

COMMENTARY**COMMENTARY: Nuclear Waste: A Mountain of Questions***By Matt Gaffney*[Normal View](#) [Print View](#) [Without Graphics](#) [Mail to a Friend](#)

Clean, renewable energy. Reducing the nation's dependence on foreign oil. Lowering greenhouse gas emissions and curbing global warming. These are the selling points, say nuclear advocates, for a "nuclear renaissance" in this country. The Bush Administration, federal lawmakers, industry lobbyists and numerous utility companies want the country to consider the nuclear option as a solution for our future energy needs. In addition to the 103 nuclear power plants that currently supply the nation with 20 percent of its electricity, as many as 30 new nuclear power plants are now being considered by the U.S. Nuclear Regulatory Commission (NRC).

The fact that nuclear waste is the most toxic substance on the planet may be lost on those who vehemently call for the country to pour its resources into creating more plants. And the U.S. currently has no viable near-term storage options for nuclear waste which continues to pollute for generations.

President Bush has long been a staunch supporter of nuclear power, and the 9/11 terrorist attacks gave him and fellow Republicans the power and leverage to finally allow the U.S. Department of Energy (DOE) to apply for a construction authorization license from the NRC to build a high-level nuclear waste repository at Yucca Mountain, Nevada. June 30, 2008 now looms as the much-anticipated date when the DOE will submit its license application (LA) to the NRC for construction authorization. Despite the new Democratic majority Senate leadership, the date is not expected to change.

**Yucca Mountain: Will it ever hold nuclear waste?**

The licensing proceeding is expected to last three to four years, so a final decision on the repository is still years away. The DOE has spent over 20 years and approximately \$7 billion for research at Yucca Mountain, and the cost of repository construction is expected to exceed \$60 billion. Whatever NRC's decision, it will certainly have far-reaching implications for energy policy, national security and environmental protection. It may be the most important land-use decision ever made by the U.S. Government.

There are two main reasons why Yucca Mountain projects have languished since 1987, the year Congress mandated that it be the only site in the nation considered for deep geological disposal: lack of a coherent and comprehensive transportation plan, and potential impacts to regional groundwater resources.

Getting it There

From the beginning, a general vagueness and an unwillingness to work cooperatively with state and local agencies and other stakeholders have all plagued DOE's transportation plan for moving waste to Yucca Mountain. If authorization to construct the depository is granted, it will impact almost every state in the West because of the nationwide transportation of high-level nuclear waste from U.S. Department of Defense weapons-making and research facilities, and commercial nuclear power plants.

The DOE prefers a "mostly rail" method of transporting waste to Yucca Mountain. Under this scenario, 9,000 to 10,000 railcars would carry waste on the nationwide rail network for a period of 24 years. There is, however, no rail line to the site, so DOE is considering two rail corridor options.

The Caliente Rail Corridor would enter Nevada from the east, and would cost more than \$2 billion. The bill is stratospheric because the rail line would have to cut through incredibly demanding terrain on its way to Yucca Mountain. The 319-mile route would cross seven different north-south mountain ranges with steep grades, as well as numerous areas subject to flash flooding and potential washouts. The DOE has stated that this route would have the fewest land-use conflicts. Nevertheless, the route will conflict with recreation, the movement of both wildlife and water, and mineral extraction. Many local ranchers would also lose access to traditional grazing lands and watering holes.

The Caliente Corridor could also impact the Railroad Valley Springfish, which is listed as threatened under the Endangered Species Act (ESA), the endangered desert tortoise, and three other



species classified as sensitive by the U.S. Bureau of Land Management (BLM). This corridor could also impact springs and riparian areas in the area, 97 identified Native-American archeological sites, three BLM Wilderness Study Areas and eight BLM designated wild horse or wild burro herd management areas.

The DOE did not consult with local residents about the routing process of the rail corridor, and has admitted that the route is not "clearly environmentally preferable." Most of the corridor is on federal land managed by the BLM, but this does not guarantee fewer land-use conflicts. Rarely does land ownership correlate with land use in the state because more than 85 percent of Nevada is federally owned, but most is open to the public.



Federal lands in southern Nevada

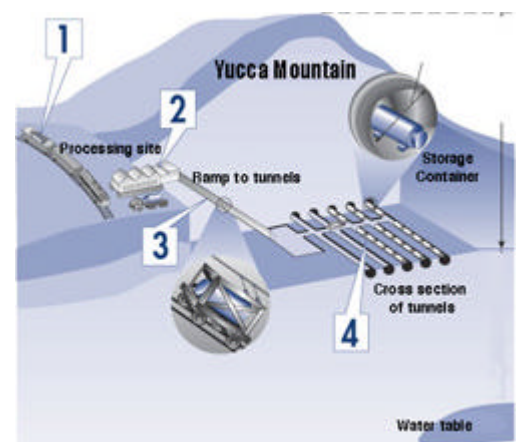
The second option is the Shurz-Mina Rail Corridor, which would travel approximately 250 miles in a north-south direction in western Nevada, with a cost of \$1.5 billion. The Walker River Paiute Tribe, which owns a crucial piece of land within the corridor, was previously against waste being transported through its reservation. This route is now on the table because the tribe has since allowed DOE to conduct a feasibility study.

This second route may require a 3,000-foot long bridge over the Walker River, and several intersections with Nevada Highway 95. The area is home to several endangered species under the ESA, including the Lahontan Cutthroat Trout. It offers wintering grounds for the bald eagle, and houses one plant species classified as critically endangered by the State of Nevada. Impacts to wetlands along the Walker River Corridor may also require special permits under the Clean Water Act. Other land-use conflicts for the route include condemnation of private land, interference of mineral extraction and processing facilities, and disruption to utility corridors. Native American cultural resources also exist in the Shurz-Mina Corridor.

If the DOE is unable to resolve costs, legal impediments, and land use conflicts in relation to a rail shipping campaign, then a "mostly truck" alternative may be the most feasible way of transporting nuclear waste. In this event, the DOE would most likely use the interstate highway system. The most attractive routes for the DOE to transport waste would be I-5, I-10, I-15, I-40, I-70 and I-80. The DOE anticipates that 53,000 truck shipments over a period of 24 years would be needed to transport nuclear waste from 131 interim storage facilities nationwide to Yucca Mountain. Another critical issue the DOE must resolve is Clark County, Nevada's steadfast opposition to the transportation of nuclear waste through Las Vegas. If a "mostly truck" scenario becomes a reality, the DOE could transport all nuclear waste from the southern U.S. through Las Vegas because of its location and proximity to Yucca Mountain. The Mayor of Las Vegas, Clark County, the State of Nevada, and Nevada's federal lawmakers oppose the shipment of nuclear waste to Yucca Mountain through the tourist-dominated city.

Groundwater Issues

The repository could also have significant groundwater impacts in both Nevada and California due to escaping radionuclides from waste packages in the repository. The DOE discovered several faults and many more fissures when excavating exploratory tunnels at the site, indicating a geologically complex and active site. The Ghost Dance Fault, the Soltario Fault, the Sundance Fault and the Drill Hole Wash Fault would run beneath or very near the proposed repository boundaries. An earthquake at Little Skull Mountain in 1992, with a magnitude of 5.4, was centered less than 12 miles from the repository site. The DOE surface facilities at Yucca Mountain suffered minor structural damage from the earthquake. The DOE maintains that seismic shaking on the Earth's surface is more intense than in the consolidated rock matrix at Yucca Mountain, and that even a strong earthquake in the region would have little impact on a deep geologic repository.



Another concern for the DOE is that hydrologic analysis conducted in the mid 1990s showed water may move from the surface through the rock at Yucca much quicker than first predicted. The repository will be located approximately 950 feet below the surface and 950 feet above the water table. Currently, critical uncertainties remain with regard to water flow through "fast pathways" in the rock fractures at Yucca Mountain. The DOE claims that surface processes, such as evaporation and plant transpiration, will remove 95 percent of water entering from the surface into the Yucca Mountain. The DOE believes that any remaining water entering the repository through fractures will evaporate due to heat output from highly radioactive waste packages, or simply drain around the waste

packages into a cooler area via fractures in the rock. Where the water goes from here, and how long that will take, is still unknown. Movement of radionuclides from corroded or failed waste packages is yet another uncertainty.

Initially, the DOE wanted to rely primarily on the geologic features of the site to isolate and contain radionuclides. However, a complex and robust waste package system was conceived in response to the hydrologic and geologic conditions discovered at Yucca Mountain. The DOE is now relying primarily on engineered barriers to contain and isolate radionuclides within the repository. The waste package will consist of an inner stainless-steel package, a nickel alloy outer covering, and a titanium "drip shield" to prevent corrosion. If the DOE believes that geologic features will play a very small role in containing radioactivity from waste packages, the site ceases to be effective or distinctive for deep geologic disposal. The DOE may be better served by beginning to study other sites where the geologic features can be more adequately utilized to contain escaping radionuclides.

The DOE uses intricate computer modeling programs to evaluate groundwater flows and predict how the repository will perform over time. Such modeling is the most effective form known for making predictions, but is it reliable? Can computer modeling based on the assumptions of the DOE scientists be relied upon to predict repository performance and groundwater movement 10,000 years in the future? Since 1988, the U.S. General Accountability Office has issued eight reports criticizing the DOE's Quality Assurance and model validation programs. These programs ensure the accuracy of all the DOE's methods and results from its myriad of modeling programs, and provide a foundation for all scientific research conducted at Yucca Mountain. Will the DOE ever reduce the numerous uncertainties in the modeling process to an acceptable level? It will ultimately be up to the NRC to decide.

Groundwater contamination from escaping radionuclides in Nye County, Nevada, where the repository will be located, and Inyo County, California, are significant not only because of the disastrous environmental consequences on groundwater resources, but because of several other regional factors.

Groundwater contamination from Yucca Mountain could affect the U.S. Fish and Wildlife Refuge at Ash Meadows, Nevada. Groundwater from the Lower Carbonate Aquifer, which underlies the repository site, reaches the surface at numerous spots in Ash Meadows to provide a haven for rare fish, plants, snails and insects. Ash Meadows provides habitat for at least 24 endemic plants and animals. Four different types of fish, including the famous Devil's Hole Pupfish, and one plant species found at Ash Meadows are currently listed as endangered species under the ESA. Six other species of plants found at the refuge are listed as threatened. Ash Meadows holds the greatest concentration of endemic life in the U.S. and the second greatest in all of North America.

Many communities in Southern Nevada and Eastern California, soon to be complemented by proposed residential developments, depend on large amounts of pumped groundwater to sustain their needs. A number of organic farms and dairies in the Amargosa Valley, Nevada are located down-gradient from the repository, and they rely on groundwater for irrigation and farming operations. Groundwater resources in Death Valley National Park could possibly be threatened by escaping radionuclides. Park employees and the 1.5 million people who visit the Park annually rely on pumped groundwater as the only source of potable water in the region. Finally, the historic tribal lands of the Timbisha Shoshone would be threatened due to any release of radionuclides from Yucca Mountain.



- Sites storing spent nuclear fuel, high-level radioactive waste, and/or surplus plutonium destined for geologic disposition.

What the Future Holds

If Yucca Mountain is licensed, it will be the first-ever deep geologic disposal site for high-level nuclear waste in the U.S., and only the second planned deep geologic disposal site for high-level waste in the world. If the NRC turns the plan down, the U.S. Government will have to scramble to find new solutions for the long-term storage of nuclear waste. In fact, if Yucca Mountain does not go forward, the DOE may be forced to look at several interim regional storage sites in the West while a longer-term search continues. The West might again be targeted as a site for deep geologic disposal because of an abundance of federal lands, huge tracts of remote and unpopulated areas, and a generally arid climate, which minimizes surface water intrusion into a potential repository.

Many have argued that the DOE was the wrong agency to be given the task of constructing a repository in the first place, and that a new, separate federal agency should have been created to build a national repository. Since its inception, the U.S. Atomic Energy Commission, which was later reorganized into the DOE, operated covertly, focusing almost exclusively on weapons-making activities. The DOE may be ill-equipped to handle the construction

of a geologic storage facility under the intense microscope of public and governmental oversight.

One of the chief reasons the DOE wants Yucca Mountain to become a reality is the U.S. Government's liability to utility companies, which presently store used fuel onsite in aboveground casks. Under the Nuclear Waste Policy Act of 1982 (NWPA), the federal government became legally obligated to take title and possession of waste generated by utility companies in early 1998. The date came and went, and now close to \$300 million has been paid by the U.S. Treasury to compensate utility companies. This amount will grow substantially, and may eventually exceed \$1 billion as more utility companies file suit in the U.S. Court of Federal Claims for breach of contract claims under the NWPA. The big loser is the American taxpayer, who foots the bill for missteps by Congress and the DOE in implementing our nation's nuclear waste policy.

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CONTACTS: Inyo County Yucca Mountain Repository Assessment Office; [Federal Government Yucca Mountain Site](#); [Yucca Mountain Wikipedia entry](#); [Yucca Mountain news from the Reno Gazette-Journal](#)

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