

What's News at Yucca Mountain

Publication of Mineral County's Yucca Mountain Repository Planning and Oversight Program



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Special points of interest:

- Litigation continues over the state engineer's denials in 2000 and 2003 of the Energy Department's request for permanent rights to 430 acre-feet per year for the Yucca Mountain Project (page 2).
- To its harshest critics, the Yucca Mountain nuclear waste repository looks dead in the water (page 4).
- MIT Professor McFarlane believes that some kind of underground repository in the United States is "absolutely necessary." But thinks it might be wiser to build the repository elsewhere, perhaps in a state closer to the East Coast (page 5).

Visit Mineral County Yucca Website:
www.mcnuoprojects.com
.....where you'll find more information about the proposed Yucca Mountain Nuclear Waste Storage Facility

New opening date for Yucca Mountain waste dump is 2017

WASHINGTON (AP) - The Energy Department has a new opening date for the long-delayed Yucca Mountain nuclear waste dump in Nevada: March 31, 2017.

That's 19 years late. But it's the first concrete timeline the department has produced in some time.

The Energy Department planned to announce the schedule at a congressional hearing, but shared it with congressional offices. Several of them made it public.

Under the schedule, the department would submit its license application to the Nuclear Regulatory Commission on June 30, 2008, get authorization to begin construction on Sept. 30, 2011, complete construction on March 30, 2016 and begin accepting nuclear waste on March 31, 2017.

The dates correspond to general goals department officials have shared recently with lawmakers.

"Our work will continue to be based on sound science, and as we move forward the program now has reachable, definable target dates that will allow us to open Yucca Mountain as the nation's repository for spent nuclear fuel," Energy Department spokesman Craig Stevens said in a statement.

"This is an ambitious schedule, but it's nice to actually see a schedule. This is the most detailed schedule on Yucca Mountain that I have seen in recent memory," said Senate Energy Committee Chairman Pete Domenici, R-N.M.

But Domenici, who in June released a proposal for interim nuclear waste storage at federal sites across the country, said his plan still would be needed because

the government is years past its 1998 deadline to begin accepting spent fuel from nuclear reactors.

Yucca Mountain is planned as the first national repository for nuclear waste and is meant to hold at least 77,000 tons of the material for thousands of years. The dump site is in the desert 90 miles northwest of Las Vegas.

The project has been delayed repeatedly by lawsuits, funding shortfalls, evidence that government scientists flouted quality control standards - requiring their work to be redone - and other problems.

Currently there are more than 50,000 tons of highly radioactive nuclear waste waiting at nuclear power plants in 31 states. The government is obligated by contract to take the waste off the utilities' hands but has not done so because it has no place to put it.

Sen. John Ensign, R-Nev., said the timeline had "no basis in science or reality."

Jon Summers, a spokesman for Senate Minority Leader Harry Reid, D-Nev., said the new schedule was "nothing more than a wish list by the people who want to turn Nevada into the nation's nuclear dumping



Yucca Mountain, 90 miles north of Las Vegas

Appointment of Director at Yucca Mountain

Edward F. Sproat, III, was appointed by President George W. Bush and confirmed by the United States Senate on May 26, 2006, as the Director of the Department of Energy's Office of Civilian Radioactive Waste Management. The office is responsible for developing the Nation's waste disposal system for spent nuclear fuel and high-level radioactive waste, as mandated by the Nuclear Waste Policy Act of 1982. The Yucca project has been headed by interim leaders since Margaret Chu resigned as director in February, 2005.

Sproat has extensive senior management, engineering, and licensing experience in the nuclear industry both domestically and internationally. Prior to his appointment he was the managing partner of McNeill, Sproat & Associates (MS&A) LLC, in Berwyn, Pennsylvania. MS&A provided organizational and technology development solutions to growing energy firms.

Previously, Sproat held the position of Vice President of International Projects for Exelon Generation, responsible for developing and managing Exelon's interests in various international generation ventures. In that position, he served as a Director on the Board of Pebble Bed Modular Reactor (PBMR) Pty. LTD, in the Republic of South Africa. The PBMR board requested Exelon to allow Sproat to assume the duties of Chief Operating Officer (COO). He served as COO from January 2002, working full time in South Africa until the services requested by the board were successfully delivered in December 2002.

Sproat held various management positions with Exelon's predecessor PECO Energy over the last 25 years. He was the Director for Strategic Programs for PECO Nuclear, responsible for all License Renewal projects for the PECO/AmerGen fleet, the development and execution of an integrated strategy for the disposal of spent nuclear fuel, and the evaluation of advanced reactor concepts. He also held the positions of Director of Engineering for the entire PECO Nuclear fleet as well as Director of Engineering and Maintenance at the Limerick Nuclear Generating Station. Source: Office of Civilian Radioactive Waste



Info on Interim On-Site Storage of Used Nuclear Fuel

Nuclear plant used fuel storage capacity.

Nuclear plants were designed to store at least a decade's worth of used fuel. The federal government was to begin moving used fuel from plant sites to a centralized storage facility in 1998, as mandated by the Nuclear Waste Policy Act of 1982. This delay means that nuclear plants must store more used fuel than expected and longer than originally intended. By 2011, the earliest opening date for a repository, 78 plants will have no room left in their used fuel pools.

Used fuel pools: Safe storage inside plants. At most plants, used fuel is stored in steel-lined, concrete vaults filled with water. In these used fuel pools, the water acts as a natural barrier for radiation from the fuel assemblies. The water also keeps the fuel cool while the fuel decays—becomes less radioactive. The water itself never leaves the inside of the plant's concrete building.

Dry storage facilities: Safe storage outside plants. Since 1986, more than two dozen U.S. plants, including several shutdown units, have supplemented their storage capacity by building above-ground, dry storage facilities. By mid-1999, nearly 150 of these containers were being used in the United States. By 2050, 83 plants will have built dry storage facilities. Other countries also have safely and successfully stored used fuel above ground since the mid-1970s.

Dry storage container construction: Containers are made of steel or steel-reinforced concrete, 18 or more inches thick, as well as lead, which serve as proven, effective radiation shields. Once loaded with used fuel assemblies, the containers are stored horizontally in a concrete vault, or they stand upright on a three-foot-thick concrete pad. The containers are designed and tested to prevent the release of radioactivity under the most extreme conditions—earthquakes, tornadoes, hurricanes, floods and sabotage—and are naturally cooled and ventilated.

NRC design approval and licensing of dry storage containers: Each container design must be approved by the U.S. Nuclear Regulatory Commission. While the NRC had determined that used fuel can be safely stored at plants sites for at least 30 years beyond the licensed operating life of the plant, the agency requires that dry storage containers be constantly monitored and relicensed every 20 years.

Dry storage systems are only a temporary solution: Dry storage containers are expensive, ranging from \$500,000 for a container stored in a vault to more than \$1 million for a container stored outside on a concrete pad. Will public utility commissions allow utilities to recover the cost of this extra storage system from customers when the customers already have contributed billions of dollars into the federally mandated Nuclear Waste Fund? Also, state and local officials are concerned that, unless the U.S. Department of Energy fulfills its legal obligation to provide used fuel disposal, on-site dry storage facilities will become, in effect, repositories themselves. Certain states have moved to limit the development or expansion of these facilities or to place conditions on the utilities in exchange for approval. Source: NEI

Facts about Radiation

Comparison of Radiation Sources

Your average radiation dose.

In all, the average person in the United States receives about 360 millirem of radiation per year. About 300 millirem comes from natural sources and 60 millirem from manmade sources.

Source	Amount
Inside the Body (air—radon)	200 millirem
Inside the Body (food and water)	40 millirem
Earth's Crust (Colorado plateau)	90 millirem
Earth's Crust (Atlantic or Gulf Coast)	23 millirem
Earth's Crust (elsewhere in the U.S.)	46 millirem
Outer Space [Cosmic Rays] (5,000-6,000 feet)	55 millirem
Outer Space [Cosmic Rays] (sea level)	26 millirem
Medical X-Ray	40 millirem
Living in Stone, Brick, or Concrete Building	7 millirem
Airline Flights (round-trip cross-country)	5 millirem
Airline Flights (per 1,000 miles flown)	1 millirem
Watching Television	1-2 millirem
Computer Terminal	0.1 millirem
Luminous Wrist Watch	0.06 millirem
Coal-Fired Power Plant (living within 50 miles)	0.03 millirem
Nuclear Power Plant (living within 50 miles)	0.009 millirem
Smoke Detector	0.008 millirem

Measuring radiation dosage. Radiation dose is measured in rem, which is based on the effect of radiation on the human body. It takes into account both the amount of radiation deposited in body tissues and the type of radiation. A millirem is a thousandth of a rem.

Low health risks from small amounts of radiation. According to the federal government, the health risks from small amounts of radiation, if any, are very low in comparison with other health risks. For instance, compared to receiving 100 millirem every year for your lifetime, smoking a pack of cigarettes a day is 400 times more risky, being 15 percent overweight is 100 times more risky, and driving a car 12,000 miles a year is 40 times more risky.

Source: Adapted from U.S. Nuclear Regulatory Commission Regulatory Guide 8-29 (<http://www.nrc.gov/NRC/RG/08/08-029.pdf>). There may, in fact, be no adverse health impacts from low levels of radiation. "According to a consensus of scientists, there is a lack of conclusive evidence of low-level radiation effects below total exposures of about 5,000 to 10,000 millirem." **Source:** Radiation Standards, GAO/RCED 00-152, June 2000, U.S. General Accounting Office.

Radiation comes from unstable atoms. As unstable atoms change to become more stable, they emit radiation in the form of invisible energy waves or particles. Scientists discovered natural radioactive elements in the late nineteenth century, and in the early twentieth century created radioactive elements artificially from stable elements. In 1942, scientists were able to split atoms deliberately to release the energy contained in the nucleus, creating an unstable atom in the process. At that point, man-made nuclear energy was born. There is no difference between natural and man-made radiation.

All people experience natural and man-made radiation. About 82 percent of our total exposure to radiation comes from natural sources: radon gas; the human body itself, which contains radioactive elements; outer space; and rocks and soil. Radon—a gas produced as uranium atoms in soils decay—accounts for about 55 percent of our exposure to natural sources of radiation. Radioactive elements in our own bodies account for 11 percent. Rocks and soil are responsible for another 11 percent. Still another 8 percent comes from outer space, including the sun. The remaining 18 percent of our total radiation exposure comes from man-made sources, primarily medical and dental X-rays and consumer products. **Source:** National Council on Radiation Protection and Measurements (NCRP).

Nuclear power plants are a miniscule source of radiation. Because of their advanced design and sophisticated containment structures, U.S. nuclear plants emit a negligible amount of radiation. In fact, even if you lived right next door to a nuclear power plant, you would still receive less radiation each year than you would receive in just one round-trip flight from New York to Los Angeles. A 1990 National Cancer Institute study, the broadest ever conducted, found no evidence of any increase in cancer mortality including childhood leukemia among people living in 107 counties that host, or are adjacent to, 62 major nuclear facilities in the United States. **Source:** Cancer in Populations Living Near Nuclear Facilities, National Cancer Institute, National Institutes of Health, U.S. Department of Health and Human Services, NIH Publication No. 90-874. **Source:** Nuclear Energy Institute (NEI) www.nei.org

Burial site project in Nevada in limbo

Thousands of tons of deadly radioactive rods of spent nuclear fuel and waste have accumulated at three California nuclear power plants because the federal government has failed to open a permanent nuclear burial site in Nevada that was supposed to be ready eight years ago.

And the delay is only getting worse: Last week, the U.S. Department of Energy announced that the nuclear dump site won't open until 2017 -- almost two decades past the original 1998 inauguration target and five years beyond the most recent scheduled opening date.

The latest delay climaxes a yearlong debacle at the Yucca Mountain Project in Nevada -- a debacle during which staff scientists were suspected of fraud, federal investigators blasted the project's management, and project officials announced plans to revamp the operation and redesign the burial site. On July 14, according to news reports, officials said they'd lay off up to 500 employees as part of the planned reorganization.

The Energy Department estimated in 2001 that the facility would cost \$60 billion. But in February, Energy Secretary Samuel Bodman admitted at a conference of nuclear power industrialists that there's no trustworthy cost estimate.

Energy Department officials say the facility will offer a permanent solution to the nation's deadliest waste, protecting the environment from the radiation of spent nuclear fuel for 10,000 years or longer. Critics say the computer models the Energy Department used to make such predictions are unreliable.

To its harshest critics, the Yucca Mountain nuclear waste repository looks dead in the water.

"The Yucca Mountain nuke dump has been riddled with scientific, health and safety problems from the beginning," said Sen. Harry Reid, D-Nev., in a statement last month. "I don't believe the dump will ever open."

But project defenders are confident they'll get their act together and overcome long-standing technical objections to the site -- especially fears that the super-hot nuclear fuel and wastes could leak into groundwater and spread for miles far faster than anyone dreamed when the project was proposed in the 1970s.

Someday "Yucca Mountain will open," Paul Golan, deputy director of the Energy

Department's Office of Civilian Radioactive Waste Management, told The Chronicle. "We're going to demonstrate that we have good science, good process, good engineering. We have good quality standards in place. This (repository) is certainly a challenge that this country can solve -- and can solve credibly."

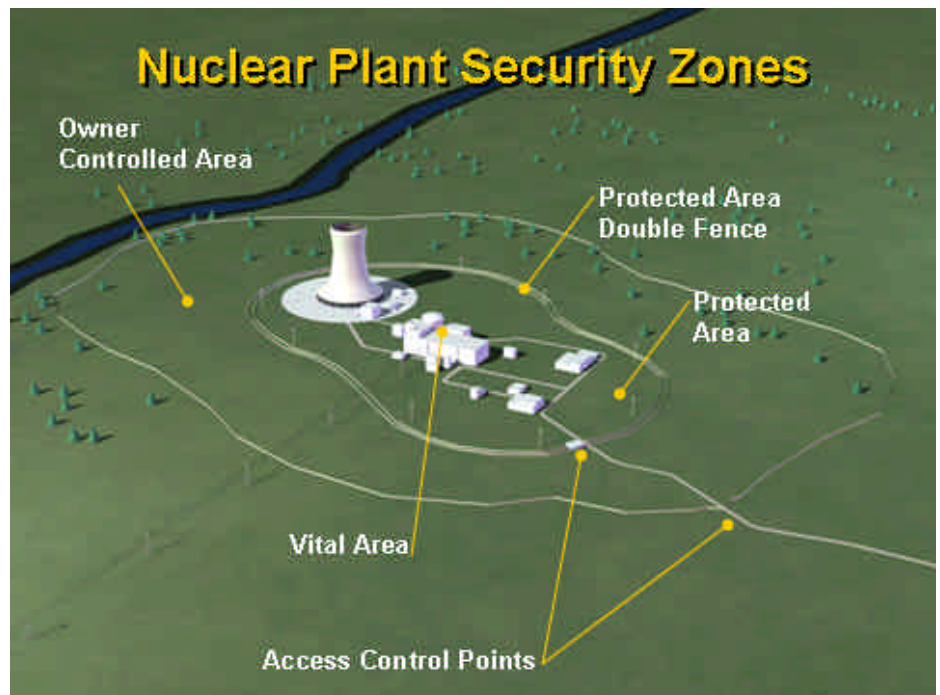
Utility officials in California and across the nation are not pleased to be stuck with growing mountains of spent fuel and waste that the Energy Department had promised to take off their hands long ago. Nationwide, more than 50,000 tons of poisonous, super-hot rods of spent nuclear fuel are sitting in cooling ponds and dry casks at atomic power plants awaiting the day when they will be shipped to Yucca Mountain.

Several utilities have sued the department to recover costs of on-site storage and won; more suits are planned.

PG&E officials, who run the Diablo Canyon nuclear plant and the now-defunct Humboldt Bay reactor, are among the litigants. They have demanded \$100 million in damages and say they expect a court decision in September. So far, the Diablo Canyon plant has accumulated more than 1,000 tons of spent fuel and waste; the much smaller Humboldt Bay plant, which closed in the 1970s, has almost 30 tons.

Southern California Edison spokesman Ray Golden told The Chronicle that the utility is reviving legal action

Deadly nuke rods piling up in state



An illustration of the area of a nuclear power plant protected by armed guards, physical barriers, and surveillance equipment.

Burial site project in Nevada in limbo (continued)

(Continued from page 4)

against the Energy Department, which had been temporarily delayed, for its failure to take spent fuel and waste now accumulating at the San Onofre Nuclear Generating Station near San Diego. A pool at that plant stores 3,000 tons of spent fuel; an additional 300 tons is stored in dry casks.

Utility officials insist that it's safe to store the fuel and nuclear waste on site. But anti-nuclear activists fear the spent fuel and waste storage facilities could become juicy targets for terrorists -- say, a pilot flying a plane filled with explosives.

On June 2, the Ninth Circuit Court of Appeals in San Francisco, responding to a lawsuit by the anti-nuclear activist group San Luis Obispo Mothers for Peace, ordered the U.S. Nuclear Regulatory Commission to study the possibility of a terrorist attack at Diablo Canyon.

Nearly a half-century has passed since the National Academy of Sciences recommended burying spent fuel from nuclear power plants at an underground site, and it's been two decades since Congress designated Yucca Mountain as that site.

Nothing else like the proposed Yucca Mountain repository, which would be operated by the Energy Department, has been built. The facility some 70 miles northwest of Las Vegas would consist of a series of tunnels 1,000 feet underground, where spent fuel rods from the nation's nuclear plants would be permanently buried.

Four years ago, President Bush, seeking to make nuclear power a cornerstone of his energy policies, unveiled a plan to complete the project by authorizing the Energy Department to file for a U.S. Nuclear Regulatory Commission license to open the site. The Energy Department still hasn't filed the application, in part because it's still struggling to come up with a workable repository design that will withstand the commission's scrutiny.

That scrutiny could be particularly intensive given the recent highly publicized scandal over suspicions of data fraud inside the Yucca Mountain project. Additionally, if Congress isn't convinced that the project can pass examination by the U.S. Nuclear Waste Technical Review Board, it can refuse to bankroll construction or to fund the expensive transport, by truck and rail, of the nation's spent fuel to Nevada.

The review board, one of the proposed repository's most dogged and distinguished critics, is an independent agency chartered by Congress in 1987 to provide independent scientific monitoring of the project. The board consists of presidential appointees and a technical staff.

On May 16, board chairman R. John Garrick testified before the Senate Committee on Energy and Natural Re-

sources that the Energy Department's computer model for the repository "may not give a realistic picture of how a proposed repository would perform" over the centuries. Garrick noted that the repository must be able to withstand unprecedented severe conditions, namely, "above-boiling repository temperatures that will last for about 1,000 years," which, he added, are difficult to model in computers.

The most potentially fateful recent development involving the planned dump site was the revelation last year of several private e-mails among U.S. Geological Survey scientists working for the project. Some e-mails hinted that researchers were faking data used in developing computer models for simulating one of the most important scientific puzzles at hand: How quickly water flows through Yucca Mountain.

The e-mails have been made public.

"I don't have a clue when these (computer) programs were installed. So I've made up the dates and names," one unidentified e-mailer said. "If they (officials) need more proof, I will be happy to make up more stuff, as long as it's not a video recording of the software being installed."

In testimony to a House committee in July 2005, one of the scientists admitted he was "somewhat horrified" by his remarks in the e-mails but insisted that such comments were "water-cooler talk" and that there was no scientific fraud.

The U.S. attorney for Nevada decided, without explanation, not to prosecute any of the scientists. But in an April report, the Energy Department's inspector general, Gregory Friedman, told Congress that the e-mails still "had the effect of undermining public confidence in the quality of the science associated with the Yucca Mountain Project" and that repairing it will be "a costly, time-consuming process."

Energy Department officials are so shaken by the e-mails and other problems that they've assigned scientists at Sandia National Laboratories in Nevada to repeat the computer research conducted by the Yucca Mountain Project scientists. The purpose is to ensure that the models are credible.

Outside observers suggest it might be for naught.

At this point "there's probably an even chance either way that (Yucca Mountain) opens or doesn't open," said geologist and MIT Professor Alison McFarlane, co-editor of "Uncertainty Underground," a 431-page anthology of scientific reports on Yucca Mountain published by MIT Press in May.

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Burial site project in Nevada in limbo (continued)

(Continued from page 5)

"It has suffered some severe blows in the past couple of years. There are a number of people in the (scientific) community who are talking about whether we need a 'Plan B,'" she said.

McFarlane believes that some kind of underground repository in the United States is "absolutely necessary." But she thinks it might be wiser to build the repository elsewhere, perhaps in a state closer to the East Coast, where there are far more nuclear power plants and, therefore, less need to transport nuclear fuel to Nevada.

Officials in Nevada, where a majority of residents vehemently oppose the project, couldn't agree more.

The project "is really a hopeless morass," said Robert Loux, director of Nevada's Agency for Nuclear Projects, who leads the state's fight against the Yucca Mountain Project.

A growing number of members of Congress are upset, too.

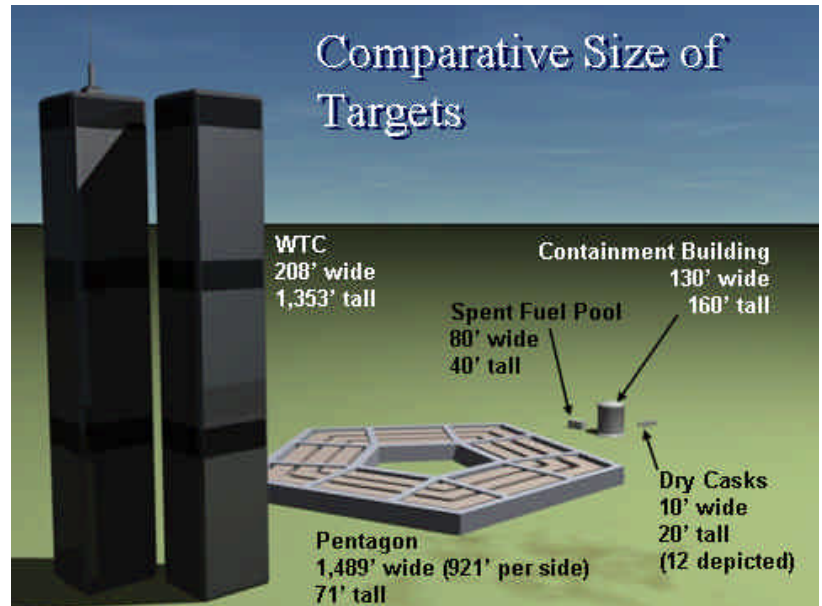
In a report in June on the Bush administration's proposed Energy Department budget, the Senate Energy and Water Committee said it is "frustrated by challenges facing the Yucca Mountain Project," including, in an allusion to the e-mail scandal, the quality of research by USGS scientists. The committee also said it is "greatly concerned" that, at this late date, the Energy Department "is redesi-

gning the repository with significant changes."

The committee adopted the report by unanimous vote.

Despite his otherwise optimistic air, the Energy Department's Golan humorously deflected a question about when he thought Yucca Mountain will open.

"I'm not a betting man," he said. "I go to Vegas all the time -- and I never put a quarter in the slot." Source: San Francisco Chronicles



A scale drawing of the relative target profiles of the World Trade Center and the Pentagon compared to a nuclear power plant containment building, spent fuel pool, and dry casks for storing used nuclear fuel. Source: NEI

This newsletter is a publication of the Mineral County Repository Planning and Oversight Program. Mineral County is one of ten affected units of local government involved in the proposed Yucca Mountain Repository. Funding provided to Mineral County is paid by users of electricity generated by nuclear power plants. Under a general contract with nuclear generating utilities, the federal government collects a fee of one mill (one-tenth of a cent) per kilowatt-hour from utility companies for nuclear generated electricity. The money goes into the Nuclear Waste fund which is used to fund all program related activities. These articles may not necessarily reflect the positions or opinions of the Mineral County Board of Commissioners.

For more information on Mineral County's program contact Linda Mathias, Director of Nuclear Projects at (775) 945-2484. Additional information on the repository program can be obtained from the U.S. Department of Energy. Yucca Mountain, Site Characterization Project Office at (702) 794-1444 or contact them at www.ymp.gov, or the Nevada Agency for Nuclear Project, Nuclear Waste Project Office, Capital Complex, Carson City, Nevada 89570, (775) 687-3744 or visit them at their web site at www.state.nv.us/nucwaste.

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