

Yucca Mountain: A Scientifically Unsound Nuclear Waste Plan

By Nukewatch Staff

Yucca Mountain, Nevada, 90 miles northwest of Las Vegas — the fastest growing city in the U.S. — is the only place currently being considered by the federal government for burial of radioactive waste fuel from power reactors. The water table is only 700 feet under the proposed repository.

The site's geology can't meet the original requirements established for deep disposal of high-level rad waste. Instead, mandatory specifications have been weakened or repealed.

In a 1998 study, the Department of Energy (DOE) itself acknowledged that the \$77 billion proposal is set inside a fractured, leaky mountain plagued by earthquakes, and that its untested waste containers have limited viability. As Mary Olson of the Nuclear Information and Resource Service says, "Yucca Mountain is a sieve."¹

Federal EPA standards hope to limit the site's release of radiation to levels that will cause no more than 1,000 cancer deaths over 10,000 years. Increased cancer incidence has never been estimated. Whether or not such a callous license to kill should be issued is a matter of scientific debate and courtroom litigation.

According to independent analyses, the project's own scientists and political opinion, Yucca should be scrapped.

High turnover of project managers could delay the planned 2008 filing of a license application by the Nuclear Regulatory Commission (NRC). Nine of 17 key management positions, including the director of quality assurance, have turned over since 2001. Further delay may result from Congress having slashed \$108 million from the White House's \$494 million budget for 2008.

As late as 2002, the NRC still listed 293 "unresolved" scientific issues, or gaps in DOE research that need filling before a license can be issued. Arjun Makhijani, of the Institute for Energy & Environmental Research, said at the time, "The DOE has not done good scientific work."

Opponents of the dump include presidential hopefuls who have promised to "end for good" (Clinton) and "shut down" (Obama) further consideration of Yucca Mt. for a dump. Even the late Ed McGaffigan, the longest-serving member of the NRC, said in February 2007, "There is no chance Yucca can go forward under current statute."

The DOE's proposed transport routes — from 72 U.S. reactor sites to the dump site — would take the deadly wastes through at least 40 states, 40 Indian Reservations, 600 counties and 100 major cities. About 138 million Americans would be exposed to dangerous levels of radiation and inevitable truck and train crashes. U.S. Department of Transportation and NRC regulations allow these containers to emit 100 millirems per hour — equal to the allowable public

dose for an entire year. One-meter away, tied-up in traffic, people in their cars would get the equivalent of one X-ray every hour.²

In January 2008, Clark County, Nevada planner and former state transportation analyst Fred Dilger caused a state-wide uproar when he said that as the waste trains go through Las Vegas, "All of the casinos on the west side of Las Vegas Boulevard would be bathed in gamma radiation."³

The Yucca Mt. plan does not begin to address the nuclear waste problem. It merely transfers the risk of accidents and leaks to Nevadans and to communities located along transport routes. A 1999 DOE report found that leaving the waste at reactor sites is as safe as moving it to Yucca Mt., as long as the waste is repackaged every 100 years.⁴

Given the uncertainties about the Yucca site and the enormous risks of moving waste fuel, it makes more sense to leave it at the reactor sites while pursuing alternatives. Independent scientists suggest on-site, aboveground, monitored storage, along with additional counter-measures for safety and security.

Yucca Mountain's Suitability Should be Disqualified

Any one of these major scientific problems should have already disqualified the site:

In 2007, the Bow Ridge earthquake fault was found to be hundreds of feet east of where they had estimated and directly under a planned cool-down area to store waste canisters before they are entombed inside the mountain. The error means designers must revamp or scrap their plans. Project officials say they are still developing repository design, construction and operating ideas for the dump. The DOE has never produced blueprints that Nevada officials can review for comments. "Everything is conception designs and cartoons," said



Bob Loux, director of the Nevada Agency for Nuclear Projects.⁵

In 2002, a June 14 earthquake 12 miles from Yucca even shocked proponents of the dump. The magnitude 4.4 quake was labeled a "wake-up call" by opponents of the project who noted the risk of damage to above-ground storage facilities, where tens of thousands of tons of waste brought to the site would be kept for decades while it cools. "If anyone ever wondered about the wisdom of locating an underground radioactive dump site on an active fault line, this shows why," U.S. Rep. Shelley Berkley, D-Nev., said after the quake.⁶

In 1999, proof that the inside of Yucca Mt. is periodically flooded with water came in the form of Zircon crystals found deep inside. "Crystals do not form without complete

immersion in water," said Jerry Szymanski, a former DOE geologist whose suggestion that deep water rises and falls inside Yucca Mt. was dismissed by the DOE.⁷ "That would mean hot underground water has invaded the mountain and might again in the time when radioactive waste would still be extremely dangerous. The results would be catastrophic."⁸

In 1998, the Yucca Mt. site was found to be subject to earthquakes or lava flows 10 times more frequently than earlier estimated, according to a California Institute of Technology study. The finding means that radiation dispersal from the site is much more likely during the proposed 10,000-year lifetime of the dump — not to mention the million-year-long radioactive hazard period.⁹

In 1997, DOE researchers admitted that rain water had seeped 800 feet from the top of Yucca Mt. into the repository in a mere 40 years. Government scientists had earlier claimed the water would take hundreds or thousands of years to reach the waste caverns. Federal guidelines state that the existence of fast-flowing water would disqualify the site.¹⁰

In 1995, physicists at Los Alamos dropped a bomb on the Yucca plan, charging that plutonium in the wastes might erupt in an explosion, scattering radioactivity to the winds or into groundwater or both.¹¹ Doctors Charles Bowman and Francesco Venneri reported that the danger of explosions will arise thousands of years from now. "We think there's a generic problem with putting fissile materials underground," Bowman said.¹²

In 1990, the National Research Council reported the DOE's plan for Yucca Mt. is "bound to fail" because it is "a scientific impossibility" to build an underground nuclear waste repository that will be safe for 10,000 years.¹³

In 1989, sixteen geologists at the U.S. Geological Survey bluntly charged the DOE with using stop-work orders to prevent the discovery of problems that would doom the repository.¹⁴ The government geologists reported that, "There is no facility for trial and error, for genuine research, for innovation, or for creativity."¹⁵ Even the NRC complained then that work at Yucca seemed designed mostly to get the repository built rather than to determine if the site is suitable.¹⁶

In 1983, the National Academy of Sciences noted that the chemical characteristics of water at Yucca Mt. are such that the waste would dissolve more easily than at most other places.¹⁷

DOE scientists know the steel canisters will dissolve long before the waste's radiation hazards are gone. Because of the million-year cancer danger of the waste, "testing of the whole project is impossible," according to Dr. R. Darryl Banks, a biophysicist at World Resources Institute, as it "would require a time machine."¹⁸

There are alternatives. Storing the waste at reactor sites will allow time to give other plans the consideration they deserve and allow the most dangerous fission products (cesium-137 and strontium-90) to become less hazardous. The deadly waste should be aboveground, repackaged and monitored till the end of time.

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Nuclear Proponents Ignore Uranium Mine Waste, Devastation

By Al Gedicks

Passage of Assembly Bill 346 would repeal limits on new nuclear reactor construction in Wisconsin. The measure will come up for a vote in the Assembly sometime this session.

Proponents of nuclear power argue that it does not produce carbon dioxide and thus does not contribute to global climate change. This argument, endlessly repeated by proponents of nuclear power, ignores the inconvenient fact that without the mining, milling and enrichment of uranium, there is no nuclear power. Each stage of the nuclear fuel cycle is extremely energy-intensive and results in the emission of carbon dioxide into the atmosphere from the burning of fossil fuels. The most energy-intensive stage of the nuclear fuel cycle is the mining and milling of uranium fuel. As the most accessible and higher grade uranium ores are mined, a greater amount of energy is required to extract uranium from less accessible and lower grade uranium concentrations.

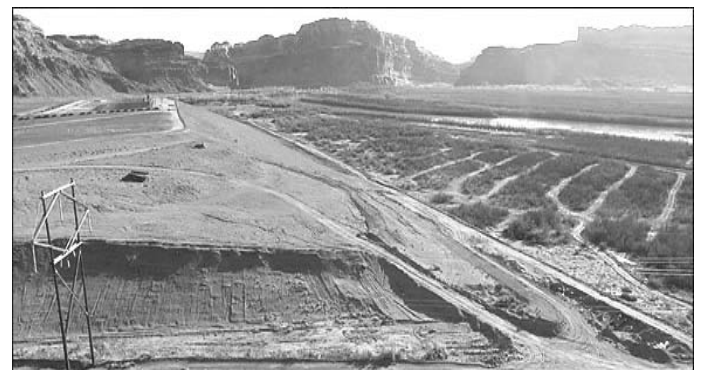
After the ore is excavated by bulldozers and shovels, it must be transported by truck to the milling plant, consuming large amounts of diesel fuel. The uranium-bearing rock is then crushed and ground to a powder in electrically powered mills. The powder is then treated with harsh chemicals, usually sulfuric acid to convert the uranium to a compound called yellow cake. Fuel is needed during this process to create steam and heated gases, and all the chemicals used in the mills must be manufactured at other chemical plants.

If the mill wastes, or tailings, which contain 85 percent of the original radioactivity in the ore, were to be disposed of properly, by deep burial in the ground, there would be additional quantities of fossil fuel required. Instead, these wastes are routinely dumped in large tailings piles on Native American lands, emitting radioactive elements into the air,

water and soils, threatening human health and the environment in perpetuity. Communities near these tailings piles report a high rate of miscarriages, cleft palates and other birth defects, bone, reproductive, and gastric cancers as related health effects of uranium mining and exposure to contaminated air and water. "This single remediation process, which should be scrupulously observed," says nuclear critic Dr. Helen Caldicott, "by itself makes the energetic price of nuclear electricity unreasonable"

Before uranium can be used in nuclear power reactors it must undergo a process of enrichment. Uranium enrichment plants are the largest industrial sites in the world and consume enormous amounts of electricity. Far from being "clean," each 1,000 megawatt-reactor required the equivalent of a 45 megawatt-electric coal plant — which annually burns 135,000 tons of coal — to supply its enrichment needs alone.

Proponents of nuclear power as a solution to global climate change not only ignore the fossil fuel emissions of every stage of the nuclear fuel cycle, they also fail to recognize the substantial emissions of radioactive elements from this same cycle and its disproportionate impact upon Native American lands and people. Over half of the nation's uranium deposits lie under Navajo and Pueblo Indian lands. At least one in five tribal members recruited to mine the ore were exposed to radioactive radon gas and have died and are continuing to die of lung cancer. The Navajo Nation banned uranium mining and processing on its land in 2005. Navajo President Joe Shirley Jr. said "It would be unforgivable to allow this cycle to continue for another generation."



Moab, Utah has long been fighting to get a mountain of radioactive uranium mine waste, which has moldered on the edge of town for decades, removed by the government. The Department of Energy said it would move the mine tailings pile to a spot about 30 miles away for entombment.

And what about nuclear waste disposal? Under current law, highly radioactive waste fuel must have a place to be stored permanently before a new reactor can be built in Wisconsin. There is no known way to safely dispose of this waste. Are we going to dump the waste on the lands of the Western Shoshone Indians, as the federal government proposes to do at the Yucca Mountain site in Nevada? Are we going to dump the waste on the lands of the Menomonee Indian Nation in Wisconsin, as the DOE tried to do in the 1980s? The DOE is required by law to report to the President and to Congress on the need for a second repository before the end of 2009.

If Wisconsin's common sense limits on the construction of new nuclear reactors are lifted, the DOE will have all the more reason to reconsider the granite bedrock of Wisconsin's Wolf River Batholith as a suitable site for a permanent nuclear waste repository.

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