



# ISSUE BRIEF

## A Proposal for Progress on Nuclear Waste Management

It is well-understood and commonly acknowledged that the United States must have a system for managing and disposing of used nuclear fuel (UNF) and fission products resulting from reprocessing (collectively referred to as high-level radioactive waste or HLW). Currently, more than 80,000 metric tons of commercial UNF sit at dozens of sites around the country, and millions of gallons of fission products are stored at U.S. Department of Energy (DOE) sites. Some of this material will be radioactive for millions of years and therefore must be isolated from the environment for many generations to protect public health and safety. In addition to the existing inventory, HLW is continually generated from currently operating nuclear plants. Furthermore, while advanced nuclear energy systems offer a promising means of generating clean energy in the future, deployment of these systems requires effective long-term management of radioactive waste.

The good news is that the United States has access to several proven technologies to manage and store HLW, including on-site and centralized dry-cask storage, nuclear fuel reprocessing, and deep geological disposal. From a technological standpoint, the American Nuclear Society (ANS) sees no “showstoppers” to the safe and secure long-term storage of HLW.

However, the current U.S. policy—to dispose of HLW in a high-level repository at the Yucca Mountain site

in Nevada—is effectively moribund. Since 2010, Congress has failed to provide the U.S. Nuclear Regulatory Commission with funding to complete its review of the Yucca Mountain license application, and the political logjam is unlikely to lessen in the next year or two.

ANS believes there are several steps the federal government can take immediately, separate and apart from Yucca Mountain, to put the United States on a better path toward effective management of HLW. These actions would not require changes in federal law (only appropriated funding from Congress and/or direction by the Administration); would not enhance any one particular HLW policy approach at the expense of another; would not prejudice the outcome of the Yucca Mountain debate in any meaningful way.

### RECOMMENDATIONS

#### 1. Reestablish the DOE Office of Civilian Radioactive Waste Management (OCRWM).

The OCRWM provides a necessary focal point for executive branch activities related to HLW management, and it is required by federal law. Moreover, reestablishing the OCRWM would send a message that the government is serious about discharging its statutory and contractual responsibilities related to HLW. Arguably, the

OCRWM does not have much to do at the current time, but implementing some or all of the following recommendations would best be accomplished by an organization devoted exclusively to HLW management.

## **2. Develop up-to-date, risk-based, generic standards for siting and licensing a geologic repository in the United States.**

These would include (i) a generic geologic repository standard for public health and safety [Environmental Protection Agency (EPA) 40 CFR Part 191]; (ii) a generic geologic repository regulation covering construction authorization, repository operations, and permanent closure [Nuclear Regulatory Commission (NRC) 10 CFR Part 60]; and (iii) generic repository siting requirements (DOE 10 CFR Part 960). Today's generic EPA, NRC, and DOE regulations are out of date and in many cases inconsistent with the current scientific understanding of repository performance. New regulations should be applicable to innovative new approaches like boreholes and horizontal drilling as well as traditional mined geologic repositories. Up-to-date generic regulations could be needed under a number of potential future scenarios. Example scenarios include (i) the country looks for a site other than Yucca Mountain for disposal of HLW, (ii) Yucca Mountain completes the licensing process but is found not to qualify for a construction authorization so a different repository is needed, and (iii) drill holes are used to dispose of defense wastes.

It takes years to promulgate federal regulations such as these. There is no reason to delay the necessary updates to the regulations. The process needs to start now so the regulations will be ready when and if they are needed. It is important to note that updating these generic regulations would not affect the licensing of Yucca Mountain one way or the other, because modern, site-specific EPA and NRC standards are already in place for that proposed facility.

## **3. Enhance U.S. HLW transportation planning, outreach, and infrastructure development.**

Ultimately, the DOE (or some other authority)

will be responsible for transporting used fuel from reactor sites to a repository or a consolidated interim storage facility. The DOE can establish reasonable scenarios and develop plans that identify necessary steps, equipment, and infrastructure to carry out a major UNF transportation campaign. The DOE can also develop and maintain its relationships with local, state, tribal, and federal authorities and key stakeholders.

The DOE has a project under way to manufacture a rail car that is specifically designed to satisfy HLW transportation requirements. This project needs to be carried to completion. This is a good example of how the government can apply resources on work now that will be needed irrespective of eventual policy pathways.

## **4. Mandate the DOE to identify the steps required to restart a repository program and estimate the associated timelines and costs. The Nuclear Waste Technical Review Board should then review the report for Congress.**

Ultimately, the country will need a geologic repository somewhere. Congress should have available reasonable, up-to-date estimates of the associated cost and schedule, both for a new repository program and for restarting Yucca Mountain licensing.

## **5. Assess the ability of advanced reactors and alternate fuel cycles to address waste disposal challenges.**

In fiscal year 2020 appropriations, Congress instructed the National Academy of Sciences to conduct a study along these lines. This is another example of how productive actions can be initiated despite the current stalemate on overall HLW policy.

## **6. Continue research and development supporting long-term storage and subsequent transportation of UNF.**

The reality is that we will need to store UNF on site for much longer than originally envisioned before transporting it to a storage, processing, or disposal facility. Thankfully, the federal government

and the waste management industry have worked effectively for more than a decade to address many of the associated technical and regulatory challenges. Funding must continue to complete the necessary work.

**7. Commission a National Academy of Sciences study of HLW management case histories in the United States and around the world. Identify best practices for communicating to the public about the real level of risk associated with HLW.**

This effort should cover repositories and consolidated storage facilities as well as activities like transportation of HLW. Given that HLW programs in some other countries are progressing while the United States program is stalled, it would be useful to better understand why. Additionally, study of case histories can reveal the extent to which international lessons learned are applicable in this country.

**8. Commission a Congressional Budget Office (CBO) study on sustainable funding for HLW management.**

Huge amounts of money have been collected from American citizens to pay for HLW management, but budget rules make it impractical to reliably and consistently access funding for HLW programs through the annual appropriations process. Proposals have been made to address the problem, but none have been implemented. Charge the CBO with identifying potential solutions and assessing the advantages and drawbacks associated with each one.

These are by no means the only steps Congress and the Administration have at their disposal to make progress, but ANS considers each of the recommendations to be relatively straightforward and ultimately productive. Importantly, these actions should not be prejudicial to the ultimate resolution of larger HLW policy issues, such as whether to proceed with Yucca Mountain or begin a new repository program, or whether or not to develop consolidated interim storage facilities for UNF. Taking action in some or all of these identified areas would send a signal that the federal government has not abandoned its HLW management responsibilities. This positive signal would be especially meaningful to those interested in supporting the development and deployment of advanced nuclear reactors.



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