

BACKGROUND

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Real Consent for Nuclear Waste Management Starts with a Free Market

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Abstract

Getting nuclear waste management right is important if America is to continue benefitting from nuclear energy, which currently supplies 19 percent of the nation's electricity. The Department of Energy is seeking to define a consent-based process for siting interim and long-term storage facilities for commercial nuclear waste. Yet the faulty system of misaligned incentives to manage commercial waste remains in place, muddling not only the goal of attaining true consent, but also long-term storage. The nuclear industry is capable of, and should be responsible for, nuclear waste management. This naturally allows "consent" to take whatever shape communities or states deem best, without government coercion, and opens the possibility for innovation. The government should maintain the role of regulator. Finland, as the first country to license construction of a long-term repository, provides a good example.

Last December, the Department of Energy (DOE) finally announced the next step in its plan to manage nuclear waste, as roughly outlined in its 2013 *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste*.¹ In what the DOE characterized as a "critical step," it opened a public comment period to gather input on how a new consent-based siting process for nuclear waste facilities might work. The DOE has yet to offer any technical framework or guidelines for what a desirable site would be.

A DOE blog post announcing the comment period states that the goal of this next step is "the long-term storage and disposal of spent nuclear fuel and high-level radioactive waste," which is important "so that we can continue to benefit from nuclear technologies."²

This paper, in its entirety, can be found at <http://report.heritage.org/bg3107>

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KEY POINTS

- The Department of Energy (DOE) wants to develop a consent-based process to site nuclear waste facilities. Building interim storage does not support the goal of long-term storage and disposal for nuclear waste under the current broken system.
- A true consent-based process is not primarily politically brokered and managed, but a market-based process in which costs and benefits are negotiated by companies and communities and the nuclear industry, and the government fulfills its function as an unbiased regulator.
- The DOE plan is a stop-gap measure that would eliminate a powerful incentive for the government to fulfill its long-delayed promise to manage the nuclear waste for which it is legally responsible under the Nuclear Waste Policy Act.
- Congress should install the greater policy reforms necessary for nuclear waste management, namely establishing the nuclear industry's responsibility to manage its nuclear waste. This has been done in Finland with good results.

However, this “critical step” does not ultimately address the goal of long-term storage nor does it increase the likelihood that Americans will continue to benefit from nuclear technology, regardless of the DOE’s intent. In fact, the DOE is largely settling for the much more short-sighted goal of addressing government liability for commercial nuclear waste.

A truly consent-based process is not primarily politically brokered and managed, but a market-based process in which costs and benefits are fully negotiated by companies and communities and the nuclear industry, and the government fulfills its appropriate function as an unbiased regulator.

Side-Stepping Long-Term Storage

The DOE’s December announcement specifically called for comments to develop a consent-based process to site the nuclear waste facilities outlined in its *Strategy*, namely a pilot interim storage facility, a larger interim storage facility, and eventually a long-term geologic repository. The problem is that building interim storage as the DOE proposes does not support the DOE’s stated goal of ultimately building long-term storage and disposal for nuclear waste.

When it became apparent that the DOE would not be collecting waste according to the 1982 Nuclear Waste Policy Act’s deadline, industry worked with the Nuclear Regulatory Commission (NRC) to develop interim storage in cooling pools and dry casks.³ Consequently, most operating and decommissioned nuclear power plants are currently functioning as what the NRC dubs an Independent Spent Fuel Storage Installation (ISFSI).⁴ In other words, the U.S. already *has* an interim storage system.

The DOE’s plan for two interim storage sites is even less necessary because the current temporary storage managed by nuclear power plants *is* safe. The NRC has determined,⁵ and the DOE itself recognized in its announcement, that “nuclear waste is safe and secure in these locations.”⁶ As commonly designed in the U.S.,⁷ an interim storage facility is little more glamorous than an expensive concrete pad for large concrete-encased casks of spent nuclear fuel or keeping fuel in existing pools for longer than planned. The DOE’s proposed consent-based siting of interim storage—as opposed to the current private storage on nuclear power plant sites—does not mark a big technological step forward, only sideways.

Despite the existing interim storage situation, the DOE explains that there are other reasons for building interim storage, namely that “the purpose of a pilot facility is to begin...developing and perfecting protocols and procedures for transportation and storage of nuclear waste.”⁸ Though individual routes may have unique challenges, there is no technical unfamiliarity with the logistics and safety measures necessary for transporting nuclear waste. The World Nuclear Association estimates that since 1971 there have been some 20,000 shipments of 80,000 tons of used nuclear fuel and high-level waste around America and the world without injuries or damage to property. This is just a very small subset of nuclear material transported by road, rail, and ship from the medical, research, agricultural, mining, and other industries.⁹

Instead, DOE interim storage primarily meets the bare minimum requirements to alleviate the government’s liability under the Nuclear Waste

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1. Franklin Orr, “Finding Long-Term Solutions for Nuclear Waste,” U.S. Department of Energy, December 21, 2015, <http://www.energy.gov/articles/finding-long-term-solutions-nuclear-waste> (accessed January 15, 2016).
 2. *Ibid.*
 3. U.S. Nuclear Regulatory Commission, “Spent Fuel Storage in Pools and Dry Casks Key Points and Questions & Answers,” April 13, 2015, <http://www.nrc.gov/waste/spent-fuel-storage/faqs.html> (accessed February 5, 2016).
 4. U.S. Nuclear Regulatory Commission, “U.S. Independent Spent Fuel Storage Installations (ISFSI),” August 13, 2015, <http://pbadupws.nrc.gov/docs/ML1524/ML15240A058.pdf> (accessed January 15, 2016).
 5. U.S. Nuclear Regulatory Commission, “Continued Storage of Spent Nuclear Fuel,” July 25, 2015, <http://www.nrc.gov/waste/spent-fuel-storage/wcd.html> (accessed January 15, 2016).
 6. Orr, “Finding Long-Term Solutions.”
 7. U.S. Nuclear Regulatory Commission, “Typical Dry Cask Storage System,” April 13, 2015, <http://www.nrc.gov/waste/spent-fuel-storage/diagram-typical-dry-cask-system.html> (accessed January 15, 2016).
 8. Orr, “Finding Long-Term Solutions.”
 9. World Nuclear Association, “Transport of Radioactive Materials,” January 2016, <http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Transport/Transport-of-Radioactive-Materials/> (accessed February 4, 2016).

Policy Act, as amended.¹⁰ Under this congressionally approved nuclear waste management plan, the DOE was to begin collecting and disposing of waste in a long-term repository at Yucca Mountain in Nevada. Despite the faults of the Nuclear Waste Policy Act, Congress at least created a means of keeping the DOE accountable to its promise to build a long-term nuclear waste repository by setting a deadline for the DOE to begin collecting waste by 1998. Failure to do so has left the federal government (and therefore the taxpayer) with growing liability as nuclear waste stockpiles have grown. Nuclear utilities have successfully sued, and the federal government has paid out \$5.3 billion in damages. The DOE projects future liability to be \$23.7 billion (assuming a pilot storage facility by 2021); the nuclear industry estimates at least \$50 billion in liabilities.¹¹

Government interim storage, as the DOE proposes, then accomplishes the main purpose of getting nuclear waste out of utilities' storage facilities and into a DOE storage facility in order to end government liability for uncollected waste. This stop-gap move would eliminate a powerful incentive for the government to make good on its long-delayed promise to manage and dispose of the nuclear waste it is legally responsible for under the Nuclear Waste Policy Act. And it would dampen incentive to install the greater policy reforms necessary for nuclear waste management, namely establishing the nuclear industry's responsibility to manage its nuclear waste.

Why Long-Term Storage Matters: Benefitting from Nuclear Technology

How the U.S. solves the nuclear waste conundrum is important because this has long-term implications for the American nuclear industry and, as the DOE stated in its consent-based-siting announcement, for America's ability to "continue to benefit from nuclear energy."¹²

Roughly 74,258 tons of spent nuclear fuel¹³ are currently stored safely on site at nuclear power plants, awaiting permanent long-term disposal. This is in addition to defense-related and government-owned nuclear waste. No matter how waste may be processed or used in the future, more than one permanent repository will almost certainly be needed.¹⁴ Unless new solutions to long-term nuclear waste management are developed, it is hard to see how a U.S. nuclear industry could thrive with a whole third of its fuel cycle (nuclear waste management) left uncertain, untended, and under government control.¹⁵

In fact, this has already been an issue. The NRC suspended all licensing activities in 2012 as a result of a lawsuit challenging the availability and safety of nuclear waste on-site storage, which became increasingly important given the federal government's inability to collect waste. In September 2014, the NRC determined that dry cask storage was safe indefinitely and restarted licensing activities.¹⁶

How to Best Achieve Long-Term Storage: Realigning Incentives. One of the biggest hurdles to a long-term storage facility and robust nuclear

10. 42 U.S. Code ch. 108.

11. U.S. Department of Energy, "Fiscal Year 2015 Agency Financial Report," November 16, 2015, pp. 77-78, http://www.energy.gov/sites/prod/files/2015/11/f27/DOE_FY2015_AFR.pdf (accessed December 30, 2015).

12. Orr, "Finding Long-Term Solutions."

13. Nuclear Energy Institute, "On-Site Storage of Nuclear Waste," <http://www.nei.org/Knowledge-Center/Nuclear-Statistics/On-Site-Storage-of-Nuclear-Waste> (accessed February 5, 2016).

14. U.S. Department of Energy Office of Civilian Radioactive Waste Management, "The Report to the President and the Congress by the Secretary of Energy on the Need for a Second Repository," December 2008, <http://energy.gov/downloads/report-president-and-congress-secretary-energy-need-second-repository> (accessed January 15, 2016).

15. Referring to nuclear fuel fabrication, power generation, and waste management. The private sector is responsible for fuel fabrication and power generation; the area where the nuclear industry has little say—waste management—has become a failure. Nuclear Regulatory Commission, "Stages of the Nuclear Fuel Cycle," October 21, 2014, <http://www.nrc.gov/materials/fuel-cycle-fac/stages-fuel-cycle.html> (accessed February 5, 2016).

16. Allison Macfarlane, Chairman, Nuclear Regulatory Commission, letter to Representative Fred Upton, August 8, 2014, http://www.eenews.net/assets/2014/08/26/document_gw_03.pdf (accessed February 5, 2016), and Hannah Northley, "NRC Finalizes Waste Rule, Lets Licensing Decisions Resume," Greenwire, August 26, 2014, <http://www.eenews.net/greenwire/2014/08/26/stories/1060004936> (accessed February 5, 2016).

industry is not developing a consent-based process, as the DOE prescribes it. Instead, it is that the federal government, per the 1982 Nuclear Waste Policy Act, is responsible for managing and disposing of the nuclear waste produced by private businesses.

No doubt, finding communities able and interested in housing a nuclear materials management facility is difficult not just in the U.S. but in other countries as well. However, at different times over the decades there have been, and currently are, communities that have expressed consent. Among them: Wyoming (Fremont County); New Mexico (the Waste Isolation Pilot Plant and Eddy-Lea County Energy Alliance); Texas (Waste Control Specialists); Utah (the Goshute Indian Tribe and San Juan County); and Nevada (Nye County, where Yucca Mountain is located). Four states currently operate low-level waste disposal facilities.¹⁷ Internationally, local consent has been achieved by nuclear waste management companies in Finland and Sweden, even when consent was not initially given, by improved community engagement, compensation packages, and tax arrangements.

The bigger problem is the government assuming responsibility to manage commercial nuclear waste. Not surprisingly, the incentives for action (or more often *inaction* in the case of nuclear waste) within a government bureaucracy are far different than in the private sector. The natural outcome is that the federal government has done little to fulfill its legal obligation to collect and manage waste, let alone develop innovative technologies throughout the fuel cycle (from fuel fabrication and reactor design to waste management and disposal) that take waste management into consideration.

In order for long-term management and innovation to happen in a sustainable and dynamic way, waste producers (nuclear power plants) must have a vested interest and responsibility in waste management. Responsibility for nuclear waste management appropriately belongs with nuclear power plant

operators as an aspect of producing commercial power, in the same way that other industries, such as health care, mining, farming, or manufacturing, are responsible for managing their own wastes. If waste management were a dynamic part of the bottom line, the nuclear industry would naturally be interested not only in efficient nuclear waste disposal, but also in cost-effective pre-disposal choices, such as interim storage options, fuel types, and reactor technology. Removing that responsibility from the commercial industry, however, significantly diminishes, if not eliminates any incentive to develop such capabilities.

Making producers responsible for nuclear waste they produce does not, however, remove the government's role altogether. Whereas nuclear waste management should appropriately be the responsibility of nuclear power operators, predictable regulations protecting health and safety are the appropriate responsibility of the federal government. The federal government could also retain ownership of any decommissioned permanent repository, having guaranteed longevity to credibly take long-term possession and liability.¹⁸ The extant nuclear industry would pay for any associated upkeep.

The Example of Finland

A system with appropriately assigned waste management responsibilities for both industry and government is not just a theoretical ideal. The common theme in successful commercial nuclear programs around the world is that nuclear waste producers are responsible for their own waste management.¹⁹

Finland's nuclear industry, which by law is responsible for siting, constructing, and paying for intermediate and long-term nuclear waste storage, is an example. Two Finnish nuclear power companies created the joint venture company Posiva to conduct research and development, and eventually locate, build, and manage a waste repository. Sites were selected, yet the community at Olkiluoto (the

17. U.S. Nuclear Regulatory Commission, "Locations of Low-Level Waste Disposal," January 27, 2016, <http://www.nrc.gov/waste/llw-disposal/licensing/locations.html> (accessed February 4, 2015).

18. Jack Spencer, "Blue Ribbon Commission on Nuclear Waste: Missing Opportunity for Lasting Reform," Heritage Foundation *Backgrounder* No. 2600, August 22, 2011, <http://www.heritage.org/research/reports/2011/08/blue-ribbon-commission-on-nuclear-waste-missing-opportunity-for-lasting-reform>.

19. Jack Spencer, "Nuclear Waste Management: Minimum Requirements for Reforms and Legislation," Heritage Foundation *Issue Brief* No. 3888, March 28, 2013, <http://www.heritage.org/research/reports/2013/03/nuclear-waste-management-minimum-requirements-for-reforms-and-legislation>.

site where a construction license would eventually be approved) initially and overwhelmingly opposed the proposal. This position eventually reversed almost completely with the local council voting 20 to seven in favor of the repository in 2000.²⁰ In November 2015, Posiva became the world's first to have a license approved for the construction of a nuclear waste geologic repository.²¹

Key to Posiva's success were the economic benefits to the community of a repository; the community's ability to reject the facility siting; the proven track record of Finland's nuclear industry; local participation through many open seminars and meetings; participation in environmental studies; and the accessibility of Posiva and of regulators to the community.²² Ultimately, Finland's success was based on properly aligning responsibility by putting producers in charge of waste.

Conversely, in America, it has become a well-established fact that the public has lost confidence in the DOE. Some believe a new agency or federal corporation could be "less vulnerable to political interference."²³ But shifting waste management responsibilities from one government entity to a new government entity would only give the appearance of progress. It would be equally as prone to failure because such an approach does not address the underlying problems of the current system.²⁴ America should, as in Finland, give the responsibility of waste management to the nuclear industry, and of establishing health and safety guidelines to the government.

The Free Market Delivers True Consent-Based Nuclear Waste Management

What the DOE is trying to accomplish through its new consent-based process without the appearance of coercion, the market does naturally. Private companies cannot use force and are thus inherently self-interested in doing what is necessary to build mutual trust with a community through long-term outreach, education, and mutually agreeable terms of business.

When nuclear power companies are responsible for waste management, regulating agencies can then be seen as simply that—regulators with a disinterested goal of protecting health and safety. The government can more transparently play the role of a neutral referee with reliable information. But as both a regulator and repository operator, the government appears to have a bias. Information is easily deemed suspect or distorted due to a conflict of interest, perceived or otherwise.

When the government is appropriately assigned the role of regulator rather than nuclear waste manager, a potential hosting community can be a truly equal partner in negotiations with a waste management company. This is as opposed to the role of an inferior party submitting to a federal government's will to locate a repository or a community finding itself facing a David and Goliath battle.²⁵ A truly consent-based process is not primarily a politically brokered and managed one, but a market-based one where costs and benefits are fully negotiated and realized by companies and communities, and the government fulfills its appropriate function as an unbiased regulator.

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20. World Nuclear Association, "Nuclear Power in Finland," November 2015, <http://www.world-nuclear.org/info/Country-Profiles/Countries-A-F/Finland/> (accessed February 5, 2016).
 21. News release, "Posiva Is Granted Construction License for Final Disposal Facility of Spent Nuclear Fuel," Posiva, May 11, 2015, http://www.posiva.fi/en/media/press_releases/posiva_is_granted_construction_licence_for_final_disposal_facility_of_spent_nuclear_fuel.3225.news#.VoqXI03wu9I (accessed February 5, 2016).
 22. Nuclear Energy Agency, "Stepwise Decision Making in Finland for the Disposal of Spent Nuclear Fuel," Organization for Economic Cooperation and Development, Workshop Proceedings, Turku, Finland, November 15-16, 2001, <https://www.oecd-nea.org/rwm/pubs/2002/3616-stepwise-decision-making.pdf> (accessed February 5, 2016).
 23. U.S. Government Accountability Office, "Spent Nuclear Fuel Management: Outreach Needed to Help Gain Public Acceptance for Federal Activities that Address Liability," GAO-15-141, October 2014, <http://www.gao.gov/assets/670/666454.pdf> (accessed January 7, 2016).
 24. Jack Spencer and Katie Tubb, "Fooled Again: The Nuclear Waste Administration Act Preserves Futile Status Quo," Heritage Foundation *Backgrounder* No. 3045, August 5, 2015, http://www.heritage.org/research/reports/2015/08/fooled-again-the-nuclear-waste-administration-act-preserves-futile-status-quo#_ftn15.
 25. Former Wyoming governor Mike Sullivan ultimately vetoed a proposition to host an interim storage facility because, since "it was a federally controlled process of a serious issue it seemed to me we would rapidly lose control of...I wasn't sure we could trust the federal government to do what they said they were going to do, and if we stepped into this we'd be dancing with a 900-pound gorilla, and I didn't think that was in the interests of the state." Greg Fladager, "Nuclear Plan in Wyoming? Committees Pass Bill for Legislation Consideration," *Casper Journal*, November 5, 2012, http://casperjournal.com/business/article_e0d78ba3-73ab-5dc7-9521-eb5a0f5da685.html (accessed February 5, 2016).

Conclusion

The DOE approach to waste management is narrow, envisioning only interim storage and a geologic repository. Opening waste management to the nuclear industry opens the possibility of a diversity of options and a thriving domestic market. It also allows consent to be in the eyes of the beholder,²⁶ taking whatever shape local communities or states deem best. Government management of nuclear waste has achieved neither public consent nor permanent waste disposal. While progress is slowly being made to determine the viability of a permanent site at Yucca Mountain, it is high time that Congress got to work mending the broken system. This will only become more important.

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26. As coined by DOE Associate Deputy Assistant Secretary for Fuel Cycle Technologies Andrew Griffith. U.S. Department of Energy, "DOE Consent-Based Siting Initiative Kickoff Meeting, Part 2," Washington, DC, January 20, 2016, video, <https://www.youtube.com/watch?v=zGG7k2CvH5k&feature=youtu.be> (accessed February 5, 2016).