

Additional Opportunity: Information Request on Conducting a Department of Energy (DOE) Spent Nuclear Fuel Package Performance Demonstration

SUMMARY: The Office of Nuclear Energy (NE) in the U.S. Department of Energy (DOE), is considering options for conducting a Package Performance Demonstration (PPD) to help build public trust and confidence in the safety of spent nuclear fuel (SNF) transportation casks and SNF transportation. The purpose of a PPD is to demonstrate the ability of a SNF transportation cask to protect workers, the public, and the environment in the event of a transportation accident. DOE-NE is providing an additional opportunity for interested parties to provide their input and responses to questions included in a previous request for information (RFI). This input will assist DOE-NE in its decision-making process with respect to items such as the types of demonstrations, casks, and parameters to include in a PPD. If you would like to participate, you're invited to **email your responses to the questions in this document (preferably, numbered according to the questions being answered) to DOE-PPD@id.doe.gov by January 31, 2025**. Two sets of 10 questions are provided below, for a total of 20 questions. You do not need to answer all the questions – you can answer as many or as few as you would like. Additional response guidelines are included at the end of this document.

BACKGROUND: The U.S. Department of Energy (DOE), Office of Nuclear Energy (NE) is making preliminary plans for a project that would publicly demonstrate the strength of containers (called transportation packages, or casks) used to transport spent nuclear fuel (SNF). This project is called a “Package Performance Demonstration,” or PPD. To design this project in a way that is responsive to public concerns, DOE-NE has been seeking information from a wide range of stakeholders, including government partners, members of the public, industry experts, and potential suppliers of the transportation casks, testing facilities where the demonstrations could be conducted, and instrumentation that could be used in a PPD. On July 31, 2024, DOE-NE published a Request for Information/Sources Sought Notice (RFI/SSN) (<https://sam.gov/opp/0d6a6b819a1d4c6baa205409d34a91ba/view>), containing background information and several categories of questions. Members of the public and potential vendors were invited to respond to the RFI/SSN in full, with responses due October 31, 2024.

However, during the RFI/SSN process, DOE-NE received requests to provide streamlined background information and fewer questions to facilitate receiving feedback from members of the public who are not very familiar with spent nuclear fuel (SNF) transportation, but who would still like to provide input to DOE's planning process. In response to those requests, DOE-NE is providing this streamlined information request and an additional opportunity for interested parties to respond to questions. Included in this opportunity are questions covering topics such as what kinds of demonstrations the public is interested in seeing, how results from the demonstrations could be used, what

could help ensure the credibility of demonstrations, and what kind of concerns a demonstration could help address.

“Spent nuclear fuel,” or SNF, refers to the nuclear fuel that has been used in a reactor. The solid fuel pellets are stacked vertically and encased in a metallic cladding to form a fuel rod. These fuel rods are bundled together into tall fuel assemblies that are then placed into a reactor. Once removed from a reactor, SNF is safely and securely stored at nuclear power plant sites. DOE-NE is planning to site one or more Federal consolidated interim storage facilities (CISFs) for SNF using a consent-based siting process. The containers (called transportation packages or casks) that would be used to ship SNF to the Federal CISF must undergo rigorous evaluation and certification by the U.S. Nuclear Regulatory Commission (NRC) to ensure their integrity throughout their use, including under hypothetical accident conditions. DOE has full confidence in the NRC’s cask certification process under Title 10 of the Code of Federal Regulations Part 71 (10 CFR Part 71), and any demonstration(s) conducted as part of a DOE-NE PPD should not be construed as part of any NRC cask certification process or validation of that process. Rather, a PPD would be a supplemental activity outside of the cask certification process to help build public trust and confidence in the safety of SNF transportation casks by performing a full-scale demonstration of such a cask.

A “full-scale demonstration” refers to the use of a full-size transportation cask of a type that could realistically be used for future SNF shipments and subjecting that cask to various conditions. By simulating severe accident scenarios and subjecting a cask or casks to these conditions, the purpose of a PPD would be to demonstrate to interested parties the safety and reliability of transporting SNF. DOE-NE recognizes that for a PPD to meet its intended goal of increasing public confidence in SNF transportation, public feedback is needed for DOE-NE to understand what concerns a PPD could address and how a demonstration could be optimally designed to address those concerns.

Please note that while DOE-NE will consider feedback and input from interested parties as to the type and parameters of demonstrations that could be completed as part of a PPD, DOE-NE will ultimately decide how to proceed subject to the constraints of authorization, availability of appropriated funds, and practical/technical feasibility.

REQUEST FOR INFORMATION QUESTIONS

Question Set 1:

1. Should DOE-NE conduct a Package Performance Demonstration (PPD)? Why or why not?
2. What concerns could a PPD address? For example, are there specific real-world accident scenarios or aspects of SNF transportation of particular concern to you (or your constituents/members if you are responding for an agency, organization, or group?) Please describe how a PPD could help alleviate these concerns.

3. What would make a PPD successful or not successful in meeting its goal of bolstering public confidence? Are there specific pitfalls that should be avoided, or steps that should be taken to ensure that DOE-NE meets its intended goal of increasing public confidence?
4. What would make a PPD credible to you (or your constituents/members)? For example, should DOE consider 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)?
5. How would you or your organization recommend that information and results from a PPD be used and shared? How should those potential outcomes be considered in the design of a PPD?
6. Are there ways a PPD could be designed to facilitate usefulness in emergency response training or in emergency preparedness planning?
7. How could videos of the demonstrations or data collection be used to help improve stakeholder confidence in SNF transportation casks? What would you or other stakeholders need to see in the videos in order to have confidence in the demonstration results? Would videos produced by an independent organization (e.g., a news outlet) be more credible than videos produced by DOE-NE or a DOE contractor?
8. If DOE-NE conducts a PPD, who 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?
9. One of DOE-NE's objectives in performing a PPD is to provide information regarding the transportation of SNF, thereby enabling stakeholders and the public to feel more confident and informed. Additional activities that could be employed for a PPD include opportunities for public interaction, such as road shows, displays (e.g., features of a transportation cask), exercises for first responders, etc. Please state whether you believe activities such as these would be helpful for providing transparency and building confidence.
10. What is your opinion of international participation or collaboration (e.g., International Atomic Energy Agency (IAEA), nuclear waste management organizations or regulators in other countries, etc.) in a PPD? In what ways would international collaboration impact stakeholder trust and confidence?

ADDITIONAL INFORMATION

For parties interested in providing additional feedback, the following paragraphs give more in-depth information about potential demonstrations that DOE is considering. In addition to questions 1 through 10 listed previously, questions 11 through 20 follow this additional background section. You may include your responses to these questions along with your 1 through 10 responses. As in the previous section, you may answer as many or as few questions as you would like.

As previously noted, DOE-NE's primary goal of a PPD is to build public trust and confidence in the safety of SNF transportation casks and SNF transportation by rail, heavy-haul truck, and barge. The conditions that a SNF transportation cask must withstand are prescribed by regulations set forth by the NRC in 10 CFR Part 71. Transportation casks are designed to withstand more than 99 percent of vehicle accidents, including water immersion, impact, punctures, and fires to meet these NRC requirements (see Figure 1). A PPD could be conducted to demonstrate the ability of a SNF transportation cask to withstand these hypothetical accident test conditions.

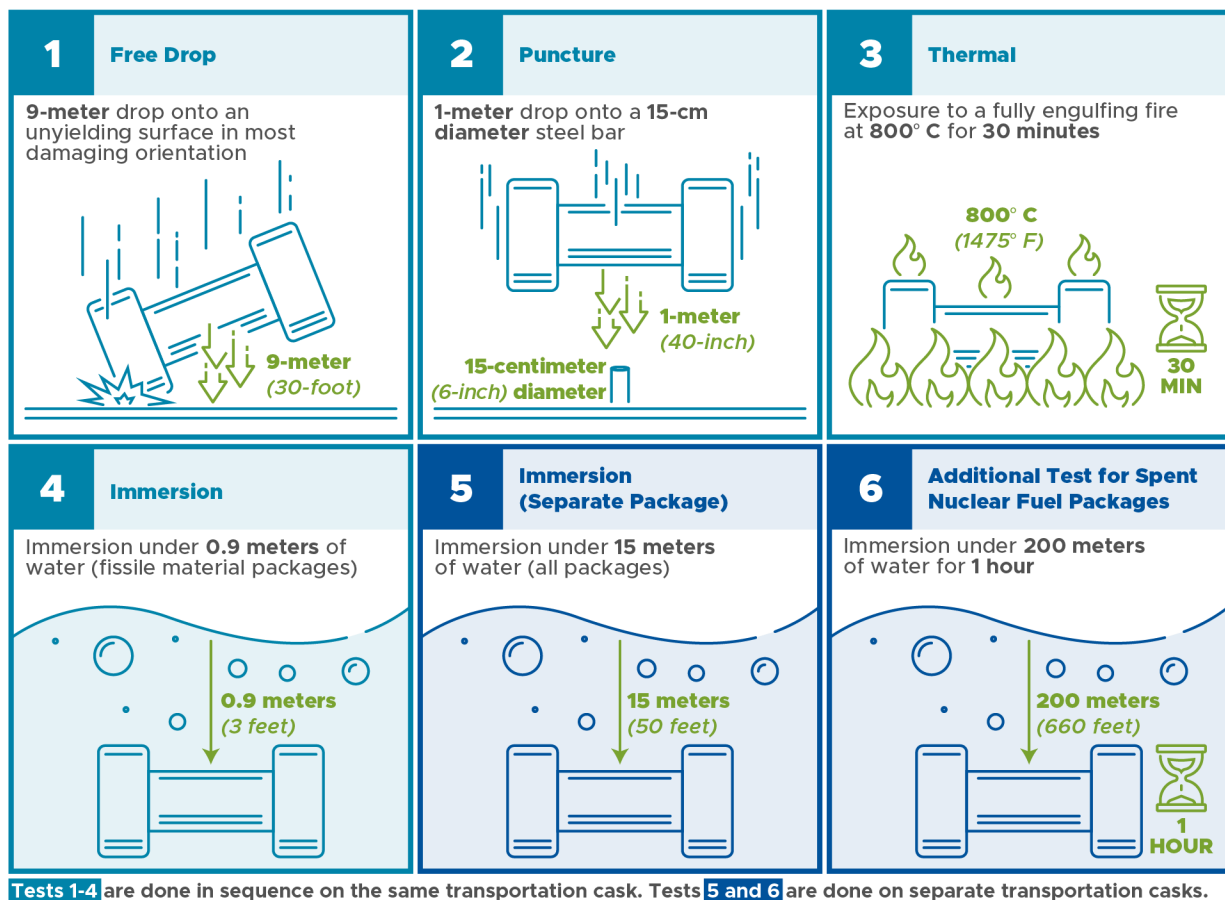


Figure 1: Tests as described in NRC's 10 CFR Part 71.

To be clear, DOE-NE is not certifying casks on behalf of NRC or calling into question the process that is used to certify transportation casks by the NRC. Rather, because the NRC's regulations provide design requirements for transportation casks, the regulatory requirements are useful to consider in the planning of potential full-scale demonstrations for a PPD.

DOE-NE could also consider conducting "scenario demonstrations" mimicking specific recognizable accident scenarios of concern to the public. Examples of such a scenario include a vehicle collision at a railroad crossing or a rail accident involving a derailment and a fire. DOE-NE could also consider a comparative scenario demonstration, such as subjecting an object in addition to a SNF cask to the same demonstrative accident conditions. For example, a demonstration could compare the damage from a 9 meter (30 foot) drop test shown in Figure 1, Box 1 (Free Drop), between a transportation cask and a different object, such as a motor vehicle.

In addition, demonstrations of cask performance under accident conditions may be useful for first responders who work in transportation corridors. As a result, DOE-NE is also exploring options for how results and videography from a PPD or inclusion of recovery operations in a PPD might be used for emergency response personnel or emergency management purposes.

The following questions address topics such as whether priority should be given to demonstrations that mimic tests described in NRC regulations or demonstrations that mimic potential accident scenarios that are more easily recognizable. The questions also encompass how videos or inclusion of recovery operations might be used for emergency personnel. Given that DOE-NE will be constrained by available funding, DOE-NE will likely need to prioritize the types of demonstrations conducted.

Question Set 2:

11. Would you prefer to see **(a)** demonstration(s) based on the tests described in 10 CFR Part 71 (those shown in Figure 1), **(b)** full-scale demonstration(s) that could be based on a realistic accident scenario(s), **(c)** both (and in which priority order, given cost constraints), or **(d)** something else. Why?
12. If you chose **(a)** or **(c)** in the previous question, how would you prioritize the various tests prescribed in 10 CFR Part 71 with respect to their ability to improve stakeholder confidence in SNF transportation? (Reference Figure 1 for information about the 10 CFR Part 71 tests.) If you chose **(b)** or **(c)** as your response above, which demonstration(s) would you prefer to see performed? For example, are there particular simulations of real-world events that DOE-NE could replicate, or are there "like-for-like" demonstrations that would be particularly meaningful (such as subjecting a different item to the same drop or fire conditions alongside a cask to compare impacts)?
13. DOE-NE intends to conduct a PPD using a SNF rail-sized transportation cask certified by NRC that likely would be relevant for future DOE SNF transportation campaigns (e.g., one that is of a high capacity and incorporates current cask

design features). There are casks currently certified for use in the United States that would meet these criteria. However, there is the possibility that more advanced or differently designed casks could be certified for use between now and the startup of DOE's large-scale transportation activities. How does this possibility affect your opinions on a PPD, including what cask DOE-NE selects for a PPD? How could the information gathered in a PPD using a currently certified cask help provide stakeholder confidence in different certified transportation casks and SNF transportation safety?

14. Based on available funding, DOE-NE will have to consider multiple factors in its selection of parameters for a PPD. Please list and rank the most important factors that DOE-NE should consider as it develops a PPD plan to maximize the ability to increase stakeholder confidence. (Examples of factors to prioritize include number and type of casks, number and type of demonstrations, constructing or modifying facilities to meet demonstration needs, data collection and instrumentation, outreach and engagement efforts, independent review, etc.)
15. If DOE-NE conducts demonstrations based on tests described in 10 CFR Part 71, how important is ensuring that the facilities or sites can exactly replicate the tests and conditions described? Would conducting demonstrations approximating, but not replicating, the tests and conditions in 10 CFR Part 71 be useful? If facilities only exist outside the United States to conduct a demonstration that can exactly replicate the tests and conditions described in 10 CFR Part 71, are there mitigating conditions that you would accept in order to conduct the demonstrations at facilities or sites located in the United States rather than conducting the demonstrations at an available facility outside the United States?
16. It is expected that rail will be the primary mode of transport used by DOE-NE for large-scale transportation of SNF. However, there may be instances where SNF casks will need to be transported for short distances by heavy-haul truck or transported by barge. Please indicate which of these three modes of transport is most important to you for a PPD. Please provide reasoning for the order of priority chosen and indicate what type of demonstration(s) would help provide confidence in each of those transport modes.
17. For the purposes of a PPD, would you like to see a demonstration of retrieval capabilities? For example, would an immersion (in water) demonstration followed by a retrieval of the submerged cask add to stakeholder confidence? Please explain and, if possible, provide any further examples of post-demonstration recovery capabilities that would aid in stakeholder confidence.
18. 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 (for example, government, public/private university, private sector, and/or non-governmental organizations)?

19. In addition to cost and capability factors, are there other factors that DOE-NE should consider when selecting potential testing facilities, sites, and services to conduct demonstrations?

20. The design of SNF casks and the computer modeling involved in the regulatory certification process are technically complex and not well known to many stakeholders. In your opinion, how helpful or important is it for a PPD and DOE-NE's outreach regarding a PPD to include information on the computer modeling practices that are employed in the certification process and their relation to physical testing (e.g., scale model testing)? Is there information or a demonstration that could be conducted as part of a PPD that could alleviate concerns about using computer models and/or scale model testing?

RESPONSE GUIDELINES

If you would like to participate, you're invited to **email your responses to the questions in this document (preferably, numbered according to the questions being answered) to DOE-PPD@id.doe.gov by January 31, 2025**. You do not need to answer all the questions – you can answer as many or as few as you would like. In your email, please include your name (you may choose to state “anonymous”) and, if applicable, your organization. As the subject line, please state “PPD Responses.” Responses are welcome from individuals or from organizations (such as companies, universities, or groups). Responses to the RFI/SSN published on July 31, 2024, do not need to be resubmitted and will not be published in full, as specified in the RFI/SSN. However, respondents are welcome to provide more feedback in response to the questions in this additional information request opportunity.

For transparency, DOE plans to post all comment documents received in response to this additional information request opportunity in their entirety following the close of this additional information request comment period. Any person or organization wishing to have their name, address, email address, or other identifying information withheld from the public record of comment documents must state this request prominently at the beginning of any comment document, or else no redactions will be made.

During the additional response period, DOE-NE will offer webinars to share information and answer questions about PPD planning and this information request. Opportunities for these sessions will be posted on the PPD information resource portal at <https://curie.pnnl.gov/DOE-PPD>. The PPD information resource portal also provides background documents to assist potential respondents in understanding package performance testing and SNF transportation cask certification as well as a link to sign up for email updates on the PPD project.