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Submitted by JamesFinch on September 19, 2006 - 12:38am.

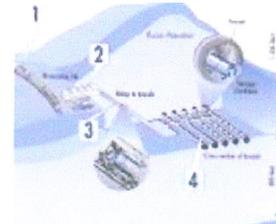
“We’ve been studying Yucca Mountain for 22 years,” Steven Kraft told us during a recent telephone interview. Mr. Kraft is mechanical engineer who serves as the senior director for Used Fuel Management at the Nuclear Energy Institute (NEI), and was part of the Recovery Team following the Three Mile Island accident in March 1979. “It is the most studied piece of real estate on the face of the earth. *There isn’t anything we don’t know about it.*”

James Finch contributes to StockInterview.com and other publications. Visit <http://www.stockinterview.com> to read his archived articles on nuclear energy, uranium mining and the emerging nuclear revival.

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Over the past 24 years, each time your house or business consumed a nuclear-generated kilowatt-hour of electricity, you were billed – by mandate of the U.S. government – one-tenth of one penny to pay for the storage of nuclear waste. And those pennies add up. Since 1982, the Nuclear Waste Fund has grown to more than \$28 billion. The plan back then was to safely dispose of the nuclear waste left over after providing 20 percent of the nation's electricity through nuclear energy. Instead, like a ticking time bomb, about 40,000 metric tons of spent fuel rods are chilling out in 141 concrete cooling ponds never intended for long-term use. Many are within a few dozen miles of large cities, such as New York, Philadelphia, Washington and Miami.



Yucca Mountain
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Now, at least nine states are heating up over the localized nuclear waste issue. On September 13th, Illinois Attorney General Lisa Madigan joined state attorneys general in California, Connecticut, Maine, Minnesota, New Hampshire, New Jersey, New York, Vermont and Wisconsin in calling on Congress to reject legislation enabling the federal government to designate nuclear waste storage facilities in all states with nuclear power plants, superceding objections by the state's governor or state and local zoning and environmental laws.

The endless merry-go-round of deciding upon a final resting place for nuclear waste has been studied for more than two decades, has cost taxpayers more than \$9 billion and has actually been solved. Unless of course, you are talking about an ideal solution which is required to be as satisfactory for up to one million years from now as it might be some 10,000 years into the future. That appears to be the most recent verdict – let's keep nuclear waste in temporary storage scattered across geologically challenged locations, some near major cities, for decades to come, because a minority of environmentalists are "uncomfortable" with a well-studied, scientifically satisfactory centralized disposal site in a remote location. Instead of moving forward with a site, which will reportedly store the waste safely for 10,000 years (and probably up to 80,000 years), the environmental lobby would prefer a toxic risk for tens of millions of Americans from 'overcrowded' temporary storage sites. They would like to stall matters until scientists can prove a centralized storage site can survive all potential abuse for up to one million years.

Unfortunately, even if Congress acts in early 2007, the best-case scenario for a centralized nuclear waste repository brings us to 2017. And that would require quite a few politicians and bureaucrats coming to their senses. While they haggle over whether the nuclear waste can be safely stored for 10,000 years (which a number of scientific studies confirm that it can), or whether the waste site must store the spent nuclear fuel for one million years, electricity consumers are annually paying \$1 billion for temporary storage.

The amount of nuclear waste accumulating since U.S. utilities began powering our homes with nuclear energy comes to about 54,000 metric tons over the past forty years. To put this in perspective, it would take up the size of a football field with a depth of less than 10 yards. Nuclear energy does not generate carbon dioxide emissions. By contrast, the amount of carbon dioxide released into the atmosphere through fossil fuels is enormous. According to one of the world's leading environmental scientists, James Lovelock, who recently authored "The Revenge of Gaia" (Basic Books, 2006), one could freeze the annual carbon dioxide emissions and create a mountain one mile high and twelve miles in circumference. And that's each year. Using the same yardstick since the 1960s, we would have 40 such mountains of carbon dioxide, but one small football field of nuclear waste.

A Mountain Which Can Solve the Current Waste Disposal Issue

After passage of the Nuclear Waste Policy Act, the U.S. Department of Energy (DOE) chose nine locations in six states as potential permanent repository sites. The DOE whittled this list down to five sites after various technical studies and environmental assessments. After intensive scientific study, the DOE chose its finalists: Yucca Mountain, Nevada, Deaf Smith County, Texas and Hanford, Washington. Following lengthy environmental studies of all three sites, Congress amended the Nuclear Waste Policy Act in 1987 and designated Yucca Mountain to be studied as the final destination for nuclear waste.

"We've been studying Yucca Mountain for 22 years," Steven Kraft told us during a recent telephone interview. Mr. Kraft is mechanical engineer who serves as the senior director for Used Fuel Management at the Nuclear Energy Institute (NEI), and was part of the Recovery Team following the Three Mile Island accident in March 1979. "It is the most studied piece of real estate on the face of the earth. There isn't anything we don't know about it."

Why didn't they pick someplace far away like Mongolia, Siberia or Greenland? "You're making the assumption that somehow the remoteness of a location makes it okay," Kraft responded. "You're talking about places where there are geologic instabilities or the geology is very difficult to understand." There are also proposals suggesting ice sheet disposal, deep ocean disposal, or simply blasting the waste into outer space. "Yucca Mountain meets all of the requirements, and I can't think of a better site," Kraft explained. "They have an awful good rock body down there that has withstood a lot of scientific scrutiny. It is by happenstance of geology they have a good location."

And what is the key to geology? "What makes Yucca Mountain such a good site is, in the formation below the repository, are naturally occurring zeolites," Kraft pointed out. Water softeners rely upon zeolites as ion-exchange beds. "Zeolites strip out a lot of the radionuclides and belays the flow of water," he explained. "By the time you get to the accessible environment, the dose rate stays well below EPA standards."

No location is perfect. Even if all nuclear power plants were turned off today, more than 108 million pounds of nuclear waste would require disposition. You can't burn nuclear fuel pellets. Nuclear waste is not flammable; it is too weak to explode. Each year, the nation's 103 reactors produce another 2,000 metric tons of waste. It has to end up somewhere. The Yucca Mountain area is geologically stable. The last volcanic

eruption – a small one – occurred 80,000 years ago. About 12 to 15 million years ago, large eruptions north of Yucca Mountain laid down the sturdy bedrock which formed this mountain.

The Yucca Mountain area only receives about seven inches of rainfall per year. Ninety percent runs off the side of the mountain ridge and mostly evaporates or is absorbed by vegetation. The proposed repository is 1000 feet underground. And the site is 1000 feet above the water table. Rainwater seeping through rock fractures is negligible and would likely be trapped inside the mountain.

Inside Alloy 22 Engineered Barrier Canisters

Within the first 1,000 years, about 99 percent of the radioactivity in the reactor fuel will have dissipated through the natural process of radioactive decay. For those who believe the nuclear waste will be dumped in some hole in the ground – as some fanatical environmentalists falsely compared this to a landfill disposal – think again. The Department of Energy designed rust-resistant canisters lined with titanium drip shield to prevent water entry. A new alloy for these canisters was created in 1987 called Alloy 22, which is a blend of nickel, chromium and other corrosive-resistant metals.

In one DOE simulation, it was found the waste canisters wouldn't begin to rust for about 80,000 years. Kraft told us, "From the presentations at the Nuclear Waste Technical Review Board meetings, the amount of time that the metal is actually subjected to the corrosive environment is actually far less in terms of hundreds of years." And who's to say how much technology will advance over the next 10,000 or 80,000 years? Imagine for a moment how much technology has changed our lives over the past one hundred years, let alone over the previous 10,000 years. The fact is we will all be long dead before a single drop of moisture ever rusts one of those canisters. And so will the next 2000 generations of our great grandchildren.

As a result of the geological and man-made barriers, scientific reports demonstrate the largest expected annual radiation dose near Yucca Mountain would be 0.1 millirem. The Environmental Protection Agency (EPA) set an annual 15-millirem limit. The EPA's dosage is about one-half what most of us get from cosmic rays every year. A chest x-ray gives you a much higher dose. Occupational standards for workers at nuclear power plants are ten times higher. Clearly, both science and logical rationale are being ignored when politicians and environmentalists dream up such "Twilight Zone" guidelines for Yucca Mountain. When the EPA standard of one million years was proposed, based upon a 1995 National Academy of Science study, it was "unprecedented worldwide," Kraft said.

Is Transporting the Nuclear Waste to Yucca Mountain Safe?

Critics worry about the dangers of transporting nuclear waste from local sites to Yucca Mountain. They seem to overlook an important fact. During the past 30 years, more than 3000 shipments have traveled across the United States over 1.6 million highway and rail miles without a single radioactive episode. Used nuclear fuel has been safely shipped tens of thousands of times outside the United States. Environmentalists would have already pounced had there been an accident involving radioactive releases.

The DOE estimates about 175 used fuel shipments will travel to Yucca Mountain each year for 24 years, transporting between 300 and 500 containers. Numerous tests performed by Sandia National Laboratories to "destroy" the canisters demonstrated the ruggedness of the containers. Crashing trucks into concrete barriers at 65 mph, trains broadsiding the trucks at 80 mph and engulfing the trucks and canisters at crispy temperatures failed to destroy the canisters. "To get a certificate from the Nuclear Regulatory Commission (NRC), they have to pass very severe accident tests," Kraft explained. "My guess is that, at this point, it will be fundamentally rail shipments with limited trucking, but we had to analyze both."

Fear of terrorists? "Before September 11, 2001, these (nuclear storage facilities) were the most secure, heavily guarded industrial sites there were," Kraft told us. "And they have only gotten even more protected. We have increased the number of guards, the stand-off distance from the gate, and other things I can't talk about because of the nature of the information. We do have very good terrorist protection."

But what about on the open road? The DOE hope to construct a 300-mile railroad spur to connect the nation's existing rail system to Yucca Mountain. In an August 2006 Fact Sheet, the NEI writes, "The shipments are heavily guarded. Travel routes and times for shipment are not publicly available; transport vehicles are equipped with devices to prevent unauthorized movement; and satellites track shipments constantly." Sandia National Laboratories also simulated a terrorist attack using a weapon 30 times more powerful than a shoulder-fired, anti-tank missile. The result? The weapon made only a quarter-inch hole, which the NRC estimated would release only about one-third of an ounce of radioactive material, a minute amount of radiation posing no risk beyond the immediate vicinity, and would be easy to clean up.

U.S. Left Behind in the Nuclear Renaissance?

In 1982, Congress passed the Nuclear Waste Policy Act, amending in 1987, levied a tax on consumers for electricity generated by nuclear power, and set a 1998 deadline to begin accepting used fuel. The U.S. government defaulted. "1998 has come and gone," said Kraft. "It's almost nine years later and 50 utilities are suing. Lawsuits are in the multiple, multiple billions of dollars." One wonders if the federal government will actually honor this obligation. "No one is being helped by this," Kraft complained. The DOE has settled with Exelon and a few others to repay their interim storage costs. Utilities have been paying about \$750 million per year since 1982. For example, Illinois consumers have paid \$3.5 billion since the inception of the Nuclear Waste Fund; Pennsylvania consumers have paid \$2.4 billion.

"There are a lot of places that want to build new nuclear plants," Kraft pointed out. "There are about 30 on the boards right now." But a lot of the communities are asking, "Wait a minute, we still have the spent fuel from the other reactor, when is all that stuff going to leave the site?"

Kraft explained, "What the communities are not asking for is an actual functioning disposal system, but a believable sustainable plan for getting there. At the moment, the DOE program does not look terribly sustainable to these communities. In each case that wants a facility, the community is making it very clear 'we want to know what the plans are for moving the nuclear waste offsite.' We have to be able to answer those questions."

He is earnest about moving Yucca Mountain into the operational stage. "I've been waking up for the past 30 years wanting to solve this problem," Kraft told us. "The person that has to wake up is Congress."

In a September 13th press release, the NEI wrote, "To meet a projected increase in electricity demand of 45 percent by 2030, 12 companies or groups of companies are developing federal construction and operating license applications, and four companies already have filed applications for early site permits with the NRC." The first wave of those nuclear power plants could be ready for commercial operation in the 2014 to 2015 time frame.

In a nutshell, U.S. consumers would be in a no-win situation in the absence of nuclear power. More than 70 percent of the electricity which comes from energy sources that do not bring about greenhouse gases or are linked to smog and acid rain comes from nuclear energy. The rest comes from renewables, especially hydroelectric power. "By shutting down 20 percent of our electricity doesn't make sense for this country," Kraft argued. "It's not something the average ordinary homeowner is going to want to have happen."

And the fate of the emerging nuclear revival, or the nuclear renaissance, hangs by the decisions Congress must soon make in honoring the government's obligation as the ultimate stewards of the nuclear waste. "We capture all our waste," said Kraft. "We store it all, we know where it is, we got it numbered and we treat it with great respect." Ironically, with the ongoing renaissance in uranium mining in the United States, if there were no reversal by Congress, the yellowcake would end up in Asia or elsewhere to fuel their galloping nuclear energy programs.

In 2002, after more than 60 public hearings were held in Nevada, then-Energy Secretary Spencer Abraham certified that Yucca Mountain meets the site selection requirements. Both house of Congress approved the Yucca Mountain site in July 2002. "Yucca Mountain is an approved project as far as Congress and the President are concerned," concluded Kraft. "And now we have the license application to complete, get it through the NRC, and start building it." Approval for Yucca Mountain came after one of the most extensive scientific investigations in U.S. history. The NRC review may take up to three years.

The remaining stumbling block appears to be the 1995 report by the National Academy of Sciences, and adopted by the EPA, demanding a million-year guarantee of safety at Yucca Mountain. This came about while Yucca Mountain was passing every scientific test for the original 10,000-year safeguard. Congress can remedy this absurdity with legislation relieving this EPA standard. In other words, it is time to get realistic. Otherwise, the nuclear waste remains in limbo, chilling out in the cooling ponds or dry casket storage instead of the Yucca Mountain tunnels.

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