

Mountain of doubt

Will the country's only planned nuclear waste dump survive Obama?
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by Judith Lewis

When Edward "Ward" Sproat moved into his new office at the U.S. Department of Energy in early 2006, the future of Yucca Mountain looked about as bleak as nuclear winter. The atomic waste storage project, which had never amounted to more than a five-mile-long tunnel through a mountain 90 miles northwest of Las Vegas, had already been hammered by lawsuits and starved of funding. Now it was tainted by scandal and absurdity. A series of incriminating e-mails had revealed how some project scientists may have fudged data to meet deadlines; a federal judge had declared the Environmental Protection Agency's 10,000-year safety timeframe inadequate. If Yucca Mountain is to open, the ruling implied, the EPA must protect the area's creatures for as long as nuclear waste remains deadly – perhaps for as long as 1 million years. Even if, as sometimes happens in 1 million years, those creatures will have mutated to survive it.

A tall, genial diplomat with a full head of white hair, Sproat has spent two decades negotiating on behalf of the nuclear energy industry. He frequently goes before audiences, not all of them friendly, to explain the Energy Department's nuclear-waste strategy, which he does with an equanimity seldom seen in bureaucrats. While serving as vice president of PECO Energy before it merged into Illinois nuclear giant Exelon Energy, he brokered a deal to get the government to pay the utility for storing spent fuel at its reactor sites. And he knows from experience that without a solution to the waste problem, the much-touted nuclear power renaissance, with all its guaranteed plant construction loans and tax breaks promised in the 2005 energy bill, is doomed.

Sproat came into his job with a straightforward but Sisyphean task: To make the government's plan for nuclear waste look respectable again. The surest way to do that was to file a long-overdue license application with the Nuclear Regulatory Commission. And on June 3, 2008 – five years past deadline, but 27 days before Sproat himself had pledged – the Energy Department filed a document more than 8,600 pages long with the commission's licensing board, requesting permission to begin construction of a nuclear waste repository at Yucca Mountain.

Now, the commission has three, possibly four, years to decide whether to grant that license. If it does, whoever holds Sproat's job will submit a second application, asking regulators to approve the actual physical transfer of the waste – a half-century of spent fuel rods from civilian atomic power, plus some

military waste – to the facility by train and truck. Its earliest opening date is 2020.

To many observers and proponents of the presumed rebirth of the nuclear power industry, Sproat's accomplishment is a magnificent coup. "He's been fantastic," says Per Peterson, a professor of nuclear engineering at the University of California at Berkeley. "He brought in a kind of pragmatism and competence, and he focused in on the most important thing: to get the license application completed and start the technical review.

"Ward Sproat," Peterson concludes, "is the best thing that's happened to Yucca Mountain in its entire history."

Throughout the summer and fall, while the nuclear industry was still kvelling over Sproat's achievement, another story was unfolding in Nevada, one that could nullify all of Sproat's hard work: Illinois Sen. Barack Obama was plotting to win the state in the presidential election. Key to his strategy was affirming beyond a doubt his opposition to the Yucca Mountain repository.

Seventy-seven percent of Nevada voters object to storing nuclear waste in their state, which has no nuclear reactors of its own. Nevada Democrats generally believe that Al Gore lost the state, and hence the election, in 2000, because he failed to stake out a position on the issue. Four years later, John Kerry also lost, because while he had mostly opposed Yucca Mountain, he had intermittently voted to fund it – a history that played neatly into the Bush campaign's portrait of him as a flip-flopper.

During the primaries, it seemed as though Obama might share Kerry's credibility problem. Obama comes from a densely nuclear-powered state, and Exelon's employees contributed nearly \$200,000 to his presidential campaign. Obama confirmed his opposition in letters to local newspapers and to Nevada Sen. Harry Reid, but Hillary Clinton still stirred up so much doubt that at a January rally he felt compelled to blurt, "What part of 'I'm not for Yucca' do you not understand?"

But by the start of the general election campaign, Nevada believed him. "There was none of this slithering around that we'd had with other politicians, saying 'Well, I just go along with what sound science says,'" says Judy Treichel, the executive director of the Nevada Nuclear Waste Task Force. "He actually had it on his position statement that Yucca Mountain was not an option." By contrast, Arizona Sen. John McCain had always championed the repository, and yet told a reporter in a televised interview that he didn't want nuclear waste rumbling through Phoenix on its way to Nevada. The Obama campaign saturated the airwaves with McCain's NIMBY blip, and Obama won the state by more than 100,000 votes.

It's hard to know exactly how much Yucca Mountain had to do with his victory. "Obviously, there's never one issue that determines how people are going to vote," says Nevada Rep. Shelley Berkley, a fierce Yucca Mountain opponent. "But I believe there was a strong sense that President-elect Barack Obama presented a clear alternative to John McCain's manic obsession with putting waste in Yucca Mountain."

Sen. Reid has now pronounced Yucca Mountain dead, and Berkley believes he's right. Nick Shapiro, a spokesman for Obama's transition team, confirmed by e-mail that Obama believes "Yucca Mountain should not and will not move forward." But it's unclear exactly how Obama will kill the project, which was written into law back in 1987. Treichel thinks the new administration will cut off the repository's funds; Berkley hopes Obama will pull its license application.

"I have not spoken with Obama regarding the license application," Berkley says. "But I would recommend that the administration take a long, hard look at it and see what can be done."

The disposal of high-level nuclear waste – mostly leftovers from atomic fission, as opposed to "crapped out" clothes and contaminated tools – has dogged the industry since the dawn of the atomic age. Waste from the very first reactor experiment, in 1942, still taints the groundwater near its burial site in a forest outside of Chicago; spent fuel rods – zirconium-alloy tubes stuffed with uranium pellets – wait in watery cooling pools and dry concrete casks at 121 operating and decommissioned reactors in 39 states. There was a time when the U.S. government expected the industry to figure out how to extract more fuel from burned-up pellets, as the French and British do today. But not only has reprocessing proved to be disastrously polluting, it separates out fissionable plutonium – and plutonium can be used to make bombs. Proliferation concerns made nuclear waste disposal the government's problem.

Fearing the collapse of an already faltering industry, Congress in 1982 drew up the Nuclear Waste Policy Act, ordering the Energy Department to open a nuclear waste storage facility within 16 years. But Congress did nothing in that time except select Yucca Mountain as the only location worth studying, delaying until 2002 to give the site final approval and allow the Energy Department to at long last apply for a license. As of December 2006, \$13.5 billion from utility bills and taxes has gone into researching the site, and utilities have accumulated some 55,000 metric tons of waste. By 2010, the waste will exceed Yucca Mountain's limit of 70,000 metric tons. (Both Sprout and Energy Secretary Samuel Bodman recently advised lifting that cap instead of finding a second site.)

Doubts about Yucca Mountain's geologic suitability have piled up as well. Six hundred earthquakes have rumbled under Yucca Mountain in the last 20 years, one as great as magnitude 5.6. A panel of scientists put the chances of "igneous

disruption" in the ridgeline's ancient field of volcanoes at one in 6,250 over the next 10,000 years – which seems low until you consider that, in most of the United States, the probability of a volcano erupting is zero.

Even the site's chief meteorological selling point – the dryness of the Nevada desert – may no longer play in its favor. For one thing, climates can change: In the winter of 2004 to 2005, enough rain fell in Death Valley, 20 miles to the West, to revive seedbeds that had lain dormant for a century. For another, the absence of water may not be as significant as the presence of air. "Yucca Mountain is an oxidizing environment," says Allison Macfarlane, an associate professor at George Mason University and editor of a book on Yucca Mountain, "and spent nuclear fuel is not stable in the presence of water and oxygen."

The Energy Department has tried to engineer away Yucca Mountain's geological deficiencies, promising to contain the waste in decay-resistant alloy canisters. It's also suggested using robots to install titanium drip shields in 100 years. (The robots have yet to be invented.) But Macfarlane argues that it's far better to encase spent fuel in rock where oxygen can't get to it. The U.S. already stores defense-related radioactive waste one-half-mile deep in 250 million-year-old salt formations at the Waste Isolation Pilot Project, near Carlsbad, N.M. Sweden and Finland both have plans to contain spent fuel rods in copper and bury them in airless crystalline bedrock, 500 meters beneath the surface.

"We have a really big country," says Macfarlane. "We're really lucky. There are lots of places that would be good geologically, and that wouldn't require transporting waste over long distances. We ought to be thinking about sharing the burden among different states, maybe among states that have nuclear power plants."

Whatever her opinion of Yucca Mountain, Macfarlane believes a geologic repository has got to be built, and soon. Even if the U.S. starts reprocessing waste, it will leave behind glass bricks of deadly radionuclides that will need to be squirreled away for good. For the sake of the climate, Macfarlane says, "we don't really want to back away from the 20 percent nuclear power that we have in this country. We need all the help we can get."

All the evidence suggests that Obama agrees with Macfarlane: We need nuclear energy, even if Yucca Mountain isn't the best place to store waste. Obama's pick for Energy secretary, Lawrence Berkeley Lab Director Steven Chu, agrees with him, at least about the first part. Asked in 2005 whether nuclear should be part of the nation's energy mix, Chu answered without hesitation: "Absolutely."

But to maintain that energy mix will require replacing and retrofitting the country's aging fleet of reactors, and to support those efforts without the prospect of Yucca Mountain, the new administration will have to act quickly to

locate a waste storage project. That won't be easy. Congress will need to throw out all previous laws regarding nuclear waste disposal and start the site selection process from scratch. The Energy Department will need to tear up decades of contracts with nuclear energy providers and negotiate new terms for temporary storage. Legislators would then set to work investigating sites: Morris, Ill., where the government once experimented with a nuclear waste reprocessing operation? Oak Ridge, Tenn., the once-secret hub of the Manhattan Project? Those states would undoubtedly mount opposition of their own, just as they did in the 1980s, when Congress picked Yucca Mountain out of nine possibilities, not least because the federal government already owns almost 90 percent of Nevada's land.

And not everyone in Nevada would be happy if Yucca Mountain failed. Under the Nuclear Waste Policy Act, Nye County, Nev., expects to gain more than \$10 million a year from the site, which is within its boundaries, along with a few new jobs. Kevin Phillips, the nuclear-besotted mayor of Caliente in neighboring Lincoln County, has pinned his small town's economic recovery on the construction of the railroad line that would form the final leg in the long transportation chain of waste to Yucca Mountain. "Caliente has always been a railroad town," he told government officials at a meeting in December. "To us it looks like renewal."

Official government agencies say little about whether the president-elect has the authority to stop Yucca Mountain. Energy Department spokesman Allen Benson refused to even speculate. Nick Shapiro wrote in an e-mail that, "We are confident that Dr. Chu shares (Obama's) goals (on Yucca Mountain) and that he will work with the President-elect and Congress to realize them." Sen. Reid, too, has claimed Chu as an ally. In August of 2008, however, Chu was among 10 scientists to sign a document recommending that the licensing review proceed, if only to give short-term confidence to the nuclear industry while scientists come up with better ideas.

Per Peterson argues that progress on the license shouldn't scare anyone; negative evaluation by regulators, in fact, might be the only way to mothball the proposed facility for good. "Anybody who really believes the site is unsuitable shouldn't have any worry about the outcome of an independent scientific review," Peterson says. If Obama interrupts that review to satisfy campaign promises, the president-elect is no better than a climate change-science denier, he says. "Politics needs to be informed by legitimate science."

Yet teasing politics out of nuclear waste disposal might well prove impossible. Yucca Mountain, as *New York Times* reporter Matthew Wald recently joked to Sproat, "was chosen by some of the best geologists in the U.S. Senate," many of whom were rushing home for Christmas break when they ruled. Even Sproat calls the site selection "a technically informed political decision." Yucca

Mountain was born out of politics. It may die from them, too. But if it does, it will be a slow, complicated death.

On Nov. 6, two days after Obama's victory, Sproat went before a small audience at the Center for Strategic and International Studies in Washington, D.C., to talk about nuclear waste. The Las Vegas papers later quoted only a snippet of his remarks, in which he admitted that Obama could withdraw the license application; Congresswoman Berkley's office was running with that theme. But Sproat was not really so pessimistic. Halting the Yucca Mountain project "would basically cast the whole process and national strategy into a lot of confusion and uncertainty," he said. Whatever faith Nevada has invested in Obama, Sproat made clear that he has more in the future of their state's repository. And even if Sproat's out of his job by January, he's not giving it up.

"It's going to be licensed and built in my expected lifetime," he said. "I truly believe that. And that's one of the reasons I'm in this job – to make that happen."

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