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# Options for the Consolidated Storage of Spent Nuclear Fuel

This issue brief is one in a series being developed by the Bipartisan Policy Center's Nuclear Waste Initiative, which is exploring ways to advance progress toward durable solutions for managing and disposing of the nation's inventory of spent nuclear fuel and high-level radioactive waste. This brief focuses on options for moving forward with the development of one or more facilities for the consolidated storage of spent fuel from commercial nuclear power plants. It is based on a longer analysis prepared for the Bipartisan Policy Center by Van Ness Feldman, LLP.



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## *Background and Context*

In its final report, issued in 2012, the Blue Ribbon Commission on America's Nuclear Future (BRC), which had been tasked with developing recommendations for a comprehensive overhaul of the U.S. nuclear waste management program, called for the "prompt development of one or more consolidated storage facilities." According to the BRC, such facilities would provide important benefits in terms of operational flexibility, cost savings, and improved understanding of technical issues related to spent fuel storage—benefits that are particularly important given the uncertain time frame for resolving the current political impasse over developing a permanent deep geological repository at Yucca Mountain. As the BRC explained:

*Developing consolidated storage capacity would allow the federal government to begin the orderly transfer of spent fuel from reactor sites to safe and secure centralized facilities independent of the schedule for operating a permanent repository. The arguments in favor of consolidated storage are strongest for "stranded" spent fuel from shutdown plant sites.*

As the BRC also recognized, however, significant barriers stand in the way of developing consolidated storage capability and that development is expected to be complicated. Chief barriers include existing statutory restrictions on the federal government's ability to move forward with such a facility before a construction license has been issued for a permanent repository and the difficulty of finding a site where affected state, tribal, and local authorities would consent to host the storage of spent nuclear fuel from other locations.

The statutory issues stem from provisions of the Nuclear Waste Policy Act (NWPA) that tie construction of a federal "monitored retrievable storage" (MRS) facility to progress on a first repository and provisions that set capacity limits on such a facility so that it cannot accommodate all of the spent fuel in need of disposal.<sup>1</sup> These provisions were intended to allay concerns that any MRS facility would become a de facto permanent disposal site. Originally, the U.S. Department of Energy (DOE) was required to choose a site for an MRS facility by June 1985. In 1987, amendments to the NWPA annulled DOE's initial selection of an MRS site in Tennessee and created an Office of Nuclear Waste Negotiator to attempt to convince another state to agree to host the first MRS facility. This effort did not succeed and the Office of Nuclear Waste Negotiator was terminated in 1995.

The concern that any consolidated storage facility would become a de facto repository is still valid and the BRC was sensitive to it. In fact, the BRC report states that a program to establish consolidated storage will only be successful if it is accompanied by an effective disposal program. The BRC went on to write, "Progress on both fronts [consolidated storage and disposal] is needed and must be sought without further delay."

Although the BRC's recommendations generally assume that the federal government would develop a consolidated storage facility, the first serious post-BRC storage proposal has come from a private party, Waste Control Specialists (WCS), which has announced plans to build a facility in Andrews County, Texas—apparently with the support of the county and the State of Texas itself. The WCS proposal is consistent with a federal MRS because WCS envisions that DOE would be its only customer. DOE would take title to the spent fuel at nuclear power plant sites and transport it to the WCS facility. DOE would retain title throughout the storage period and pay WCS for use of the storage facility. This would allow DOE to reduce payments from the Judgment Fund.

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<sup>1</sup> It has been suggested that the Department of Energy could seek to license an MRS facility without resorting to the NWPA process, using statutory authority provided under the Atomic Energy Act. Whether this approach would hold up to legal scrutiny, however, is uncertain (see also, footnote 2).

Two other federal-level developments with relevance for consolidated storage occurred in March 2015. First, new legislation was introduced in Congress to implement several of the BRC recommendations. Specifically, Senate Bill 854 would create a new Nuclear Waste Administration within the executive branch to take over DOE's nuclear waste responsibilities and would create a process for approving interim storage facilities so that the government could begin accepting spent fuel from nuclear utilities. (Other provisions in S.B. 854 would provide for "consent-based siting" and resume the collection of Nuclear Waste Fund fees from nuclear utilities.) Also in March 2015, Energy Secretary Moniz—as part of a broader announcement that included a change in federal policy concerning the commingling of defense waste and commercial spent fuel—announced new efforts to move forward on interim storage, including establishing a consent-based process for siting storage facilities and repositories.

## *Options for Interim Storage*

This section discusses three options for interim storage, including the main advantages and disadvantages of each approach.

### **Option A: At-Reactor Storage**

Today, nearly all of the nation's inventory of spent nuclear fuel is being stored at the sites where it was generated, including at roughly 61 still-operating nuclear power plants (99 units) and 14 shutdown reactor sites. All operating plants have water pools to store spent fuel after it is removed from the reactor core; in addition, some portion of the older spent fuel inventory at many plants is being stored in dry casks onsite. At shutdown plant sites, where the water pools have been decommissioned, all the spent fuel has been moved to dry storage. At reactor sites with enough room to expand existing dry storage facilities, it would be relatively easy to accommodate spent fuel from other reactors.

In terms of timeliness and cost, therefore, consolidating storage at existing reactor sites could have some advantages. Moving spent fuel from shutdown sites, in particular, could generate large cost savings, since the cost of dry storage at a shutdown plant far exceeds the cost at a still-operating plant (\$4.5–\$8 million per year compared with approximately \$1 million per year, according to the BRC's estimates). The NRC already has extensive regulations in place to govern at-reactor storage and recently concluded—in its Continued Storage Rule—that at-reactor storage is safe and can be maintained indefinitely. (It is worth noting that the latter rule is being challenged in court by some states and environmental groups.)

Perhaps the main drawback of the at-reactor option is that nuclear utilities have so far shown no interest in pursuing this approach. In the present situation, where utilities' payments into the Nuclear Waste Fund have been suspended but utilities can still sue the federal government to recover the costs of onsite storage; there is little incentive for the industry to support a change in current policy. If, on the other hand, a reactor owner were to offer additional storage services in exchange for a fee and DOE took title to the spent fuel, that might create an incentive. In that case, opposition from communities near the reactor (and/or along the path that spent fuel would travel to reach the site) could constitute the main impediment and a consent-based process might be needed to identify communities that would be willing to accept the transfer of spent fuel from other sites to their local nuclear plant. It is doubtful that DOE would be able to take title to the fuel if it were to remain on a utility site for storage.

## Option B: Federal Storage Facilities

DOE maintains various facilities for storing government-generated nuclear waste, both from the weapons program and from its reactor and other nuclear operations. Some of this waste is in the form of spent fuel; some of it is high-level waste in liquid form (typically stored in tanks). Thus, one approach might be for DOE to take title to commercial spent fuel and transfer the spent fuel to one or more of the government's existing sites.<sup>2</sup> However, this option presents a number of political and legal difficulties. One issue is that a history of well-reported problems at existing DOE facilities (e.g., leaking tanks at Hanford) means that many host states would be strongly opposed. In fact, the States of Washington and Idaho have court-approved agreements with DOE to move spent fuel and high-level waste out of state within the next few decades. In addition, any federal storage option would require congressional appropriations and is likely subject to the NWPA restrictions discussed previously. Thus, if DOE wished to proceed ahead of licensing a permanent repository, it would either have to seek an amendment to the NWPA or convince the courts that it can take this step under the Atomic Energy Act. It would also have to convince Congress to provide funding. The WCS proposal would also be subject to these same limitations.

## Option C: Private Storage Facilities

A private storage facility may offer a viable alternative for moving forward. This approach has been pursued in the past—in fact, the NRC issued a license for a private storage facility, Private Fuel Storage (PFS) in 2006. The PFS facility would have been built in Utah to store spent fuel destined for final disposal at Yucca Mountain. However, PFS was never constructed because the project failed to obtain the land withdrawals needed to provide rail access to the site.<sup>3</sup> More recently, WCS has proposed a private storage facility for Andrews County, Texas, but the facility would be more like a federal MRS. WCS has publicly stated it will file an application for a storage license with the NRC in 2016.

Winning state, tribal, and local support is likely to be the most important obstacle to siting a private facility, as the PFS experience demonstrates. By contrast, the record of the Waste Isolation Pilot Plant (WIPP) in New Mexico suggests that it is possible to gain some measure of state and local support for a nuclear waste facility—in the WIPP case, though several areas of dispute had to be resolved through legislation and litigation, the State of New Mexico administers regulatory authority over the hazardous-waste aspects of the disposed material and actively regulates the facility in that limited fashion, accordingly. But the well-publicized release of radiation at WIPP in 2014, which is still being investigated and which led the state to propose \$54 million in civil penalties (to be paid by DOE), has raised new questions about whether New Mexico will continue to be a willing host for WIPP, let alone for a new facility.

Nonetheless, at this writing WCS seems to enjoy good relations with the State of Texas, with other relevant state agencies, and with county officials (who have formally issued a resolution endorsing the WCS plan). Of course, even if the host state and county are (and remain) supportive, other stakeholders, including communities through which spent fuel will travel on the way to the WCS facility may have different views.

If WCS goes forward, the question is whether any reactor owners would be willing to send spent fuel to the facility rather than simply keeping it onsite at taxpayer (via payments from the Judgment Fund) expense. The answer for almost all of the permanently shutdown sites has been yes, assuming the DOE would take title as the material left the facilities. For spent fuel stored at shutdown reactor sites, the cost savings to DOE could be sufficient to justify DOE's working with the owners to mitigate damages. Were that the case, DOE could work with the owners and WCS to come up with a transportation plan that would move the spent fuel to the WCS facility.

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<sup>2</sup> In fact, DOE already holds three storage licenses, issued by the NRC under Atomic Energy Act authority, "for special purposes," and is using two of them to store spent fuel at Fort St. Vrain, Colorado, and Idaho Falls, Idaho.

<sup>3</sup> PFS is now attempting to sell its assets. The NRC has indicated that the PFS license could be transferred for use at another site, provided that any site-specific issues were resolved.

To determine whether this is a viable strategy, careful analysis of the relative costs of at-reactor and consolidated storage would be necessary and existing settlements between the Department of Justice and nuclear utilities would have to be reviewed. In addition, industry supporters assert that federal funding—possibly from the Nuclear Waste Fund—could be required to license and build the WCS facility. (WCS has indicated that it will apply for the license and construct the facility without prior federal funding, provided there is progress on legislation that authorizes DOE to take title and contract with WCS for storage.) In that case, Congress would have to make the necessary appropriations and authorizations. Alternatively, it is possible that nuclear utilities could pay for off-site storage from their own funds, and then sue DOE for damages. If such damages were deemed recoverable, which is not at all clear, they would presumably be paid by taxpayers out of the Judgment Fund, not out of the Nuclear Waste Fund.

## *Location of Consolidated Storage Facilities*

Numerous options exist for locating consolidated storage facilities, but one strategy that could be considered is regional “on-the-way” storage. This would entail locating regional facilities where they could become collection points for spent fuel being moved from reactors to likely repository sites. In this way, redundant transportation needs could be avoided or minimized. Another option, as noted above, is to locate consolidated storage at operating reactor sites that have existing spent fuel facilities, existing transportation infrastructure and routes, and trained staff.



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