

**SUCCESSFUL AND COST EFFECTIVE BULK SHIPMENTS OF DEPLETED URANIUM
OXIDE TO DISPOSAL FACILITY VIA PRIVATE GONDOLA RAILCAR TRANSPORTATION
FROM THE SAVANNAH RIVER SITE**

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ABSTRACT

Due to various Savannah River Site (SRS) missions, objectives, and directives over the past several decades, a vast quantity of Depleted Uranium in various forms has been stockpiled in several buildings in numerous areas across the SRS complex. In early CY 2003, in accordance with present SRS missions, the U.S. Department of Energy (DOE) made the decision to ship several hundred drums of Depleted Uranium Oxide (DUO) off-site to a western U.S. waste disposal facility. Under direction from the DOE, the Westinghouse Savannah River Company (WSRC), working in conjunction with MHF Logistical Solutions, Inc. (MHF-LS), safely, and cost effectively packaged, transported, and disposed of approximately 3270 drums of DUO waste material

INTRODUCTION

In November of 2002 the WSRC released a request for proposal (RFP) regarding a "Pilot" DUO disposal project. The specific scope of work described in this particular RFP involved the packaging and transportation of referenced waste material from the F Area of the Savannah River Site in Aiken, SC to Envirocare of Utah disposal facility in Clive, Utah. MHF-LS was officially awarded this DUO pilot packaging and transportation scope of work in February 2003.

PROJECT WASTE MATERIAL

The waste material packaged and transported during this project consisted solely of DUO. This material had been stockpiled in several locations in various buildings within F Area for an extended period of time, some for literally decades. Most all the project DUO was packaged in 55-gallon steel drums. Due to the deterioration of some of the buildings in which this DUO was stored and the duration of time that this material had been stored on-site, the drums themselves had begun to show signs of serious deterioration and therefore could not be certified as a Department of Transportation (DOT) compliant shipping package.

BULK PACKAGING OF PROJECT WASTE MATERIAL

Due to the fact that the DOU was presently contained in non-compliant shipping packages the need for a safe, cost effective, DOT compliant shipping package presented a special challenge. MHF-LS along with several WSRC technical and operational support personnel performed an extensive analysis of pertinent project data and determined that bulk packaging the project waste material for rail transportation by gondola cars was the most reasonable, safe, cost effective, and DOT compliant option. After extensive analysis by both MHF-LS and WSRC, MHF-LS presented WSRC with several bulk packaging options they felt were appropriate for this particular DUO packaging and transportation project. The WSRC opted for a packaging and transportation combination of the soft-sided, Super Load Wrapper (SLW) and MHF-LS private 105 Ton Capacity low-sided gondola railcar.

OPERATIONS

Waste Material Preparation for Packaging/Transport

At the request of the disposal facility and to aid in safe, cost effective packaging and conveyance loading operations, the 55 gallon drums of DUO were banded to wooden pallets. Utilizing a select group of WSRC waste operations personnel, 4 drums were metal banded to a structurally engineered Oak 4' x 4' wooden pallet. Each drum weighed an average of approximately 1,650 lbs, with the total gross weight of each pallet being approximately 7,000 lbs. The loaded pallets were stored in multiple locations within the area ready for transport conveyance loading operations.

Conveyance Loading of Waste Material

Based on a custom designed SLW/Gondola Railcar load plan developed by MHF-LS and approved by WSRC, the waste material loading operations began in April 2003. WSRC waste operations personnel installed the SLW as well as other ancillary items in the specialized 66' gondola railcar and then loaded the pallets individually into the SLW via a 40-ton mobile crane. The volumetric and weight capacity of this specialized rail conveyance proved to be optimal for this material due to the physical size and arrangement of pallets in the car as well as the density of the DUO material itself. The load plan and packaging procedures were monitored, reviewed, and evaluated by project personnel and were adjusted and refined as needed.

Both volume and weight per transport conveyance was maximized utilizing this specialized equipment and material load plan. Each conveyance transported an average of 30 pallets (120 drums), which equaled approximately 210,000 lbs., including the weight of the packaging and blocking/bracing materials. Based on industry standards and DOT over the road trucking regulations regarding allowable legal gross truck weight, this bulk/rail shipping option produced an approximate 4.7: 1 Truck to Rail ratio, which created substantial cost savings to WSRC as opposed to an over the road trucking campaign. In addition, transportation safety was greatly enhanced by reducing the number of conveyances involved and by the use of rail Transport.

TRANSPORTATION

A total of 27 specialized, privately operated, low-sided gondola railcars, associated SLWs and applicable blocking & bracing materials/equipment, began arriving on-site for use by WSRC in April 2003. After all required training and equipment and design inspections were successfully completed, loading operations began and the first shipment departed from the Savannah River Site in South Carolina bound for Envirocare in May 2003. The 3,270 DUO drums were successfully transported for disposal via 27-gondola railcar shipments conducted during May-August 2003.

Bulk/Rail Cost Effectiveness

When comparing the cost to perform this project by truck verses rail many factors were evaluated. These included the use of typical truck costs per mile and the net weight that a truck can transport legally. This comparison identified a 36% savings or almost \$300,000 for the 27 shipments by rail verses the truck shipments that would have been required to transport the same quantity of drums. This comparison does not include the cost to properly prepare the drums for shipment via truck. Because the drums were not DOT compliant, additional costs would have been incurred to repack or overpack the non-compliant drums. This extra cost, that was not included in the analysis, would have increased the savings that were created by using rail to an even greater amount. While the calculations used to arrive at these conclusions are based on the total waste volumes shipped as related to the WSRC DUO project and may or may not be

indicative of other specific projects, it is indicative of the cost savings available with the appropriate use of packaging, equipment and rail transportation.

CONCLUSION

This WSRC DUO pilot packaging and transportation project was successfully completed in late summer 2003. The project was completed safely and well ahead of projected schedule. Project success can be greatly attributed to an excellent working relationship between the WSRC and MHF-LS. The problems that often occur during a pilot project such as this were resolved promptly and effectively as a result of the dedication and cooperation of all those involved. Lessons learned identified additional keys to success regarding this project which involved extensive and accurate "front end" project planning, attention to detail from all parties involved from the top down, hands-on management involvement, and the innovative implementation and integration of technical expertise and associated specialized equipment.

REFERENCE

- 1 W.H. Dearman Westinghouse Savannah River Company – DUO Project STR