Good morning Mr. Griffith,

It is with great disappointment that I missed the deadline by a few hours for comment on the Department of Energy’s consent based siting plans as posted in the *Federal Register*. I foolishly had everything prepared on Friday, but failed to finish the task of sending the material. The fault is my own – the DOE made clear when the due date was and I mistook October 30th for a Monday.

I believe the perspective of analysts at the Heritage Foundation offer something unique to the conversation, that is the option for private solutions in a government regulated environment and a pathway to get there via a transitional corporation. I know of others who would agree but do not have the same liberty we do at Heritage to advocate for such policy.

If you are willing, please consider the attached comments in addition to the rest the DOE has received from others.

With gratitude,

Katie Tubb

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**Katie Tubb**  
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October 28, 2016

U.S. Department of Energy
Office of Nuclear Energy
Draft Consent-Based Siting Report
1000 Independence Ave. SW
Washington, DC 20585

To whom it concerns:

Regarding Federal Register docket DOE-HQ-2016-0023, thank you for the opportunity to contribute to and comment on the Department of Energy’s intent to develop a new process for siting nuclear waste management. Enclosed are two papers we believe appropriately identify the problems ailing the current approach to management, and accordingly steps to a broad set of solutions. These papers encapsulate in brief out comments to the Department of Energy and what we believe and experience has shown is necessary to have a thriving and functional nuclear waste management system in the United States.

Sincerely,

Katie Tubb
Institute for Economic Freedom and Opportunity
The Heritage Foundation
214 Massachusetts Ave. NE
Washington, D.C.
20002

Enclosures (2):

Katie Tubb and Jack Spencer, “Real Consent for Nuclear Waste Management Starts with a Free Market.”

Note: Please note that the first paper, testimony by Jack Spencer, is dated August 30, 2010. While some details have changed (for instance, the status of the nuclear waste fund, the core of the paper remains directly relevant.
My name is Jack Spencer. I am a Research Fellow for Nuclear Energy Policy at The Heritage Foundation. The views I express in this statement are my own, and should not be construed as representing any official position of The Heritage Foundation.

The Nuclear Waste Policy Act of 1982 attempted to establish a comprehensive disposal strategy for high-level nuclear waste. This strategy has failed. The government has spent billions of dollars without opening a repository, has yet to receive any waste, and is amassing billions of dollars of liability. Furthermore, the strategy has removed any incentive to find more workable alternatives. For those that actually produce waste and would benefit most from its efficient disposal, this strategy has created a disincentive for developing sustainable, market-based waste-management strategies.

The strategy codified in the Nuclear Waste Policy Act seemed straightforward and economically sound when it was developed in the early 1980s. It charged the federal government with disposing of used nuclear fuel and created a structure through which users of nuclear energy would pay a set fee for the service—a fee that has never been adjusted, even for inflation. These payments would go to the Nuclear Waste Fund, which the federal government could access through congressional appropriations to pay for disposal activities.

The federal government has accumulated approximately $30 billion (fees plus interest) in the Nuclear Waste Fund and has spent about $10 billion to prepare the repository for operations, leaving a balance of around $20 billion. Utility payments into the fund total about $750 million annually. Yet the repository has never opened.
The taxpayers have fared no better. The Nuclear Waste Policy Act set January 31, 1998, as the deadline for the federal government to begin receiving used fuel. The government’s refusal to take possession of the used fuel has made both the federal government and the taxpayers liable to the nuclear power plant operators for an increasingly enormous amount as described above.

The federal government’s inability to fulfill its legal obligations under the 1982 act has often been cited as a significant obstacle to building additional nuclear power plants. Given nuclear power’s potential to help meet many of the nation’s energy requirements, now is the time to break the impasse over managing the nation’s used nuclear fuel.

The Current Irrational System

The United States has 60,000 tons of high-level nuclear waste stored at more than 100 sites in 39 states, and its 104 commercial nuclear reactors produce approximately 2,000 tons of used fuel every year. The Yucca Mountain repository’s capacity is statutorily limited to 70,000 tons of waste (not to mention the problems associated with even opening the repository). Of this, 63,000 tons will be allocated to commercial waste, and 7,000 tons will be allocated to the Department of Energy (DOE).

These are arbitrary limitations that Congress set without regard to Yucca’s actual capacity. As currently defined by the Nuclear Waste Policy Act, Yucca would reach capacity in about three years unless the law is changed. Thus, even if Yucca becomes operational, it will not be a permanent solution, and the nation would soon be back at the drawing board.

The repository’s actual capacity, however, is much larger than the current limit. Congress should repeal the 70,000-ton limitation immediately and instead let technology, science, and physical capacity determine the limit. Recent studies have found that the Yucca repository could safely hold 120,000 tons of waste. According to the DOE, that should be enough to hold all of the used fuel produced by currently operating reactors. Some believe the capacity is even greater.

Yet even with an expanded capacity of 120,000 tons, Yucca Mountain could hold only a few more years of America’s nuclear waste if the U.S. significantly increases its nuclear power production. According to one analysis, America’s current operating reactors would generate enough used fuel to fill a 70,000-ton Yucca right away and a 120,000-ton Yucca over their lifetime. If nuclear power production increased by 1.8 percent annually after 2010, a 120,000-ton Yucca would be full by 2030. At that growth rate, without recycling any used fuel, the U.S. would need nine Yucca Mountains by the turn of the century.¹

Given the difficulty of opening one repository, relying on future repositories would be extremely risky. With the right mix of technologies such as storage and recycling, Yucca could last almost indefinitely.

Using Resources More Wisely by Recycling

The current U.S. policy is to dispose of all used fuel by moving it directly from the reactors into Yucca Mountain for permanent storage without any additional processing. This is a monumental waste of resources. To generate power, reactor fuel must contain 3 percent to 5 percent enriched fissionable

uranium (uranium-235). Once the enriched uranium falls below that level, the fuel must be replaced. Yet this “used” fuel generally retains about 95 percent of its fissionable uranium, and that uranium, along with other byproducts in the used fuel, can be recovered and recycled. Regrettably, the current system’s structure provides no incentive for the private sector to pursue this option.

Many technologies exist to recover and recycle different parts of the used fuel. France has successfully commercialized such a process. They remove the uranium and plutonium and fabricate new fuel. Using this method, America’s 60,000 tons of used fuel contains roughly enough energy to power every household in America for 12 years.

Other technologies show even more promise. Indeed, most of them, including the process used in France, were developed originally in the United States. Some recycling technologies would leave almost no waste at all and would lead to the recovery of an almost endless source of fuel, but none of these processes has been commercialized successfully in the United States, and this will take time. Until the future of nuclear power in the U.S. becomes clearer, it will be impossible to know which technologies will be most appropriate to pursue in this market.

Ultimately, the private sector should make these decisions. Valuing used fuel against the costs of permanent burial is a calculation best done by companies that provide fuel-management services.

Overhauling Used-Fuel Management in the U.S.

The success of a sustained rebirth of nuclear energy in the U.S. depends largely on disposing of nuclear waste safely. New nuclear plants could last as long as 100 years, but to reap the benefits of such an investment, a plant must be able to operate during that time. Having a practical pathway for waste disposal is one way to ensure long-term plant operations. Establishing such a pathway would also mitigate much of the risk associated with nuclear power, but as long as the federal government is responsible for disposing of waste, it is the only entity with any incentive to introduce these technologies and practices.

The problem is that the federal government has never been able to fulfill its current waste disposal obligations, much less introduce new and innovative methods of waste management. Although the Department of Energy under its current leadership has opened the door to reform, it is very unclear that such reform will help the long-term prospects of nuclear energy. Administrations come and go, but inflexible rules and bureaucracies that oversee waste management seem to endure forever, making it impossible for the government to respond effectively to a rapidly changing industry. When it does attempt to respond, it often acts in ways that make no business sense and are inconsistent with the actual state of the industry.

Many of these efforts culminate in large government programs. While some of these programs have some near-term benefit insofar as they demonstrate political support for nuclear power, encourage private and public research and development, and develop the nuclear industry, they inevitably do more harm than good. They are run inefficiently, are often never completed, cost the taxpayers billions of dollars, and are often not economically rational. Furthermore, they often forgo long-term planning, and this leads to unsustainable programs that ultimately set industry back by providing fodder for anti-nuclear critics and discouraging progress in the private sector.
A New Approach

Introducing market forces into the process and empowering the private sector to manage nuclear waste can solve the problem, but this will require major reform. The federal government will need to step aside and allow the private sector to assume the responsibility for managing used fuel, and the private sector should welcome that responsibility.

The primary goal of any strategy for used-fuel management should be to provide a disposition pathway for all of America's nuclear waste. The basic problem with the current system is that every nuclear power plant needs a place to put its waste, and Yucca Mountain is potentially not big enough to hold it all under the current used-fuel management regime.

In other words, permanent geologic storage capacity is a scarce resource on which the industry depends. If used-fuel management were a market-based system, this storage capacity would carry a very high value. A new system should price geologic storage as a scarce resource and fold any costs into a fee for emplacing nuclear waste in Yucca Mountain.

**Repealing the Mil.** The key to this new approach will be to transform how waste management is financed. Once market-based pricing is in place, the fee that nuclear energy consumers pay to the federal government for waste management should be repealed. Under the current system, consumers pay for waste disposition through a flat fee, called the mil, that is paid to the federal government at the rate of 0.1 cent per kilowatt-hour of nuclear-generated electricity. This fee as currently assessed has no market rationale. It is simply a flat fee that ratepayers pay to the federal government. It has never been changed, not even for inflation and is not a reflection of any actual services provided.

In a market-based system, instead of paying a pre-set fee to the federal government to manage used fuel, nuclear power operators would pay a fee for service. This could include simply paying to place used nuclear fuel into geologic storage or for a more complex suite of processing services. These waste-management costs would then be folded into operating cost, which would be reflected in the price of power. This cost might be higher or lower than the current fee; more important, it would reflect the true costs of nuclear power.

**Pricing Geologic Storage as a Scarce Resource.** The idea would be to set a rational pricing mechanism for emplacing nuclear waste into a geologic repository. The price could be based on a formula that considers a set of relevant variables, including heat content of the waste, predicted production of used fuel, repository capacity, and lifetime operation costs. Each of these variables would help to determine the price of placing a given volume of waste in Yucca at any specific time.

As the repository is filled, the fee to emplace additional fuel would obviously increase. The fee could also increase, depending on the formula, as new plants are constructed or old plants’ licenses are renewed because they would produce additional used fuel, thereby increasing the demand for repository space. Prices would be lower for waste that radiates less heat. Prices would fall if Yucca’s capacity is expanded or if waste is reduced through alternative processes.

This would create a market for repository space. The fee could be structured in a number of ways. One example would be to charge a floating fee according to a predetermined formula. Under this scenario, the fee would shift constantly as the price variables change. For example, a volume of waste with less heat would...
content would cost less to emplace than a similar amount with a higher heat profile. An alternative to a floating fee might be one that resets at timed intervals, such as once a year.

A pure market solution could also work where repository managers simply set the price for emplacement based on what operators are willing to pay, much like how shoes or a new truck is priced.

The exact structure and implementation of the fee could be determined at some future point. One simple option would be to divide the capacity available in Yucca by the lifetime costs to give a price to emplace an amount (e.g., a ton) of waste in the repository. As the repository was filled, the price per ton would increase.

Nuclear power operators could then decide, given the price to place waste in Yucca, how to manage their used fuel. As the price to access Yucca goes up, so will the incentive for nuclear operators to do something else with their used fuel. This should give rise to a market-based industry that manages used fuel in the U.S.

The market would dictate the options available. Some operators may choose to keep their used fuel on site to allow its heat load to dissipate, thus reducing the cost of placing that waste into Yucca. Companies may emerge to provide interim storage services that would achieve a similar purpose. The operators could choose options based on their particular circumstances.

As prices change and business models emerge, firms that recycle used fuel would likely be established. Multiple factors would feed into the economics of recycling nuclear fuel. Operators would make decisions based not only on the cost of placing waste in Yucca, but also on the price of fuel.

If a global nuclear renaissance does unfold, the prices for uranium and fuel services will likely rise. This would place greater value on the fuel resources that could be recovered from used fuel, thus affecting the overall economics of recycling. Instead of the federal government deciding what to build, when to build it, and which technology should emerge, the private sector would make those determinations.

Some nuclear operators may determine that one type of recycling works for them, while others may decide that a different method is more appropriate. This would create competition and encourage the development of the most appropriate technologies for the American market.

Such a market for repository space could give rise to a broader market for geologic storage. As waste production causes Yucca storage costs to rise, companies could emerge that provide additional geologic storage at a lower price. This additional space would in turn reduce the value of the space available in Yucca. These additional repositories would set their prices however they deem appropriate.

Alternatively, as Yucca fills, nuclear operators may decide to develop additional geologic storage facilities in a joint venture. While this may seem unlikely, given the problems associated with opening Yucca Mountain, other communities may be more receptive to hosting a repository once a reliable safety record is established and the economic benefits of hosting a repository are demonstrated. The federal government would still take title to any waste placed in future repositories once they are decommissioned.

Predicting how a market might evolve is impossible, but unlike the government-run process that led to the Yucca Mountain site—a process mired in politics—private entities would establish the path forward by
working with government regulators. Private entities would also be able to pursue their plans without having to contend with as much of the bureaucratic inertia that accompanies government-run operations.

Most important, this system would encourage the introduction of new technologies and services into the market as they are needed, as opposed to relying on the federal government. New technologies would not be hamstrung by red tape or overregulation. This system would also allow for the possibility of no expansion of nuclear power. If the U.S. does not expand nuclear power broadly, there is probably no reason to build recycling or interim storage facilities.

**Establishing a Separate Organization to Manage Yucca Mountain.** As permanent geologic storage is commoditized, the problem then becomes one of establishing responsibility for managing that scarce resource. Leaving that responsibility with the government provides no benefits, other, perhaps, than political. No overarching need mandates that the government must manage Yucca Mountain or used nuclear fuel. Furthermore, leaving this responsibility in the hands of government comes with all kinds of pitfalls, including inflexibility, inefficiency, politics, and being subject to annual appropriations, to name a few. Similarly, a public–private partnership is not necessary and has no inherent advantages, again, other than perhaps political.

Instead, a completely new organization should be established to manage Yucca Mountain. The new organization’s purpose would be to ensure that Yucca is available to support the commercial nuclear industry’s need for long-term geologic storage in a way that benefits Nevada and to set the fee for placing radiological materials in Yucca. This fee would be the primary mechanism for managing access to the repository. Its one operating mandate should be to remain open to receive radiological materials either until a second repository is opened or until the last commercial nuclear power plant ceases operations.

The federal government should not be part of the management team; however, local and or state government could. The new entity could be organized in any number of ways. It could take the form of a nonprofit organization that is independent of but represents the nation’s nuclear energy producers. Such a structure would ensure that no operator receives preferential treatment and that it operates as a service to all nuclear operators. It also would prevent a profit-seeking entity from holding a monopoly over a key asset on which an entire industry depends. The entity could also be a public–private partnership with, perhaps, the State of Nevada being a majority partner. The federal government would provide oversight through the Nuclear Regulatory Commission (NRC) and other appropriate agencies.

The new organization should be created as soon as possible and immediately commence a transition plan, which would coincide with the NRC’s review of the Department of Energy’s application for a Yucca Mountain construction permit. During the transition period, the new organization would work with the Department of Energy’s Office of Civilian Radioactive Waste Management to move the application for the Yucca construction permit through the NRC. If the license is granted, the new organization would take control of Yucca operations, which would include overseeing Yucca construction and preparing for long-term operations.

**Establishing a Waste Disposal Fund.** The NRC requires that each nuclear plant operator establish a funding mechanism to ensure that resources will be available to decommission the plant once operations cease. This is achieved either through guarantees from its parent company or by establishing a
decommissioning fund. This protects the taxpayer from the financial obligations of plant
decommissioning if the operator becomes financially unable to carry out that responsibility.

A similar funding mechanism should be required for new plant licenses and life extensions to cover the
costs of waste disposal once the mil is repealed. This could be included in the decommissioning fund or
set up as a separate entity. It would not be a payment to the federal government and would always be
controlled by the nuclear operator. The monies set aside should be adequate to finance the geologic
disposal of any used fuel held on-site in dry storage. This guarantees that waste disposal funds will be
available, even if the operator becomes insolvent.

Other Issues. Changing from the current system of waste management to a market-based system raises a
number of issues:

- How will repository construction be funded if it is dependent on disposal fees?
- What will happen to the Nuclear Waste Fund?
- Who is responsible for the disposal of existing nuclear waste, which has already been paid for?
- What happens to defense waste?

The Nuclear Waste Fund and Construction of the Yucca Mountain Repository. The Nuclear Waste Fund
was set up by the 1982 Nuclear Waste Policy Act to pay for the costs of waste disposal. The fund has
approximately $20 billion, and about $10 billion has been spent so far on repository activities. Congress
should abolish the fund and make the money available to the new organization for licensing and
constructing of the Yucca Mountain repository.

According to a 2009 analysis by the Department of Energy, pre-emplacement and closure activities will
cost an estimated $27.8 billion. The Nuclear Waste Fund can cover both of those expenses. Any balance
should be applied to post-construction operating costs. It must be noted, however, that a private entity
could price Yucca’s costs differently even from DOE’s new assessment.

Once used-fuel management is subject to the open market, it is always possible that no one will use
Yucca Mountain, thus depriving it of the funds it needs to maintain operations. Given this possibility, the
new organization should be authorized to assess nuclear operators a fee to maintain minimum operations
at Yucca if revenue streams are not adequate. This fee should be triggered only under predetermined
circumstances. The facility should not remain open if no market emerges for Yucca storage once the
market for used fuel management services is established.

Disposal of Existing Used Fuel. While a new regime to deal with new used fuel may make sense, it will
not fix the existing problem created by the federal government’s failure to dispose of existing waste
despite being paid to do so. As a result of its failure, the government and the taxpayers have incurred an
expensive ongoing liability for 60,000 tons of used fuel stored around the country.

The courts have confirmed this liability. As a result, the taxpayers have already paid $94 million in
lawyer expenses and $290 million in damages. The government is appealing another $420 million award.
The government’s long-term liability for used fuel is projected to reach $7 billion by 2017 and $11 billion
by 2020. While no solution will satisfy all parties entirely, a resolution that allows a sustainable used-fuel strategy to emerge would be in the broad national interest.

One remedy would be to set aside an amount of space in Yucca Mountain for each reactor operator equal to the amount of used fuel that it produced before discontinuation of the waste fee. Operators could use this space without further fees as they see fit, including selling it to other operators.

Given that America’s reactors have already produced around 60,000 tons of waste, if the mil were repealed today, the new organization would set the fee based on the total available space minus 60,000 tons. The capacity should be set based on scientific and technical parameters of what could safely be stored in Yucca.

**Defense Waste.** One of reasons that Yucca must be opened is that the United States has significant amounts of defense-related nuclear waste that is slated for disposal. Current plans set aside 7,000 tons of Yucca’s capacity for defense purposes.

The federal government would be a customer for waste-management services just as every other operator and would pay a fee for placing its waste in Yucca. Alternatively, the government could buy waste-management services on the open market to process its waste, thereby minimizing what is placed in Yucca.

**Defining the Federal Role in Waste Disposal.** Although its involvement in used-fuel management should be minimized, the federal government will continue to have a number of critical roles. During operations, the federal government would have significant oversight responsibilities. As is currently the case, the Nuclear Regulatory Commission would oversee operations, and other federal agencies, such as the Environmental Protection Agency, would continue to play a regulatory role. The national laboratory system would also play a critical role in facilitating research and development.

The federal government would fulfill its final obligation by taking possession of the closed and decommissioned Yucca Mountain whenever that may occur, along with any geologic repositories that may be built in the future. This is a critical role for the federal government because it is the only institution that can maintain assured liability for the waste in perpetuity.

**Steps to Overhaul Nuclear Waste Management**

To begin the process of overhauling the nation’s nuclear-waste management regime, Congress should amend the Nuclear Waste Policy Act of 1982 to encourage development of a market-based management system for used nuclear fuel. Specifically, Congress should:

- **Empower** the private sector to manage used fuel;
- **Allow** the NRC to carry out its review of the Department of Energy’s Yucca Mountain construction permit;
- **Create** a private entity (PE) that is representative of, but independent from, nuclear operators to construct and manage Yucca Mountain;
- **Repeal** the 70,000-ton limitation on the Yucca Mountain repository;
• **Empower** the PE to commoditize geologic storage;

• **Repeal** the mill and abolish the Nuclear Waste Fund, allowing nuclear operators to fold the costs of waste management into the price of nuclear powered electricity;

• **Limit** the federal government’s role to providing oversight, basic research and development, and taking title of spent fuel upon repository decommissioning.

**Conclusion**

The current approach to managing used nuclear fuel is systemically broken. It was developed to support a nuclear industry that was largely believed to be in decline. That is no longer the case. The federal government promised to take title of the used fuel and dispose of it; this removed any incentive for the private sector to develop better ways to manage the fuel that could be more consistent with an emerging nuclear industry. And the federal government has proven incapable of fulfilling its obligations to dispose of the fuel.

The current system is driven by government programs and politics. There is little connection between used-fuel management programs and the needs of the nuclear industry. Any successful plan must grow out of the private sector. The time has come for the federal government to step aside and allow utilities, nuclear technology companies, and consumers to manage used nuclear fuel.

Overhauling the nation’s nuclear-waste management regime will not be easy. It will require a significant amendment of the Nuclear Waste Policy Act and a long-term commitment by Congress, the Administration, and industry. But developing such a system would put the United States well on its way to re-establishing itself as a global leader in nuclear energy.
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Real Consent for Nuclear Waste Management Starts with a Free Market
Katie Tubb and Jack Spencer

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. 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.”

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

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Nothing written here is to be construed as necessarily reflecting the views of The Heritage Foundation or as an attempt to aid or hinder the passage of any bill before Congress.

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. Consequently, most operating and decommissioned nuclear power plants are currently functioning as what the NRC dubs an Independent Spent Fuel Storage Installation (ISFSI). 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, and the DOE itself recognized in its announcement, that “nuclear waste is safe and secure in these locations.” As commonly designed in the U.S., 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.” 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.

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

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2. Ibid.
Policy Act, as amended. 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.

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."

Roughly 74,258 tons of spent nuclear fuel 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. 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.

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.

How to Best Achieve Long-Term Storage: Realigning Incentives. One of the biggest hurdles to a long-term storage facility and robust nuclear
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.\(^1\) 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.\(^1\)\(^8\) 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.\(^1\)\(^9\)

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

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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. In November 2015, Posiva became the world’s first to have a license approved for the construction of a nuclear waste geologic repository.

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. 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.” 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. 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. 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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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-eb5a05da685.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, 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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