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How Should We Deal With Nuclear Waste?

By KEITH JOHNSON

High-level nuclear waste has been piling up in the U.S. for decades, and we still have no permanent home for it.

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Policy makers have been wrestling with the issue since at least 1982, when Congress mandated that waste be stored deep underground. In 1987, lawmakers chose Yucca Mountain in Nevada as a permanent repository; while it was being built, utilities simply stored spent fuel inside cooling pools at nuclear-reactor sites, while paying the government to permanently dispose of the waste.

But billions of dollars and decades later, the U.S. is back to square one. Nevada wasn't happy hosting the nation's nuclear-waste dump, and the Obama administration formally pulled the plug on Yucca Mountain in 2010.

We asked Jack Spencer, senior research fellow for nuclear-energy policy at the Heritage Foundation, Edwin Lyman, senior scientist in the global security program at the Union of Concerned Scientists, and Richard K. Lester, head of the department of nuclear science and engineering at Massachusetts Institute of Technology, to weigh in on the issue. Here are edited excerpts:

Fool Me Twice?

WSJ: The Department of Energy's latest plan for nuclear waste calls for an interim storage facility by 2025 and a deep, Yucca Mountain-style facility by 2050. Does this plan answer once and for all the question of what to do with spent nuclear fuel?



Heritage Foundation

Jack Spencer

MR. SPENCER: No matter how waste is ultimately managed or disposed of, any approach needs a permanent repository. But an interim site removes the incentive for the two major interests, the federal government and utilities, to pursue a repository, thus virtually guaranteeing that none will ever get built. Building another interim site on the promise of another repository would be a classic case of "Fool me once, shame on you. Fool me twice, shame on me."

MR. LYMAN: Moving forward with centralized storage wouldn't only slow momentum for a geologic repository, it would come with uncertain, or even negative, impacts on safety; the risks associated with transporting spent fuel not once but twice need to be weighed against the modest benefits of consolidation. Dry-cask storage [at reactor sites] could be expanded as needed to thin out the [cooling] pools.

MR. LESTER: Common sense would conclude that if you have 70,000 tons of material, spent fuel or anything else stored at scores of sites around the country with limited storage capacity, and your plan is to send this to an unknown destination at an unknown date, it would be sensible to have one or more centralized storage depots for the material while you figure out what to do. The spent-fuel management "system" is dysfunctional, and makes no sense from a logistical and materials-management perspective. Fixing it will take more than the publication of another plan.

WSJ: Should the U.S. completely rethink how it handles nuclear waste? Perhaps create a European-style government agency? Hand it over to the private sector? As it is, utilities have been paying for nonexistent waste storage for decades.

MR. SPENCER: I believe the entire system needs to be reformed. One common thread between the approaches of other countries that have even a semblance of functionality is that the waste producers are responsible for waste management. Disconnecting the responsibility for waste management from the entity that produces it undermines the incentive for those that have the means and the know-how to come



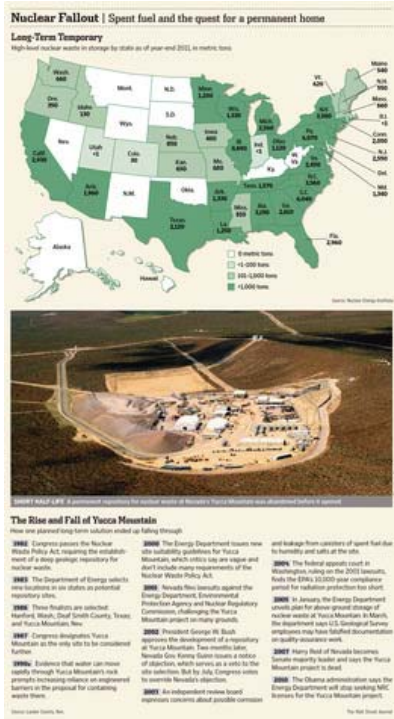
Teri Grimwood, Union of Concerned Scientists

Edwin Lyman



Richard K. Lester

Justin Knight



up with a solution to do anything about it.

It might be that the private sector can't provide services as well as the government can. Or, more likely, we will see that the private sector can provide the entire spectrum of services better than the government can. Just having a choice in the matter makes this a better approach than our current system.

MR. LYMAN: It depends on what entity is best positioned to overcome the near-insurmountable obstacles of locating and licensing repository sites; both government-led and private sector-led attempts to license new spent-fuel facilities ended in failure, due largely to state-level opposition. The federal government has a wider array of potential incentives (read, bribes) that it can bring to bear than private industry does, and can better address environmental concerns. I don't have as much faith as Jack does that the invisible hand of the free market can work its magic on this problem. But I agree it isn't appropriate for the government to take title to spent fuel forever.

MR. LESTER: In the mid-1970s, I proposed shifting responsibility for high-level waste into a federally chartered public corporation; that proposal went nowhere, and the federal nuclear-waste program has been used as a political football ever since. Now, 35 years later, the president's Blue Ribbon Commission has again recommended forming a dedicated government corporation to manage the waste. At this point, such a scheme probably doesn't go far enough.

A better proposal may be to assign responsibility to the electric utilities themselves. A utility-led initiative would introduce more competition—no bad thing given the unhappy experience with the Department of Energy's monopoly.

The Terrorism Threat

WSJ: Is part of the problem the U.S.'s use of a once-through fuel cycle? Would it make sense to embrace some sort of closed-fuel cycle, with limited reprocessing of spent fuel?

MR. SPENCER: To answer that, we'd have to know, how much repository space is there? Under what conditions will waste be stored? How much will we produce? What technologies will be developed? What type of reactor technologies will be developed? What will these things cost?

Maybe some company could offer a reprocessing service that gives the utility a smaller quantity of waste for the repository plus some nuclear fuel to help offset the cost. Maybe another company could offer a reactor that produces less waste—who knows how the market will unfold?

We think of cost in terms of operating a repository versus the cost of reprocessing; or we think about the economics of reprocessing in terms of extracting usable fuel versus the cost of fresh fuel. This is wrong. Reprocessing should be understood simply as a tool for waste management.

Government must stay away from the business of nuclear energy and stick to regulation. This will allow industry to solve waste problems through competition and innovation.

MR. LYMAN: The problem with Jack's answer is that it presupposes that reprocessing provides benefits for nuclear-waste management. The opposite is true: Reprocessing is the worst possible alternative to deep geological disposal because it greatly increases the cost, as well as the dangers, of waste management.

Reprocessing increases the total volume of nuclear waste sevenfold over direct disposal; those multiple new waste streams present additional challenges for storage, transport and disposal. Even worse, reprocessing produces copious quantities of concentrated nuclear-weapon-usable materials, primarily plutonium. One large reprocessing plant can produce about 1,000 bombs' worth of plutonium each year.

Adding insult to injury, this technological disaster costs a lot of money. If Jack's free-market utopia for spent-fuel management did come to pass, it would be the death knell for reprocessing. [President] Reagan told the private sector if it wanted reprocessing, it would have to pay for it. What happened? The utilities went with Yucca Mountain instead.

MR. SPENCER: I don't fear terrorists stealing plutonium in the U.S.; the commercial nuclear industry is fully capable of securing those materials.

What I am proposing is far from a free-market utopia. I am suggesting a system where waste producers are responsible for the waste they produce. It draws on market forces, rather than political ones, to determine how to best manage and dispose of nuclear waste.

MR. LYMAN: I don't agree with Jack's optimism that revolutionary new reprocessing technologies will come along. And I must take strong exception to his cavalier attitude toward nuclear terrorism. To imagine that private industry, needing to cut costs to the bone, could do a better job at securing massive quantities of bomb-grade material is a fantasy.

MR. LESTER: Ed's focus is on what should be done, while Jack's is on who should choose. Both have merit, but when it comes to actually breaking the impasse over nuclear waste I'd have to give the nod to Jack. We need a new institutional structure that creates incentives rather than disincentives for innovation at the back of the fuel cycle.

For a quarter-century, while it was focused on Yucca Mountain, the Department of Energy wasn't even allowed to consider storage alternatives—an extraordinary, self-imposed federal moratorium on nuclear-waste innovation. The nation hasn't been well-served by the federal spent-fuel management monopoly. It is a system stacked against innovation. When we fix this, we'll have a real chance to resolve the problem.

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