

Yucca Mountain: 'Dumb as we wanna be'

Our nation's effort to "permanently" store 77,000 tons of spent nuclear fuel at Yucca Mountain is the biggest thing ever seriously proposed for the state of Nevada.

Its economic and social impact would dwarf the Comstock (1859), Tonopah (1900) and Goldfield (1902) booms. With its estimated \$70 billion-plus cost, you could afford to buy most of the Las Vegas Strip.

Yet despite such opportunity, the Yucca Mountain project has had a tortuous history and is no closer to opening than it was 20 years ago.

I don't know what the future holds for Yucca Mountain but I do know some of its history, and it's not pretty.

Let's briefly review that history, along with a little background on nuclear power, and suggest some future trends.

Background

At its simplest, a nuclear reactor is nothing more than a mass of Uranium 235 (U235) or Plutonium 239 (PU239) atoms held in a controlled environment. As the atoms are gradually split, energy is released. That energy, in the form of heat, is used to generate electricity.

Splitting the atom leads to the formation of spent nuclear fuel, often incorrectly referred to as "waste."

The first nuclear reactor was successfully tested in 1942 by a team of scientists led by Enrico Fermi in a laboratory beneath the stands of the University of Chicago football field. From there, nuclear research focused mostly on the development of nuclear weapons.

The first nuclear-powered submarine, the USS Nautilus, was launched in 1954. On Dec. 8, 1953, President Dwight D. Eisenhower offered a prophetic vision of the use of nuclear power for the betterment of mankind, known as "Atoms for Peace." A special purpose of his program, he said, "would be to provide abundant electrical energy in the power-starved areas of the world."

Nuclear power

The first commercial-scale nuclear power plant opened in England in 1956. The first commercial nuclear power plant in the United States began operation in 1957 in Shippingport, Pa.

According to Sen. Peter Domenici (R-N.M.), a strong proponent of nuclear power, as of 2004, there were 437 operable nuclear power plants in 30 countries producing about 16 percent of the world's electricity.



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One hundred three of these plants are in the United States, producing about 20 percent of our nation's electric power.

Although nuclear power has come a long way since Fermi's first demonstration, it was recognized early on that one final step was needed to complete the nuclear power production cycle, or loop, as it is called. This last step concerns proper disposal of the spent nuclear fuel.

Two possible disposal solutions exist.

The first is based on the fact that the spent fuel still retains most of its original energy and can be reprocessed, and the good stuff -- the U235 and PU239 -- removed, then "reburned" in a reactor to produce more energy.

After several "reburnings," the quantity of spent fuel remaining is much less.

In the 1970s, the U.S. was well on its way to solving its spent fuel problem through reprocessing. So confident were our leaders in the future of nuclear power in 1975 that President Gerald Ford called for the construction of 200 nuclear power plants in the U.S. to help free the country from dependence on foreign energy sources.

It looked like President Eisenhower's vision was going to become a reality.

Unfortunately, history took a detour. In April 1977, President Jimmy Carter ordered an end to the U.S. effort to reprocess spent nuclear fuel. He tried to get other nations to go along with his stance, but some did not.

Carter's action resulted in the United States having to depend on the second disposal solution -- permanent storage of spent nuclear fuel. In practice, this meant putting it in the ocean or burying it in the ground. Disposal at sea was impracticable.

Carter's decision to forgo reprocessing saddled the nuclear power industry and the federal government with an unanticipated problem -- where to entomb the spent fuel.

Matters were further complicated, at least in terms of public perception, by the accident at Three Mile Island in Pennsylvania in 1979.

Carter's action and Three Mile Island brought a halt to forward movement in the nuclear power industry in America and, to some extent, overseas. The accident at Chernobyl in the Soviet Union in 1987 only deepened the public concern.

Existing nuclear plants in this country continued to operate, but no new ones were constructed. Easy availability of oil, gas, and coal provided a further disincentive to moving forward with nuclear power.

Yucca Mountain

In an attempt to solve the problem of disposal of spent nuclear fuel, Congress passed the Nuclear Waste Policy Act in December 1982, and it was signed into law by

President Ronald Reagan on January 7, 1983 (Public Law 97-425). Nine potential disposal sites were initially considered.

After study, the list was narrowed to three locations -- Deaf Smith County, Texas; Hanford, Wash.; and Yucca Mountain.

The act also required the federal government to begin accepting spent nuclear fuel from the power producers for permanent entombment in 1997.

In 1987 the Nuclear Waste Policy Act was amended, narrowing the list to one potential disposal site -- Yucca Mountain.

The U.S. Department of Energy (DOE) held its first public meeting in Nevada on Yucca Mountain at UNLV early in 1983. I was at that meeting. Don Veith, the Yucca Mountain project manager for the DOE, presided. After welcoming everyone, he presented an overview of the new legislation and suggested what we could expect to happen at Yucca Mountain. Then he opened the meeting to public comment.

The first speaker was then-Gov. Richard Bryan who, accompanied by an entourage, entered the large meeting hall with considerable pomp. He announced, in the most forceful and concrete terms, that he was "unalterably opposed" to the storage of "nuclear waste" in Nevada.

Following Bryan, a surrogate for then-Congressman Harry Reid announced the congressman's strong opposition to the storage of nuclear waste in Nevada.

As I recall, most of the other speakers expressed an opinion amounting to, "Interesting - perhaps there is something in it for us."

The state, through the governor's office and the Nevada Agency for Nuclear Projects (created in 1985), adopted a highly negative perspective on Yucca Mountain.

Under Director Bob Loux, the Yucca Mountain program has faced more than two decades of unrelenting criticism and obstruction, from the state, to any effort to move the repository forward. Such negativity continues with unabated vigor to this day.

Spent fuel is stored at temporary sites located around the nation.

For its part, Nye County has received funds in lieu of taxes on Yucca Mountain from DOE yearly as well as financial support for the county's own oversight of Yucca Mountain through the Nye County Nuclear Waste Project Office.

This DOE money for Nye County, while extremely helpful, has not significantly influenced DOE's effort to build a repository.

From early 1983 on, DOE held periodic public information meetings in the communities in the Yucca Mountain impact area intended to keep citizens informed on what was happening with the program. The meetings were typically poorly attended.

No significant effort was ever made, either at the meetings or in other venues, to truly educate the public on why Yucca Mountain is needed and the huge amount of science that lay behind it.

Never was there an attempt to sell the project and, in current marketing parlance, to "brand" it.

DOE also established small museum-like information centers in several local communities, including Las Vegas, Beatty and Pahrump. Adequate as information centers, they were never up to the task of winning over public support, especially in Las Vegas.

In retrospect, what was, and still is, desperately needed is a community education and organizing program with boots on the ground, with face-to-face contact with citizens and local groups.

But neither DOE nor the nuclear industry ever went to such lengths to educate Nevadans; such activities would have been seen as beyond their job descriptions.

Several multi-billion-dollar offers were informally made to Nevada by the U.S. Department of Energy or the nuclear industry in exchange for the state's acceptance of the repository.

Though the offers were never made public, they were impressive. For example, at one point the Reagan administration offered Nevada a multi-billion-dollar nuclear medicine and nuclear science research facility to be associated with UNLV and situated on the Nevada Test Site in exchange for the state dropping its opposition to the repository. That offer was rejected out of hand.

On another occasion, Nevada was offered a super-train between Las Vegas and Los Angeles and the multi-billion-dollar super-collider as well as other large unspecified gifts in exchange for support. Like the research facility, these offers were dead on arrival.

(Writer's note: I borrowed this title from New York Times columnist Thomas Friedman, who used it as the heading of a piece he wrote recently critiquing the silly ideas of presidential candidates Hillary Clinton and John McCain to place a moratorium this summer on the federal gas tax. I believe the heading aptly describes the history of the Yucca Mountain project.

The federal government's effort to store 77,000 tons of spent nuclear fuel at Yucca Mountain began with the passage of the Nuclear Waste Policy Act in 1983. Since then, the effort has had a rough and expensive ride.

In the first part of this brief history of Yucca Mountain, we looked at the first years of the project. In Part 2, we trace some of the politics that have driven the project, suggest reasons why the effort has not succeeded up to now, and discuss the price we have paid for our failures.

Yucca stalls

The U.S. Department of Energy's (DOE) workman-like approach in dealing with Nevadans on Yucca Mountain is, I believe, a symptom of the agency's and the nuclear industry's misunderstanding of the spent nuclear fuel storage issue.

Prior to 1983, DOE officials had been advised by Battelle, one of their large contractors, that successful construction of a repository for spent nuclear fuel was much more a social-political problem than a technical challenge.

The engineers and scientists, a Battelle report stated, could handle quite well the safe transportation and permanent storage of the spent nuclear fuel. However, if social and political aspects of the storage of spent nuclear fuel were not dealt with effectively, Battelle suggested, the effort could become controversial and divisive.

The issue was ripe for political manipulation.

For several years following DOE's first public meeting on Yucca Mountain, held in Las Vegas in early 1983, I believe opinion in Nevada regarding the repository was rather soft; most people didn't take a firm position one way or the other. I believe this was still somewhat true even after 1987, when Yucca Mountain was singled out as the sole candidate for a spent fuel repository.

People wanted more information; they needed to be persuaded.

In my travels in Las Vegas and in Nye, Esmeralda, Eureka and Lincoln counties, most people with whom I spoke were not worked up about the issue. When people did have opinions, they were likely to be weakly held.

Perhaps uppermost in most people's minds was, "What's in it for us?"

In the rural areas it was, "Hey, we need jobs out here."

Most of Nevada's congressional delegation had open minds on Yucca Mountain for several years after 1983. Nevada Sen. Chic Hecht, a Republican who took office in January 1983 and described himself to me as President Ronald Reagan's man in the Senate, was strongly pro-repository and very much a champion of Nye County's interests.

Judging from accounts in the press, Republican Sen. Paul Laxalt, also a strong Reagan supporter who served between 1975 and 1987, was also pro-Yucca Mountain.

Representative Barbara Vucanovic, a Republican from Nevada's 2nd Congressional District, appeared open-minded about the repository. Harry Reid was the only member of Nevada's congressional delegation who strongly opposed the proposed Yucca Mountain repository in those first years.

The Las Vegas Sun and its editor, Hank Greenspun, were adamantly opposed, as they had been to the Nevada Test Site throughout its history. The Las Vegas Review Journal for years was equivocal on Yucca Mountain, I would say neither strongly in favor nor opposed.

The big Las Vegas casinos for years were also equivocal.

In the meantime, anti-Yucca Mountain, anti-nuclear opinion among many in Nevada was slowly taking root, especially in the urban areas.

Perhaps a significant amount of this negative opinion may have come from the many newcomers to the state in this period. Chernobyl in 1987 had the effect of feeding it. Anti-Yucca Mountain sentiment was free to develop more or less unimpeded in the

state, having been given a free ride by the failures of DOE and others in favor of nuclear power to educate the public and counter the negativity.

The Las Vegas Sun put out a steady stream of biased information on Yucca Mountain and nuclear energy technology. They even had a reporter, Mary Manning, whose specialty was nuclear negativity.

The negativity from Bob Loux's state office has never stopped. Both Harry Reid and Richard Bryan rode the anti-Yucca Mountain sentiment they had helped create to the Senate.

Reid moved to the Senate in 1987, replacing Laxalt. Bryan moved from Nevada governor to the Senate in 1989 by defeating Hecht.

About a year before he died, Hecht told me he attributed his defeat primarily to Bryan's milking of the Yucca Mountain issue.

In about 1986, I suggested to Loux that Bryan was on the wrong side of the Yucca Mountain issue.

"Are you kidding?" he replied. "It's the best issue he's got."

Instead of two pro-Yucca Mountain senators, by 1989 Nevada had two senators who strongly opposed it. The die was nearly cast.

I asked Hecht how Bryan and Reid knew early on Yucca Mountain was going to be such a good issue for them. He replied, "Fear always makes a powerful issue for a politician."

Bryan retired after two terms in the Senate; Reid built his political career around his opposition to Yucca Mountain and has been highly effective in playing the role of obstructionist.

From the late 1980s on, most Nevada politicians from both sides of the aisle have been obliged to toe the anti-Yucca Mountain party line.

Costs we pay

I believe Nevada's opposition to Yucca Mountain has been costly in many ways.

The federal government collects a tax on all nuclear power produced in the United States. So far, \$27.2 billion has been collected under that tax. As of fiscal year 2006, almost \$10 billion has been spent on programs for permanent storage of spent nuclear fuel. As of September 2007, \$6.9 billion had been dispersed for the Yucca Mountain effort.

Since the federal government was required by law to begin accepting spent nuclear fuel from the utilities in 1997, nuclear power producers have taken to suing the federal government for breach of contract. So far, they have been awarded more than \$7 billion. That's a total of \$17 billion out of the public's pocket and not much to show for it.

But these costs are probably insignificant compared to the damage done to the earth's environment because of the U.S.'s failure to close the nuclear fuel cycle.

Untold numbers of gas- and coal-burning power plants have been constructed while further development of nuclear power has been on hold. Much, if not most, of that fossil fuel-based power production -- yesterday's technology -- could have been nuclear.

How much carbon dioxide, mercury and other toxic substances, some of them radioactive -- yes, burning coal sends radioactive substances naturally present in coal

up the smokestack -- have been discharged into the earth's atmosphere because of this failure?

The damage done to the earth's environment, not to mention human health, is impossible to calculate, but it is likely considerable.

And then there are missed economic and social opportunities for Nye County, Nevadans and the country.

If the cards had been played right, Yucca Mountain could have seeded the development of a large advanced energy and nuclear science technology complex perhaps unmatched in the world.

In the 1980s and 1990s, it was not obvious to most that the world was headed for serious, potentially catastrophic energy and related global warming problems. The supposed need to store nuclear "waste" safely in the ground for 10,000 years, or for 1 million years, as the state of Nevada foolishly demands, was not seen as overkill.

We didn't seem to understand that there is more recoverable energy in the 77,000 tons of spent nuclear fuel intended for Yucca Mountain than in all the oil and gas in Saudi Arabia.

It is becoming increasingly clear that the nuclear "waste" to which the anti-Yucca Mountain forces have been opposed, will soon become the basis of a huge new energy industry, and Nevada (particularly Nye County) could have been -- and may still have a chance to be -- at the center of things.

That spent nuclear fuel intended for Yucca Mountain is going to be reprocessed and turned into electricity by somebody somewhere -- why not us?

The Tennessee Valley Authority just received \$4 million from the Department of Energy to develop a conceptual design for "a nuclear waste reprocessing plant." A friend who lives in east Tennessee told me, "That money should be going to Nevada."

The French have been smart about all of this. Today, France gets about 80 percent of its electric power from 59 nuclear reactors. The French, who enjoy as high a standard of living as we and a longer life expectancy, dump less than one-half the amount of carbon per capita into the atmosphere that we do.

France's reliance on nuclear power is the main reason.

In the 1970s, France analyzed its energy situation -- "No oil, no gas, no coal, no choice," they said. They concluded nuclear was the best option. The public was educated on the pros and cons and the people made a rational choice about the future.

With gas costing more than \$120 per barrel and global warming coming at us like a freight train, it's a different world from the time when Richard Bryan and Harry Reid announced their opposition to Yucca Mountain.

The day is not far off when such an unfortunate view will get a politician in trouble. But we have paid a price.

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