

Yucca Mountain: A Brief History in Layman's Terms

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The following was written by Bob McCracken - an author, former resident of Tonopah, Nevada, and currently under contract to Nye County to prepare an oral history of Rhyolite (part 2 will be added next week):

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.

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.