secretary that I think this decision stinks, the whole process stinks, and we'll see him in court" (Nevada Outraged, 2002).

As the Bush administration approved nuclear-waste storage at Yucca Mountain, the Nuclear Waste Technical Review Board issued a report concluding that scientific uncertainties make it impossible to guarantee that the dump will remain safe for the thousands of years necessary to protect the environment. While the board found that "no individual technical or scientific factor . . . would automatically eliminate Yucca Mountain from consideration as the site of a permanent repository" for the nation's nuclear waste, a variety of problems exist with the studies that aim to ensure the safety of the site (Lazaroff, 2002). The N.W.T.R.B. study questioned the adequacy of computer models used to project how the site's natural features, including geological and hydrologic formations, will protect the stored wastes. The report also raises concerns about how well casks designed to contain the wastes for the 10,000 years required by lawmakers will hold up to the potential tests of time, natural and manmade disasters (Lazaroff, 2002).

"Gaps in data and basic understanding cause important uncertainties in the concepts and assumptions on which the D.O.E.'s performance estimates are now based," the report concluded. "Because of these uncertainties, the Board has limited confidence in current performance estimates generated by the D.O.E.'s performance assessment model" (Lazaroff, 2002). The D.O.E. has spent \$4 billion studying the site during the last 24 years. Spent nuclear fuel and high-level radioactive waste is now scattered across 131 sites in 39 states, according to the D.O.E.

On February 5, 2002, President Bush approved his Energy Secretary's recommendation of Yucca Mountain as a storage site for 77,000 tons of high-level nuclear waste generated to that date by power reactors and nuclear weapons production across the United States. In a letter to Congressional leaders announcing his decision, Bush said that proceeding with the repository program "is necessary to protect public safety, health, and the nation's security because successful completion of this project would isolate in a geologic repository at a remote location highly radioactive materials now scattered throughout the nation" (Bush Greenlights, 2002). Following Bush's recommendation licensing proceedings for the site will begin before the Nuclear Regulatory Commission.

The president's decision provoked renewed outrage among Nevada elected officials and environmentalists. It also delighted the nuclear industry. Joe Colvin, president and chief executive officer of the Nuclear Energy Institute, said that "After almost two decades of exhaustive scientific evaluation showing that the site is suitable to isolate and safely dispose of used nuclear fuel, the federal government is acting responsibly and taking steps to fulfill its obligation to the American people" (Bush Greenlights, 2002).

Nevada Senator Harry Reid, a Democrat, countered: "President Bush has betrayed our trust and endangered the American public." Senator Reid charged that Bush had lied to him and to the people of Nevada because "just last week in a meeting with Senator [John] Ensign, Governor Guinn and me at the White House [he] again vowed to wait until he received and reviewed all of the scientific evidence on Yucca Mountain. Today President Bush has broken his promise" (Bush Greenlights, 2002). Reid said that transport of the waste, will require the use of 20,000 rail cars traveling through 43 states. "The President," he said, "Has created

100,000 targets of opportunity for terrorists who have proven their capability of hitting targets far less vulnerable than a truck on the open highway" (Bush Greenlights, 2002).

Within minutes of Bush's approval, Nevada Governor Guinn announced that he will exercise his Notice of Disapproval to the U.S. Congress, known as the Governor's Veto. Congress would then have 90 legislative days in which it could override Guinn's veto on a simple majority vote. "We will exhaust every option and press our legal case to the limit," Guinn asserted. "The Nevada Legislature, cities, counties and now the private sector have raised \$5.4 million toward our fight" (Bush Greenlights, 2002). On April 8, Governor Guinn vetoed the Bush administration's recommendation to build a permanent repository for radioactive wastes at Yucca Mountain. "Let me make one thing crystal clear -- Yucca Mountain is not inevitable, and Yucca Mountain is no bargaining chip," Guinn said in an address at the University of Nevada. "And, so long as I am governor, it will never become one" (Nevada Governor, 2002). By law, Congress had 90 legislative days from the date of the veto to override Guinn's veto on a simple majority vote. On May 8, 2002, the House of Representatives approved the Yucca Mountain project by a vote of 306-117.

Illustrating the fervor with which a number of Nevadans oppose the Yucca Mountain facility, Kalynda Tilges, nuclear issues coordinator for Las Vegas-based group Citizen Alert, said that if Yucca Mountain shipments eventually go ahead, "I will be standing in front of the first truck of the first gate they send it from, and I will not be alone. And if I'm not dead, when I get out of jail, I'll go stand in front of the next one. They will bring nuclear waste to Yucca Mountain over my dead body" (Bush Greenlights, 2002).

Despite President Bush's belief that the Yucca Mountain site's construction rests on sound science, the Advisory Committee on Nuclear Waste of the N.R.C. during September, 2001 issued a report asserting that recommendations favoring the site's safety rely "on modeling assumptions that mask a realistic assessment of risk" and that "computations and analyses are assumption-based, not evidence-supported" (Ewing, 2002, 659). An analysis of the situation in *Science*, the most prominent general scientific journal in the United States, concluded that "In our view, the disposal of high-level nuclear waste at Yucca Mountain is based on an unsound engineering strategy and poor use of present understanding of the properties of spent nuclear fuel. . . . To move ahead without first addressing the outstanding scientific issues will only continue to marginalize the role of science and detract from the credibility of the Department of Energy effort. As Thomas Jefferson cautioned George Washington, 'Delay is preferable to error'" (Ewing, 2002, 660).

On July 9, 2002, the U.S. Senate has voted to move ahead with the repository at Yucca Mountain by a vote of 60 to 39. President Bush signed the measure July 23.

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