Workers perform upgrades to a Hanford tank farm. A DOE proposal to interpret radioactive waste based on its characteristics rather than its origin may help sites such as Hanford disposition its waste more efficiently and reduce risks. (Photo: DOE)

A New Interpretation of High-Level Waste

As the DOE looks to clarify its interpretation of HLW, local governments are supporting the examination of a risk-based alternative for disposal.

By Kara Colton

The U.S. Department of Energy is currently reviewing public comments regarding a proposed alternative for disposing of some of the country's most dangerous radioactive nuclear waste. The Energy Communities Alliance (ECA)[1], the association of local governments hosting DOE federal facilities and those directly affected by the DOE's policies, strongly supports efforts to move forward and evaluate the proposed interpretation of the definition of "high-level radioactive waste." ECA expects that by basing treatment and disposal decisions on the actual characteristics of waste and the risk to human health and safety—rather than continuing to classify it based on origin—the DOE can move waste out of host communities more efficiently using a smarter, risk-based decision framework that *saves* taxpayers money.

Despite the fact that HLW and spent nuclear fuel is stored across the country at both commercial nuclear power plants and large DOE sites, the United States currently has only one plan on what to do with it[2]: disposal in a deep geologic repository. While current law designates Yucca Mountain in Nye County, Nev.,

1. ECA's mission is to bring together leadership from DOE-affected communities to share information, establish policy positions, and advocate for common interests in order to effectively address an increasingly complex set of environmental, regulatory, and economic development needs. ECA board members include local elected officials and community leaders from communities across the DOE complex.

2. The United States is not currently reprocessing nuclear waste for fuel for nuclear reactors.

as the site for the deep geologic repository, the process to develop it has been stalled for more than a decade. As a result, the communities hosting sites where the DOE stores HLW are now *de facto* nuclear waste interim storage sites, a role they neither agreed to nor expected.

In 1989, the DOE created the Office of Environmental Management (EM) to complete the safe cleanup of the environmental legacy resulting from nuclear weapons development and government-sponsored nuclear energy research. Since that time the life-cycle costs of the cleanup continues to grow despite real progress on the ground. EM's environmental cleanup mission is now, at an estimated $257 billion[3], the third largest liability to the American taxpayer, and the defense HLW continues to pose the greatest risk to human health and the environment (see Fig. 1).

Simply leaving nuclear

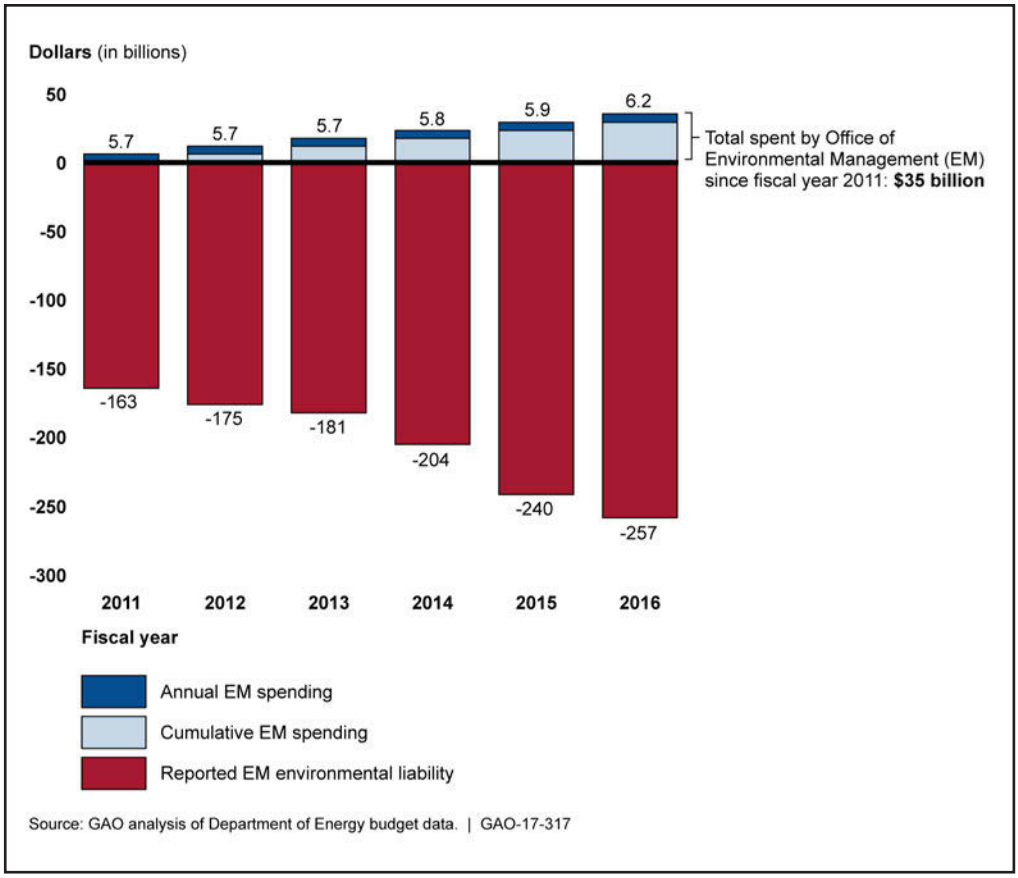

Fig. 1. DOE Office of Environmental Management's annual spending and growing environmental liability (GAO-17-317).

3. U.S. Government Accountability Office's 2017 High Risk Report.

waste in place is neither acceptable nor the safest option. A renewed sense of urgency and a willingness to consider technically defensible alternatives based on science are necessary and paramount—for the safety of communities.

The DOE's 2018 proposal on the interpretation of the definition of HLW is one such alternative. On October 10, 2018, the DOE published notice in the *Federal Register* and invited stakeholders to submit comments on the statutory term of "high-level radioactive waste" as set forth in the Atomic Energy Act of 1954 (AEA) and the Nuclear Waste Policy Act of 1982 (NWPA). The public comment period ended on December 10.

The AEA and NWPA define HLW as:

> (A) The highly radioactive material resulting from the processing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and
>
> (B) Other highly radioactive material that the [Nuclear Regulatory] Commission, consistent with existing law, determines by rule requires permanent isolation.

Under the DOE's proposal, the department would interpret that some reprocessing wastes may be classified as non-HLW and may be disposed of based on their radiological characteristics. This is significant because, historically, the DOE has conservatively managed such wastes based solely on their origin, using only the first paragraph of the definition. After decades of experience evaluating the *actual* radiological hazards posed by the wastes and the development of advanced waste forms and site-specific performance-based disposal strategies, the DOE appears poised to define disposition paths that are technically defensible and implementable in the nearer term. This shift could:

- reduce years of DOE operations and risks to current host communities;
- accelerate Hanford, Idaho, West Valley, and Savannah River tank retrievals and closures, thereby decreasing risk at those sites;
- reduce the number, size, and duration of storage facilities pending availability of a permanent deep geologic HLW repository;
- save taxpayers $40 billion or more on DOE-EM's remaining life-cycle costs.

The proposed interpretation is also consistent with the International Atomic Energy Agency's (IAEA) activity-based waste classification scheme and safety standards that call for the specific types and properties of waste to be taken into account when making disposal decisions.

As noted above, the DOE's notice is most directly relevant to Hanford, Idaho, Savannah River Site, and West Valley—the DOE sites that store large amounts of waste currently classified as HLW but would be considered non-HLW under the interpretation. ECA can reasonably interpret that the specific waste streams concerned are the vitrified canisters at Savannah River and West Valley, the sodium-bearing waste and calcine at Idaho, and some Hanford tank wastes. Notably, an extension of this risk-based approach to disposition of other DOE waste streams can reasonably be anticipated, which would have far-reaching implications for virtually every site across the EM complex.

The disposal sites that the DOE may consider utilizing for the disposal of reprocessing wastes determined to *not* be HLW are those that have performance assessments demonstrating they can safely dispose of Class C low-level radioactive waste, or even wastes that exceed Class C concentrations. Based on the DOE's prior analysis (*Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste* (DOE/EIS-0375)) and other current regulatory information, these disposal facilities include the Waste Isolation Pilot Plant (WIPP), the Waste Control Specialists facilities in Texas, the DOE's Nevada National Security Site (NNSS) and certain on-site DOE disposal facilities, such as the Integrated Disposal Facility (IDF) at Hanford. While other commercial LLW disposal facilities can accept Class C LLW (Barnwell in South Carolina and US Ecology in Washington), they operate as Compact facilities (i.e., commercial facilities designated under the Low Level Waste Policy Act to receive commercial wastes from specific states defined by legal compacts), and the DOE does not currently dispose of its wastes at these sites. Also, all DOE on-site disposal facilities operate under disposal authorization statements (similar to disposal licenses) that are based on site-specific performance assessments. It is therefore inappropriate to assume that all on-site DOE disposal facilities could accept reprocessing wastes subject to this interpretation. However, it still will enable acceleration over current cleanup baselines and enable the "end states" vision that the Office of Environmental Management is pursuing.

ECA considers the DOE's *Federal Register* notice and request for public input to be an important *initial* step in pursuit of these objectives, especially in light of aging infrastructure, an aging workforce, budget limitations, and at times, a lack of trust between regulators and the department across the DOE's weapon complex. But now that the comment period has closed, the DOE needs to address stakeholders' legitimate concerns and provide the data that demonstrates the benefits as well as the challenges of the change, such as the feasibility of amending existing consent orders, permits, and agreements with the states.

In our comments to the DOE, ECA outlined six specific near-term recommendations in response to the proposed interpretation:

1. The DOE must be transparent and meaningfully engage host communities, state regulators, tribes, and the broader public in the decision-making process. Meaningful interaction *must* occur to ensure a common understanding of the timeline, challenges, and effects of the DOE's waste management decisions. As the DOE has already noted, any changes to how waste is currently managed will still require compliance with the state agreements and performance objectives of a disposal facility as demonstrated through a performance assessment conducted in accordance with all applicable state and federal regulatory requirements.

2. The DOE should complete and release an evaluation of the feasibility, costs, and cost savings of classifying covered defense nuclear waste as other than HLW, such as outlined in Section 3139 of the National Defense Authorization Act for fiscal year 2018. In order to build support, it is crucial that affected communities, states, and decision-makers see an evaluation and analysis of how the DOE's interpretation would affect cleanup. Only then can the intended and unintended consequences be fully understood. Information and resources must also be provided for education and outreach efforts to facilitate meaningful stakeholder engagement, validation, and endorsement.

3. The DOE should revise its radioactive waste management policy (DOE Order 435.1) to clarify that waste will be managed and dispositioned according to its characteristics, not its origin. This will allow some wastes currently categorized as HLW to more appropriately be treated as transuranic (TRU) waste or LLW in accordance with its composition, making alternative, nearer-term disposal paths available, provided the waste meets the applicable requirements (performance assessment and waste acceptance criteria) of existing disposal facilities.

4. The DOE must work directly with the state of New Mexico on a permit modification for WIPP to remove the blanket prohibition on tank waste and wastes managed as HLW so that if it meets the applicable requirements it can be disposed of at WIPP.

5. The DOE (and the U.S. Congress) should provide full funding for WIPP capital asset projects to resume the full range of waste disposal capabilities and ultimately increase capacity.

6. The DOE should begin work on a number of pilot projects and waste management policy evaluations to better understand alternative approaches and inform future policy decisions. These projects include demonstrating feasibility of treatment and off-site disposal of Hanford low-activity tank waste, and documenting the technical basis for certain treated tank wastes from Savannah River and Idaho to be designated as TRU waste and dispositioned at WIPP or commercial facilities.

7. The DOE must analyze the ramifications at each site and communicate it to the public. Currently, every site has questions regarding the change in the HLW interpretation. The DOE has not provided the data and the policy direction. The DOE must immediately communicate the actual significance to each site and community based on its proposed actions at the sites. Failure to release the information will likely result in an inability to implement the change in policy successfully and will definitely lead to mistrust and regulator lawsuits, which will continue the delays in reducing risk.

Most of these recommendations were originally outlined, and can be found in more detail, in ECA's 2017 report, *Waste Disposition: A New Approach to DOE's Waste Management Must be Pursued*, which can be found at www.energyca.org/s/ECA-Waste-Disposition-Report.pdf.

The DOE needs to develop and issue guidance to its sites on how this interpretation is to be implemented relative to the existing DOE Order for Radioactive Waste Management (DOE Order 435.1). Furthermore, it is likely that any revisions to current waste stream disposition strategies will require new or additional review under the National Environmental Policy Act. Thus, any revised disposal decisions are expected to involve additional public review and will not occur until late in 2019, at the earliest.

It is also very important to note this effort on the DOE's interpretation of HLW does not negate the need for a permanent geologic repository. Regardless of how the DOE proceeds, there will still be federal defense HLW requiring permanent disposal in a deep geologic repository. In the interim, however, the DOE and its stakeholders at the local, state, and federal level should not only allow, but also support, efforts that take into account lessons learned over time, technological developments, and political and fiscal realities. The most important role for local governments—one shared with the federal government—is to protect the health, safety, and quality of life of its citizens while ensuring their economic future. The DOE's proposed alternative may well help achieve that, and a full examination should be allowed before it is discounted. The communities that have long supported our national defense and security deserve at least that. ■

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