

DESIGN EVALUATION OF A LARGE CONCRETE CASK TO MEET IP-2 REQUIREMENTS

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ABSTRACT

The Melton Valley Storage Tank (MVST) Storage and Disposal Cask is a large, concrete package that was originally designed to store radioactive waste, as a solid, on site. The contents consist of waste material thoroughly mixed with cement and solidified in a 20,000-lb monolith, contained in a steel shell. These monoliths are loaded into 40,000-lb outer concrete shields with 10,000-lb concrete lids. Currently, there are approximately 180 MVST casks on the Oak Ridge Reservation which contain these monoliths.

During FY 2000, a number of the monoliths were transferred from the concrete packages to an NRC-certified lead-shielded cask and shipped to the Nevada Test Site (NTS) for disposal. This activity has resulted in (1) increased radiation exposure both when the monoliths were transferred to the lead-shielded cask and when they were unloaded and buried at the NTS and (2) high cask rental and shipping costs for the program. In addition, once the MVST casks are emptied, they will have to be shipped to NTS empty, and the monoliths would be reloaded into the cask for burial. As a result, DOE Oak Ridge has been exploring ways to ship the MVST cask with its monolith to the NTS for disposal as a unit. To do this, the MVST cask would have to be self-certified as meeting IP-2 package requirements.

The MVST cask, which weighs over 70,000 lb when loaded, was not designed initially to be shipped off-site. The concrete lid currently rests on the top of the cask body and is not fastened to it. Thus, to meet IP-2 requirements, a lid-retaining device (LRD) had to be designed and shown to retain the lid on the cask and retain the monolith within the shield under the test conditions specified for an IP-2. Using LS-DYNA, the LRD was designed and was shown that in a 1-ft drop the lid and contents would both be retained and no significant increase in radiation

levels would occur.

This paper will present the results of (1) the analysis of the LRD and the concrete shield, and (2) the full-scale test of the package..

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