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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Washington, DC 20004-2901



January 6, 2022

The Honorable Jennifer Granholm
Secretary of Energy
US Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Granholm:

The Department of Energy's (DOE) *Nuclear Safety Management* rule, 10 Code of Federal Regulations (CFR) 830, specifies that onsite transportation of nuclear materials at Department of Energy sites may be conducted either in accordance with Department of Transportation (DOT) regulations or under a documented safety analysis known as a transportation safety document (TSD). Following a safety review of the Los Alamos National Laboratory's (LANL) TSD, the Board's staff identified significant safety issues with both the LANL TSD and the safe harbors for safety analysis of onsite transportation specified in 10 CFR 830.¹

Onsite Transportation Safe Harbors. The safe harbors identified in 10 CFR 830 for preparing documented safety analyses of onsite transportation activities do not have corresponding requirements or detailed guidance for meeting several 10 CFR 830 requirements. For instance, DOE Guide 460.1-1 lacks clear safety guidance regarding hazard analysis, accident analysis, and selection of controls. 10 CFR 830 also requires the development of technical safety requirements for Hazard Category 1, 2, and 3 nuclear facilities; however, the onsite transportation safe harbors do not discuss technical safety requirements.²

¹ 10 CFR 830, Appendix A to Subpart B, *General Statement of Safety Basis Policy*, Table 1, identifies DOE Order 460.1D, *Hazardous Materials Packaging and Transportation Safety*, and DOE Guide 460.1-1, *Implementation Guide for Use with DOE O460.1A, Packaging and Transportation Safety*, as the safe harbors for onsite transportation activities that do not include transportation of materials of national security interest.

² In 2016, DOE revised DOE Order 461.1, *Packaging and Transportation for Offsite Shipment of Materials of National Security Interest*, adding an appendix to describe an acceptable methodology for developing and maintaining a documented safety analysis for *offsite* transportation activities that complies with the safety basis requirements of 10 CFR 830. The appendix gives detailed requirements related to hazard identification, accident analysis, and the derivation of hazard controls and safety management programs, and notably states the documented safety analysis must "comply with the requirements of DOE Standard 3009-2014, except for deviations that are specifically identified in this Appendix."

Additionally, the onsite transportation safe harbors require TSDs to demonstrate an equivalent level of safety to DOT and Nuclear Regulatory Commission (NRC) offsite transportation regulations but do not provide a clear definition of equivalent level of safety. DOT and NRC regulations rely on credited packages to survive pre-defined normal or hypothetical accident conditions. The onsite transportation safe harbors do not clearly define what would constitute equivalency to this safety standard. Therefore, it is not clear how DOE and National Nuclear Security Administration (NNSA) field office personnel responsible for reviewing and approving TSDs assess whether they demonstrate equivalent safety and whether the risk of onsite transportation activities is acceptable. This safety concern is exacerbated by the fact that DOE Standard 1104, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*, does not discuss TSDs.

LANL TSD. The LANL TSD briefly describes credible accident scenarios with a list of safety controls for each event; however, it does not contain a safety analysis of the effectiveness of the control set for each specific accident scenario. Instead, the TSD provides generic safety functions for each safety control and a high-level qualitative evaluation of the effectiveness of the entire suite of safety controls, which the TSD refers to as a barrier analysis. As an example, the tie-down system is credited as a preventive safety control in the event of a fire following a leak or spill of vehicle fuel due to operator error. However, its generic safety function is to reduce the likelihood of a release by restricting the movement of packages, and thus is not effective at preventing the fire scenario for which it is credited. Additionally, the TSD does not contain any quantitative safety analysis of credible accident scenarios, nor does it analyze all transportation-related hazards. For example, most onsite transfers at LANL occur along the Pajarito corridor, and the cliffs along this route are not mentioned or analyzed in the TSD.



Example of a drop off along the Pajarito corridor

The Board's staff reviewed a selection of other sites' TSDs, including those from Lawrence Livermore National Laboratory, Hanford, and the Nevada National Security Site. In contrast to the LANL TSD, these sites used methodology from DOE Standard 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*, in developing the hazard analysis, accident analysis, and control selection in their TSDs, including quantitative risk analyses.

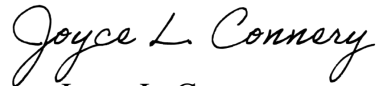
During the review and approval of Revision 3 of the LANL TSD in 2007, personnel from the NNSA Packaging Certification Division concluded the LANL TSD did not provide an adequate level of safety analysis and submitted a differing professional opinion to the approval of the TSD. The associated safety evaluation report contained several conditions of approval, including a complete prohibition of traffic other than convoy vehicles during transfers exceeding Hazard Category 2 radioactive material thresholds, and direction to perform a quantitative risk analysis by the next annual update. However, the Board's staff found that the current revision of the LANL TSD contains neither the traffic prohibition nor any quantitative risk analysis. Given the allowable material-at-risk for each transfer and the proximity of the transport routes to the site boundary, the unmitigated consequences from various credible accidents are high to both workers at LANL and the off-site public.

Request for DOE Report and Briefing. Based on the staff's safety review, the Board is concerned with the adequacy of the LANL TSD and the onsite transportation safe harbors. Pursuant to 42 United States Code (USC) § 2286b(d), the Board requests a briefing and written report, within 120 days of receipt of this letter, that address the following:

1. DOE's perspective on how the LANL TSD meets 10 CFR 830 requirements for adequately analyzing and controlling hazards associated with onsite transportation activities, and whether compensatory measures are warranted to ensure the safety of ongoing onsite transportation activities at LANL.
2. DOE's perspective on how LANL implemented the safe harbor in developing its TSD, compared to other sites which supplemented the onsite transportation safe harbor methodology with more thorough and detailed methodology from DOE Standard 3009.
3. DOE's perspective on the flow down of all applicable 10 CFR 830 requirements into the onsite transportation safe harbors, and whether DOE is considering a revision to the onsite transportation safe harbor directives similar to the revision to DOE Order 461.1.
4. How DOE and NNSA field office personnel evaluate whether the risk of onsite transportation activities is acceptable when approving TSDs, given the requirement to provide equivalent safety to DOT and NRC transportation regulations.
5. How the safety requirements and guidance in DOE Standard 1104 apply to TSDs, and if any supplementary guidance or training has been provided for field office personnel responsible for reviewing and approving TSDs.

6. The current level of engagement between headquarters elements responsible for DOE's onsite transportation safe harbors and field office elements responsible for reviewing and approving site TSDs at DOE Environmental Management and NNSA sites.

Sincerely,

A handwritten signature in black ink that reads "Joyce L. Connery". The signature is written in a cursive style with a large initial "J".

Joyce L. Connery
Chair

c: Mr. Ted Wyka
Mr. Joe Olencz