



# OLR RESEARCH REPORT

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## **DOE BLUE RIBBON COMMISSION REPORT ON DISPOSAL OF SPENT NUCLEAR FUEL**

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You asked for a summary of the draft report by Department of Energy's (DOE) blue ribbon commission on disposal of spent nuclear fuel. The report, which was issued on July 29, 2011, is available at [http://www.brc.gov/sites/default/files/documents/brc\\_draft\\_report\\_29jul2011\\_0.pdf](http://www.brc.gov/sites/default/files/documents/brc_draft_report_29jul2011_0.pdf).

### **SUMMARY**

Under the National Waste Policy Act (NWPA), DOE is responsible for developing a permanent repository for disposing of spent nuclear fuel. The law also permits DOE to develop an interim storage facility, but only after the permanent repository is licensed by the Nuclear Regulatory Commission (NRC). The law required DOE to accept spent fuel from utilities as of January 31, 1998 for disposal at the repository in exchange for their payment of a charge on the electricity produced by nuclear power plants. However, the repository has not been built to date and the continued collection of the charge is the subject of litigation.

The DOE commission concludes that "America's nuclear waste management program is at an impasse" and the decision to halt work on the Yucca Mountain, Nevada repository is only the latest indication of a policy that has been troubled for decades and is now all but completely broken down. According to the commission, earlier actions by DOE and Congress created a widespread perception that the Yucca Mountain site

was primarily chosen on political rather than scientific grounds. The site selection process did not involve the affected communities.

The commission states that the:

... nation's failure to come to grips with the nuclear waste issue has already proved damaging and costly and it will be more damaging and more costly the longer it continues... Continued stalemate is also costly—to utility ratepayers, to communities that have become unwilling hosts of long-term nuclear waste storage facilities, and to U.S. taxpayers who face mounting liabilities, already running into billions of dollars, as a result of the failure by both the executive and legislative branches to meet federal waste management commitments.

The report recommends that the NWPA be amended to authorize:

1. a new process for selecting and evaluating sites and licensing storage and disposal facilities in the future that involves obtaining consent of stakeholders at the proposed sites and
2. development of multiple interim waste storage facilities with adequate capacity to be sited, licensed, and constructed when needed.

The report calls for the creation of a new, independent, government-chartered corporation (analogous to the Tennessee Valley Authority) that is solely focused on managing spent nuclear fuel and other high-level radioactive wastes. It recommends changes in budget policies to provide the corporation access to funds nuclear utility ratepayers are already paying for nuclear waste management. The report also recommends (1) support for continued U.S. innovation in nuclear energy technology and for workforce development and (2) active U.S. leadership in international efforts to address safety, waste management, nonproliferation, and security concerns.

## **BACKGROUND**

There are 104 commercial nuclear power reactors operating in the United States today. Nearly all of the existing spent nuclear fuel is being stored at the reactor sites where it was generated, about three-quarters of it in shielded concrete pools and the rest in dry casks above ground. There is currently about 65,000 metric tons (a metric ton is 2,200 pounds) of spent fuel, which would cover a football field approximately 20 feet deep. If all commercial reactors in the United States were shut

down tomorrow, about 75,000 metric tons (the current spent fuel inventory plus the fuel currently in commercial reactor cores) would require disposal. If a substantial number of new reactors were built this amount could exceed 200,000 metric tons by the middle of this century.

The federal NWPA, adopted in 1982, governs the disposition of spent nuclear fuel. It initially provided for the selection of two permanent repository sites. To ensure that there would not be a single, national repository, Congress limited the capacity of the first repository to 70,000 metric tons until a second repository was opened.

Among other things, the act:

1. gave states certain rights with respect to oversight over waste storage or disposal sites within their borders and the ability to veto DOE siting decisions, while allowing Congress to override the veto by votes of both houses;
2. gave NRC responsibility for licensing the construction and operation of nuclear waste facilities, subject to public health and environmental standards established by the Environmental Protection Agency; and
3. allows for the construction of one interim storage facility with limited capacity, but only after a permanent repository is licensed.

In 1986, DOE recommended Yucca Mountain in Nevada and two other sites for detailed site analysis (characterization) as leading candidates for the nation's first permanent repository. Citing rising costs and lower projections for nuclear waste production in the future, DOE suspended efforts to identify and develop a second permanent repository.

Congress amended NWPA's original timelines and cost assumptions in 1987. The amendment halted geological research of potential sites in the Midwest and along the Atlantic coast, cancelled the second repository, and designated Yucca Mountain as the sole site to be considered for a permanent repository. DOE continued detailed site characterization studies at Yucca Mountain through the 1990s and issued a formal finding of suitability for the site in 2002. President Bush recommended the site to Congress, which prompted Nevada (which staunchly opposed the project throughout) to veto the selection. Congress overrode the state's veto, allowing DOE to apply to the NRC for a license to start construction. This step was supposed to follow within 90 days, but it took six years due to litigation over repository safety standards, funding shortfalls, and other problems.

DOE completed the license application for a waste repository and submitted it to NRC in June 2008 and the license application was deemed complete three months later. In 2009, however, the Obama administration declared its intent to suspend further work on Yucca Mountain and in March 2010 moved to withdraw the application for a construction license to the NRC. With key decisions by the courts and the NRC still pending, the future of the project remains uncertain. Funding for development of the Yucca Mountain site was eliminated in the 2011 federal budget.

Under the NWPA, utilities that own nuclear plants are assessed a user fee (currently 0.1 cent) on every kilowatt-hour the plants generate in exchange for the government's contractual commitment to accept commercial spent fuel for disposal. (The fee is typically passed on to ratepayers.) The fee goes into a fund for the nuclear waste program. In exchange for the fee revenue, the government was supposed to begin accepting the spent fuel as of January 31, 1998. DOE and the utilities have been engaged in litigation since then over DOE's failure to perform its obligations, with 74 lawsuits filed. Some utilities settled with the government and courts reached judgments in other cases finding DOE in "partial breach" of its contracts. This means ratepayers must pay damages awarded to the utilities in the lawsuits due to DOE's failure to accept fuel.

The DOE secretary, at the direction of President Obama, formed the blue ribbon commission to conduct a comprehensive review of policies for managing spent nuclear fuel and recommend a new plan for developing repositories. The commission was co-chaired by retired general Brent Scowcroft and former Representative Lee Hamilton. The commission included representatives of the electric utility and nuclear power industries, an environmental group, state and federal energy regulators, and a wide variety of academics.

The commission was not asked to consider and did not address the suitability of the Yucca Mountain site or the administration's request to withdraw the license application for this site. Instead, it focused on developing a strategy for future interim storage and permanent disposal facilities and operations that it believes can and should be implemented regardless of what happens with Yucca Mountain. The commission did not propose any specific site or sites for any component of the waste management system. Nor did it offer a judgment about the appropriate role of nuclear power in the nation's future energy supply mix.

## **FINDINGS**

The report found several weaknesses in the nation's current approach to nuclear waste management, and to the selection and characterization of the Yucca Mountain site. First, DOE's termination of the second repository siting process, combined with Congress's subsequent action to single out Yucca Mountain as the sole site for consideration, created a widespread perception that the repository location was being determined on the basis of primarily political, rather than technical and scientific, considerations.

Second, neither the original site selection process established by the NWPA nor the subsequent legislative designation of Yucca Mountain as the sole site for consideration was based on achieving the consent of those most affected by it. The designation of Yucca Mountain as the sole site for investigation in 1987 was strongly opposed by the state and the majority of its citizens.

A third long-standing issue was the practice of setting unrealistic and rigid deadlines. As DOE failed time and again to meet various deadlines, the report found that confidence in the federal government's competence to manage its obligations concerning the management of nuclear waste eroded among all parties involved. Key stakeholders became increasingly frustrated. These included residents of the communities where these materials were being stored and nuclear utilities and their customers, who continued to pay into the fund that supported the program.

At the same time, the federal government was also exposing itself and taxpayers to liability and financial damages arising from its failure to comply with its obligations under the NWPA and DOE contracts with utilities. The report found these liabilities were in the billions of dollars and are projected to increase by \$500 million for each additional year of delay.

According to the report another fundamental flaw of the repository development process was its relative inflexibility. This made it difficult to adapt or respond to new developments, including new scientific information, technological advances, and the concerns of potentially affected citizens and their representatives. The 1987 amendments made no provision for an alternative path forward if Yucca Mountain proved untenable. This lack of adaptability further undermined confidence in the analysis and planning conducted by DOE and other federal agencies.

Similarly, by directing EPA to develop safety standards specific to Yucca Mountain, the report found that Congress undermined confidence that those standards represented an independent scientific judgment about what was necessary to protect human health and the environment.

Although reprocessing has been suggested as an alternative to long-term disposal of spent nuclear fuel, the report found that all of the spent fuel reprocessing or recycling options already available or under active development generate waste streams. Moreover, foreseeable separation technologies will still leave sufficient amounts of long-lived radioactive elements that will require a long-term disposal solution. According to the report, deep geological disposal is the most promising and accepted method currently available for safely isolating spent fuel from the environment for very long periods of time. The report also noted that regardless what happens with Yucca Mountain, the U.S. inventory of spent nuclear fuel will soon exceed the amount that could be legally placed at this site until a second repository begins operation. So under current law, the United States will need to find a new disposal site even if Yucca Mountain goes forward.

## **RECOMMENDATIONS**

According to the report, fully implementing the commission's recommendations will require several changes to the NWPA. The law provides for the evaluation and licensing of a single permanent repository site at Yucca Mountain. The report recommends that the law be amended to authorize a new consent-based process to be used for selecting, evaluating, and licensing multiple sites for storage and disposal facilities in the future. Under this approach, the communities affected by a proposed facility would have an opportunity to decide whether to accept facility siting decisions and retain significant local control over the facility. The report calls for giving all have an opportunity to understand key decisions and engage the process in a meaningful way. Key decisions would be revisited and modified as necessary along the way rather than being pre-determined. The process would be flexible and produce decisions that are responsive to new information and new technical, social, or political developments. The facilities themselves would have to meet rigorous, objective, and consistently-applied standards of safety and environmental protection.

As noted above, the NWPA allows for the construction of one consolidated interim storage facility with limited capacity, and only after a nuclear waste repository is licensed. The commission believes that one or more consolidated storage facilities will be required, independent of

the schedule for opening a permanent repository. As a result, the report recommends modifying the NWPA to allow multiple storage facilities with adequate capacity to be sited, licensed, and constructed when needed.

Currently, DOE has the responsibility for implementing the nation's nuclear waste management program. The report recommends legislation to move this responsibility to a new, independent, government-chartered corporation, analogous to the Tennessee Valley Authority, solely focused on managing spent nuclear fuel and high-level radioactive wastes.

The corporation's responsibilities would include:

1. siting, obtaining licenses for, constructing, operating, and ultimately closing facilities for the disposal of spent fuel and high level waste;
2. siting, obtaining licenses for, constructing, and operating centralized facilities for the interim storage of spent fuel; and
3. transporting spent fuel once it has been accepted from utilities for disposition.

The report also recommends legislation to establish appropriate Congressional oversight mechanisms.

As noted above, the nuclear waste program is funded by a fee on electricity generated at nuclear power plants. According to the report, a series of actions by successive administrations and Congress has made the approximately \$750 million in annual fee revenues and the unspent \$25 billion balance in the fund effectively inaccessible, forcing them to take money away from other federal priorities to fund activities needed to meet contractual waste management obligations. The report recommends that the administration should (1) change the way in which the fee is collected so that only an amount equal to actual appropriations from the fund is collected each year, with the utilities retaining the remainder in approved trust funds to be available when needed for future use and (2) work with the congressional budget committees and the Congressional Budget Office to reclassify the fee receipts so that they can directly offset appropriations for the waste program. According to the report, in the long-term, legislation must provide access to the fund and fees independent of the annual appropriations process.

As initial steps, the report recommends:

1. developing basic siting criteria to ensure that time is not wasted investigating sites that are clearly unsuitable or inappropriate;
2. developing a generic standard and supporting regulatory requirements early in the siting process to engender public confidence and support the efficient consideration and examination of multiple sites;
3. encouraging interest from a large variety of communities that have potentially suitable sites; and
4. establishing initial program milestones in a mission plan to allow for review by congress, the administration, and stakeholders and to provide verifiable indicators for oversight of the new corporation's performance.

The report also recommends (1) support for continued U.S. innovation in nuclear energy technology and workforce development and (2) active U.S. leadership in international efforts to address safety, waste management, nonproliferation, and security concerns.

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