

**U.S. DEPARTMENT OF ENERGY
NUCLEAR ENERGY RESEARCH INITIATIVE
ABSTRACT**

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Institution: Sandia National Laboratories

Collaborators: None

Title: Experimental Investigation of Burn-up Credit for Safe Transport, Storage, and Disposal of Spent Nuclear Fuel

The performance of the methods used to assure criticality safety must be demonstrated through the use of benchmarks applicable to the configuration being analyzed. The research proposed here, when completed, will provide benchmark critical data in systems that are directly relevant to fuel configurations used in the shipping, storage and disposal of spent nuclear fuel.

As nuclear fuel is burned, the composition of the fuel changes due to the depletion of the actinide species and the buildup of fission products. Accounting for this effect will result in significant cost savings in the handling of spent nuclear fuel. A key issue related to this course of action is the verification of the impact of the composition of the spent fuel on the system reactivity. The verification of the effects of the fission products is especially important. The critical experiments proposed here directly address this issue. The approach will be to construct a critical assembly using low-enriched fuel, design the critical experiments based on the data needs of the spent nuclear fuel shipping, storage, and disposal community, and perform relevant critical experiments. Through this approach, benchmark critical data directly applicable to the handling of spent nuclear fuel will be obtained.