SYNOPSIS OF BOARD REPORT
PREPARING FOR NUCLEAR WASTE TRANSPORTATION

INTRODUCTION

The U.S. Nuclear Waste Technical Review Board (Board) has completed an evaluation of the technical and integration issues that the U.S. Department of Energy (DOE) will need to address to ensure that spent nuclear fuel (SNF) and high-level radioactive waste (HLW) are ready for transportation to a nuclear waste repository or an interim storage site. The exact destination for these wastes was not considered in this evaluation, nor were potential transportation routes. The Board's review focused on technical and scientific issues only and did not consider institutional or social issues, such as nuclear waste policy, funding, or public outreach. In September 2019, the Board published its evaluations, findings, and recommendations in the report *Preparing For Nuclear Waste Transportation – Technical Issues That Need to Be Addressed in Preparing for a Nationwide Effort to Transport Spent Nuclear Fuel and High-Level Radioactive Waste*. The report can be found at www.nwtrb.gov/our-work/reports.

BACKGROUND

In the U.S., commercial nuclear power plants, DOE, and the U.S. Navy produce, package, and store SNF or HLW at many sites. As of April 2019, SNF and HLW were stored at more than 80 locations in 35 states. For decades, small-scale shipments of SNF have occurred, most notably, periodic shipments of naval SNF by the U.S. Navy[1]. DOE has also transported small quantities of packaged HLW between facilities within the boundaries of DOE sites, but not off site. However, transporting large quantities of SNF and HLW has not been done in this country and will require significant planning and coordination by DOE, the agency responsible for transporting these wastes under the Nuclear Waste Policy Act. All shipments of SNF and HLW must meet safety requirements promulgated by the U.S. Department of Transportation and the U.S. Nuclear Regulatory Commission.

SNF rail transportation casks.
DOE used these casks for the rail transport of commercial SNF from the West Valley Demonstration Project in New York to the Idaho National Laboratory. (Source: DOE)

BOARD REVIEW

To fulfill its legislatively mandated mission (see the text box on the next page), the Board interacts regularly with representatives of DOE, DOE contractors, and national laboratory scientists. These regular communications

[1] Naval SNF is considered a subset of DOE-managed SNF, but packaging, transporting, and storing naval SNF are responsibilities of the U.S. Navy.

with DOE were a key source of information supporting the Board's evaluation of the technical issues to be addressed in preparing a large transportation program. During 2014–2018, the Board also conducted four public meetings that focused on various aspects of DOE's research and assessment of the readiness of SNF and HLW for transportation. The agendas, presentations, and transcripts for these public meetings are available on the Board's website at https://www.nwtrb.gov/meetings/past-meetings.

TECHNICAL ISSUES, FINDINGS, AND RECOMMENDATIONS

The Board identified 30 technical issues that need to be addressed in preparing for SNF and HLW transportation. A few examples of the actions necessary before certain types of waste can be transported include the need to 1) complete more detailed neutronics calculations (to demonstrate criticality safety) for some commercial SNF, 2) refurbish or reestablish transportation infrastructure at commercial nuclear power plant sites where that infrastructure is no longer functional, and 3) complete existing designs or develop and license new designs for casks and canisters for transporting DOE-managed SNF and HLW. See the full report for a tabulation and description of all 30 technical issues.

Some of the technical issues apply to all waste types and others apply to certain groups of waste (e.g., commercial SNF) or to only one specific waste type (e.g., cesium and strontium capsules at the Hanford site in Washington State). Not all of the technical issues have to be addressed before the first of the waste is transported, but all 30 issues must be addressed before all of the waste is eventually transported. Based on its review, the Board makes the following recommendations:

1. As DOE continues its analyses and research for a nationwide waste management and transportation system, the Board recommends that DOE ensure the issues tabulated in the Board's report are addressed. The Board also recommends that these issues, and any other issues identified by DOE, be prioritized and carefully sequenced to support the integrated operation of a nationwide transportation program.

2. The Board recommends that DOE give higher priority to evaluating the removal of commercial SNF from shutdown nuclear power plant sites and to evaluating DOE sites that store DOE-managed SNF and HLW. DOE should also share the results of the evaluations with operators of waste storage sites, so they can apply lessons learned, retain critical site transportation infrastructure, and be better prepared for the eventual transportation of the wastes.

3. The Board recommends that, for planning purposes, DOE should allow for a minimum of a decade to develop new cask and canister designs for SNF and HLW storage and transportation, or DOE should conduct its own detailed evaluation of the time needed to complete the design, licensing, fabrication, and testing of new casks and canisters.

The U.S. Nuclear Waste Technical Review Board is an independent federal agency established in the 1987 Nuclear Waste Policy Amendments Act.

The Board evaluates the technical and scientific validity of U.S. Department of Energy activities related to implementing the Nuclear Waste Policy Act. The Board also provides objective expert advice on nuclear waste management and disposal issues to Congress and the Secretary of Energy.

The Board's eleven members are nominated by the National Academy of Sciences and are appointed by the President.