April 11, 2013

COMMERCIAL SPENT NUCLEAR FUEL

Observations on the Key Attributes and Challenges of Storage and Disposal Options

GAO Accountability * Integrity * Reliability

Highlights

Highlights of GAO-13-532T, a testimony before the Subcommittee on Energy and Water Development and Related Agencies, Committee on Appropriations, House of Representatives

Why GAO Did This Study

Spent nuclear fuel, the used fuel removed from commercial nuclear power reactors, is one of the most hazardous substances created by humans. Commercial reactors have generated nearly 70,000 metric tons of spent fuel, which is currently stored at 75 reactor sites in 33 states, and this inventory is expected to more than double by 2055. The Nuclear Waste Policy Act of 1982, as amended, directs DOE to investigate the Yucca Mountain site in Nevada—100 miles northwest of Las Vegas—to determine if the site is suitable for a permanent repository for this and other nuclear waste. DOE submitted a license application for the Yucca Mountain site to the Nuclear Regulatory Commission in 2008, but in 2010 DOE suspended its licensing efforts and instead established a blue ribbon commission to study other options. The commission issued a report in January 2012 recommending a new strategy for managing nuclear waste, and DOE issued a new nuclear waste disposal strategy in 2013.

This testimony is primarily based on prior work GAO issued from November 2009 to August 2012 and updated with information from DOE. It discusses the key attributes and challenges of options that have been considered for storage or disposal of spent nuclear fuel.

GAO is making no new recommendations at this time.

View GAO-13-532T. For more information, contact Frank Rusco at (202) 512-3841 or ruscof@gao.gov.

What GAO Found

In November 2009, GAO reported on the attributes and challenges of a Yucca Mountain repository. A key attribute identified was that the Department of Energy (DOE) had spent significant resources to carry out design, engineering, and testing activities on the Yucca Mountain site and had completed a license application and submitted it to the Nuclear Regulatory Commission, which has regulatory authority over the construction, operation, and closure of a repository. If the repository had been built as planned, GAO concluded that it would have provided a permanent solution for the nation's commercial nuclear fuel and other nuclear waste and minimized the uncertainty of future waste safety. Constructing the repository also could have helped address issues including federal liabilities resulting from industry lawsuits against DOE related to continued storage of spent nuclear fuel at reactor sites. However, not having the support of the administration and the state of Nevada proved a key challenge. As GAO reported in April 2011, DOE officials did not cite technical or safety issues with the Yucca Mountain repository project when the project's termination was announced but instead stated that other solutions could achieve broader support.

Temporarily storing spent fuel in a central location offers several positive attributes, as well as challenges, as GAO reported in November 2009 and August 2012. Positive attributes include allowing DOE to consolidate the nation's nuclear waste after reactors are decommissioned. Consolidation would decrease the complexity of securing and overseeing the waste located at reactor sites around the nation and would allow DOE to begin to address the taxpayer financial liabilities stemming from industry lawsuits. Interim storage could also provide the nation with some flexibility to consider alternative policies or new technologies. However, interim storage faces several challenges. First, DOE's statutory authority to develop interim storage is uncertain. Provisions in the Nuclear Waste Policy Act of 1982, as amended, that allow DOE to arrange for centralized interim storage have either expired or are unusable because they are tied to milestones in repository development that have not been met. Second, siting an interim storage facility could prove difficult. Even if a community might be willing to host a centralized interim storage facility, finding a state that would be willing to host such a facility could be challenging, particularly since some states have voiced concerns that an interim facility could become a de facto permanent disposal site. Third, interim storage may also present transportation challenges since it is likely that the spent fuel would have to be transported twice—once to the interim storage site and once to a permanent disposal site. Finally, developing centralized interim storage would not ultimately preclude the need for a permanent repository for spent nuclear fuel.

Siting, licensing, and developing a permanent repository at a location other than Yucca Mountain could provide the opportunity to find a location that might achieve broader acceptance, as GAO reported in November 2009 and August 2012, and could help avoid costly delays experienced by the Yucca Mountain repository program. However, developing an alternative repository would restart the likely costly and time-consuming process of developing a repository. It is also unclear whether the Nuclear Waste Fund—established under the Nuclear Waste Policy Act of 1982, as amended, to pay industry's share of the cost for the Yucca Mountain repository—will be sufficient to fund a repository at another site.