High-Level Radioactive Waste Committee Response to the U.S. Department of Energy Office of Nuclear Energy's Request for Information: Package Performance Demonstration

October 31, 2024

INTRODUCTION

The Western Interstate Energy Board (WIEB) High-Level Radioactive Waste (HLRW) Committee appreciates the opportunity to offer comments on the U.S. Department of Energy (DOE) Office of Nuclear Energy's Request for Information (RFI) on a spent nuclear fuel transportation Package Performance Demonstration (PPD). WIEB is an organization of eleven Western states and two Canadian provinces which focuses on promoting energy policies developed through the cooperative efforts of WIEB's members in collaboration with the federal government. WIEB's HLRW Committee is composed of representatives from eleven Western states who have expertise in the field of spent nuclear fuel and high-level radioactive waste (SNF/HLW) transportation. For over thirty years, the HLRW Committee has examined the issues that surround this topic, offering comments, developing policies, and interacting with federal, industry, tribal, and other state interests in this space. The HLRW Committee would now like to leverage this experience in offering comments on the DOE PPD RFI.

All responses to selected questions below are taken from the HLRW Committee's 2018 Position Paper: "Full-Scale Cask Testing," with footnotes omitted. This paper, as well as the HLRW Committee's ten other Position Papers, can be found at: https://www.westernenergyboard.org/category/library/nuclear-library/. Please contact WIEB's Nuclear Energy Policy Program Manager, Melanie Snyder, at msnyder@westernenergyboard.org, for inquiries or further information about these responses, the HLRW Committee, or WIEB.

RESPONSES

A-1: Should DOE-NE conduct a PPD? Why or why not?

Yes; "to demonstrate compliance with and validate the U.S. Nuclear Regulatory Commission (NRC) accident performance requirements at 10 CFR 71.73;" and to "improve public confidence in the performance of a cask in accident conditions," in that order.

"Simulations are useful tools, not a replacement for full-scale testing. Simulations are modeled imitations of a real-world process or system. Simulating a system requires a model, derived from

known or theoretical information, which represents relevant characteristics, behaviors and functions of the targeted real system. Simulations are, at best, approximate imitations of real-world systems with the following limitations: simulations never perfectly mirror or represent the system and simulations do not test the relationship between the modeled system and real systems. Due to these constraints, both the model and simulation require robust, real-world verification and validation. Full-scale, real-world testing is the requisite verification and validation process for simulations."

A-2: If DOE-NE conducts a PPD, which stakeholders (or whom from your respective constituents or stakeholder groups) should a PPD be designed to reach? For example, should a PPD be designed to address concerns of a particular stakeholder group or citizen population? How should DOE-NE prioritize different interests from various stakeholders?

"Stakeholders such as the Western Interstate Energy Board, along with other state, tribal, and industry representatives, have a long history of participation in all aspects of radioactive material transportation planning. The design and implementation of any full-scale testing program should make use of this expertise."

A-4: What would make a PPD credible to you or your constituents? For example, would having specific parties with appropriate technical expertise (such as universities, the International Atomic Energy Agency, the NRC, or other entities) witness a PPD in person or having independent reviewers provide input to demonstration plans and data gathered as part of the demonstration(s) contribute to the credibility of a PPD's results?

"Independent peer review of the test program must be provided. Independent assessment and validation of the test program is necessary to achieve public credibility in the robustness of the casks. Although technical review may involve sensitive or classified information, security concerns should not be allowed to hinder a thorough independent evaluation. All resulting publications and multimedia materials should be subject to rigorous peer review."

"Safety claims should not be exaggerated in test reports, films, and videos. The public has become quite adept at recognizing when government agencies are being less than forthcoming. The test results need to stand on their own, without hyperbole or exaggeration."

A-9: Are there aspects of previous package testing or demonstrations conducted historically that were particularly useful, or should be avoided? What lessons learned from these previous tests should be considered if DOE-NE conducts a PPD?

"Two previous full-scale testing programs have significant lessons for any future testing program. The primary objective of full-scale cask testing is to validate the design of the cask. Test results may illuminate deficiencies and indicate design changes needed to improve cask performance.

Previous full-scale cask tests have identified design flaws that, when corrected, improved cask safety. An example was the TRUPACT II testing program, which included full-scale drop and fire testing for packages used to transport transuranic wastes to the Waste Isolation Pilot Plant. These full-scale tests

continue to serve as an important element in the "WIPP transportation model," a successful large-scale transportation campaign of radioactive waste. The full-scale test program built confidence not only in the TRUPACT-II but in other related cask designs for transport of transuranic wastes.

The "Operation Smash Hit" Magnox cask testing program involved full-scale regulatory tests of a cask design to transport spent nuclear fuel. Those casks continue to be used in the United Kingdom.

The TRUPACT-II and Magnox cask tests succeeded in enhancing stakeholder confidence and acceptance. The test results were accurately portrayed in public information materials, especially through films and videos. The testing program and the rest results were endorsed by key stakeholders in the Western United States and in the United Kingdom, especially government officials, emergency response personnel, and law enforcement officers in affected jurisdictions along shipping routes."

A-12: Would having an independent review panel that consists of experts with in-depth knowledge of radioactive materials transportation, regulatory requirements, and the technical aspects of a PPD assist in providing transparency and building confidence in a PPD? Please describe why you believe this would or would not be beneficial. If you view an independent review panel as beneficial, are there specific types of experts that you would be more or less likely to trust (e.g., government, public/private university, private sector, non-governmental organizations, etc.).

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A-14: What type of cask(s) would you like to see used for a PPD, and why? For example, is there a particular size, weight, or vendor of cask that you would prefer DOE-NE to use for a PPD?

"Prior to the commencement of any large-scale spent nuclear fuel shipping program, a production model of a rail cask and a production model of a truck cask should be subjected to regulatory tests at full-scale."

A-20: Would you prefer to see (a) full-scale demonstration(s) based on the tests described in 10 CFR Part 71, (b) full-scale demonstration(s) that could be based on a realistic accident scenario(s), (c) both (and in which priority order, given costs constraints), or (d) something else. Why?

"Full-scale tests should be designed to subject the packages to the hypothetical accident conditions as specified in the NRC regulations. Regulatory testing provides valuable data necessary to validate computer modeling and scale-model testing. The hypothetical accident conditions specified in the

NRC regulations, when performed in sequence, likely represent more than 99 percent of expected transportation accidents.

Full-scale testing should be performed in addition to regulatory analysis. Computer modeling and scale-model testing provide data that is vital to assess the ability of a cask to survive severe accident conditions. The information derived from computer modeling and scale-model testing must be validated by data obtained through full-scale testing.

Demonstration testing is acceptable only in conjunction with regulatory testing. A regulatory thirty-foot drop test does not provide the visual reinforcement of a high-speed collision involving trucks and/or trains. A “demonstration” test showing a real-world collision would likely be more impactful with the public and with emergency responders. However, demonstration tests should not be conducted without also generating confirmatory data through regulatory testing.”