

TECHNOLOGY@ROCKY FLATS

Demonstration & Deployment Summary

Polyurea Coating Becomes Shipping Container for Radioactive Waste



A 20-ton Lindberg furnace is removed from Building 865 as part of decommissioning efforts at Rocky Flats. The furnace,



above right, is packaged using a polyurea spray coating and ready for shipment to the Nevada Test Site for disposal.

Summary

One of the major challenges involved in closing Rocky Flats is the disposal of extremely large pieces of production equipment contaminated with radioactive or hazardous materials. Past practice has been to size-reduce the equipment into pieces that fit in approved, standard waste containers. Size-reducing this large equipment is extremely labor-intensive, exposing workers to significant industrial, chemical and radiological hazards. Cost and schedule are also significantly impacted.

A proposal in early 2002 to coat equipment with a polyurea spray proved to be effective in meeting the definition of a Strong-Tight Industrial Package. This allowed the equipment to be transported to a waste receiver site intact on a flat bed trailer. Some extremely large pieces of equipment at Rocky Flats will still require size reduction to meet road size limitations. But the use of polyurea spray coating to provide the packaging of a majority of the large pieces of equipment at Rocky Flats is expected to significantly reduce worker exposure to hazards and pare down project cost and schedule.

The Need

The size reduction and waste packaging of large pieces of production equipment from plutonium and beryllium processing facilities at Rocky Flats presents enormous challenges with respect to safety, cost and scheduling. Size-reducing and packaging certain pieces of large equipment can take up to several weeks. In addition, no standard method of size reduction of contaminated equipment exists, requiring unique engineering approaches that increase cost and schedule. The manufacture and procurement of specially constructed containers for each oversized object is also cost-prohibitive.

The Demonstration

Technical leads for Rocky Flats Building 883 investigated the potential use of a sprayable polyurea plastic coating for use as a Strong-Tight IP-1 package.

The physical properties of a well formulated polyurea plastic are ideal to function as a surface packing container. It is resistant to punctures and tears and imperme-

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able to moisture and other environmental stresses.

One of two 20-ton furnaces from Building 865 was selected for use in the demonstration project. A base platform shaped to match the footprint of the furnace and lipped on all sides was sprayed with a polyurea coating, forming the base. After the furnace was placed on a platform, shrink-wrap plastic was applied to cover the entire furnace and attached to the base, creating a contiguous plastic cover for the furnace and base. The plastic film was shrink-wrapped using a propane heat gun, and the entire surface was inspected to ensure total coverage.

Using the shrink-wrap surface as a continuous substrate, polyurea was sprayed over the entire work area to a thickness of $\frac{3}{16}$ to $\frac{1}{4}$ inch. For superior performance, workers applied a light, thin initial coat followed by additional spray coating to the specified thickness. After a technical review of this method of packaging, the Department of Transportation and the Nevada Test Site approved the use of polyurea plastic for packaging low-level waste for shipment to NTS.

Summary

The demonstration using polyurea plastic was successful. Aggressive size-reduction efforts were eliminated for both furnaces. Nearly all safety and health hazards associated with size-reducing and packaging were also eliminated. Cost savings for two furnaces exceeded \$30,000. This is the first known use of a polyurea spray as an industrial package for low-level radioactive and hazardous equipment in the DOE Complex. The process is expected to save millions of dollars in the closure of Rocky Flats. For instance, the process is currently being reviewed as a method of packaging the Advanced Size Reduction Facility (ASRF) in Building 776/777, which is a large, contaminated waste compactor. The savings estimated for using polyurea spray coating on the ASRF is \$100,000. For more information on polyurea spray coating as a low-level waste packaging method, contact Kent Dorr, Kaiser Hill Company, (303) 966-6034.



Plastic shrink wrap covering the furnace is secured to the base platform. Shrink wrapping is performed with a heat gun to provide a contiguous surface prior to applying the polyurea spray coating.



Workers apply the spray coating, first in a light, initial coating followed by a second coating at the specified thickness.



The furnace is loaded onto a flat-bed truck for shipment to the Nevada Test Site.



Technology Supporting the Path to Closure

For more information about Technology at Rocky Flats, contact David Maloney, Kaiser-Hill Company, (303) 966-7566, or Gary Huffman, DOE, Rocky Flats Field Office, (303) 966-7490

