

# **A**PPPLICATION PROFILE

## Automated Transport, Staging and Retrieval of Radioactive Waste

**Increase throughput volume  
and reduce radioactive exposure**

The staging of storage drums full of radioactive waste at Waste Receiving and Process Facilities (WRAP) typically requires workers be in close proximity to the drums, exposing them to a potentially significant source of radiation. Currently, drums containing radioactive and/or mixed wastes are staged on pallets at the WRAP facility and are stored in fixed-storage racks which are loaded and unloaded by forklift. The operation includes drums that have just been received, as well as drums that have been through nondestructive evaluation and/or the process area and are waiting for shipment. Loading and unloading of palletized drums from the storage racks is currently done with man-operated fork trucks. Potential employee radiation exposure estimates project a cumulative exposure of 4 times the site control limit of 1 rem per year for workers in this area. Worker health and safety, operational costs, inventory control and potential accidents were issues that were considered when investigating automation of the WRAP staging operations.

As a result of these investigations an Automated Storage Retrieval System (ASRS) was installed in the WRAP facility to address the issues of exposure to radiation, cost savings, enhanced inventory control, and safer operations. The technology uses a computerized control system to transport, stage, and retrieve palletized drums. The ASRS replaces forklift operations for loading and unloading palletized drums into storage racks, reducing human exposure to radiation associated with that activity and significantly reducing potential forklift accidents.

The ASRS is essentially a large storage rack with 3 levels of bins and 18 bins per level for a total of 54 bins. Each bin holds one pallet loaded with drums. The bins are accessed by the Storage Retrieval



Machine (SRM), which travels down the aisle on a rail to the specified bin location and deposits or picks up a pallet loaded with drums.

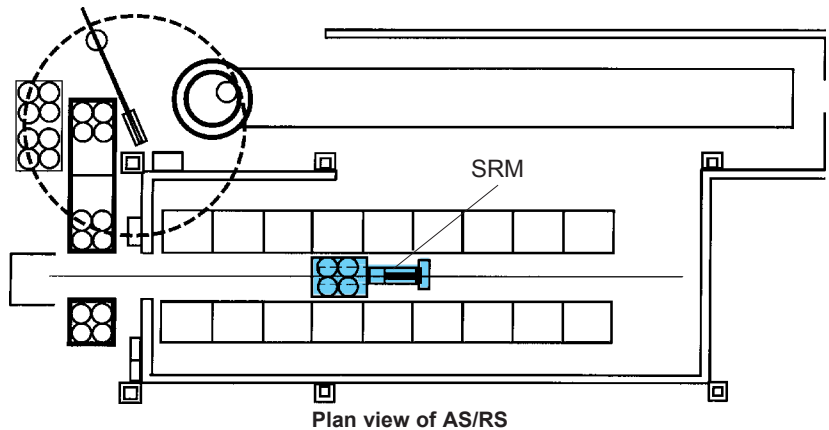
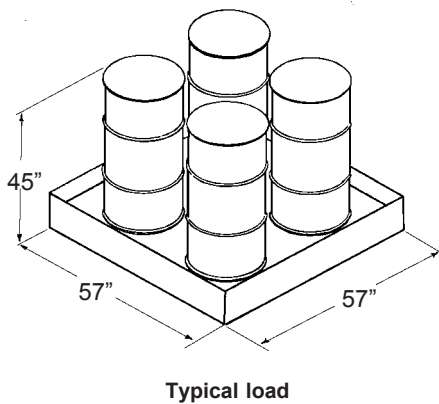
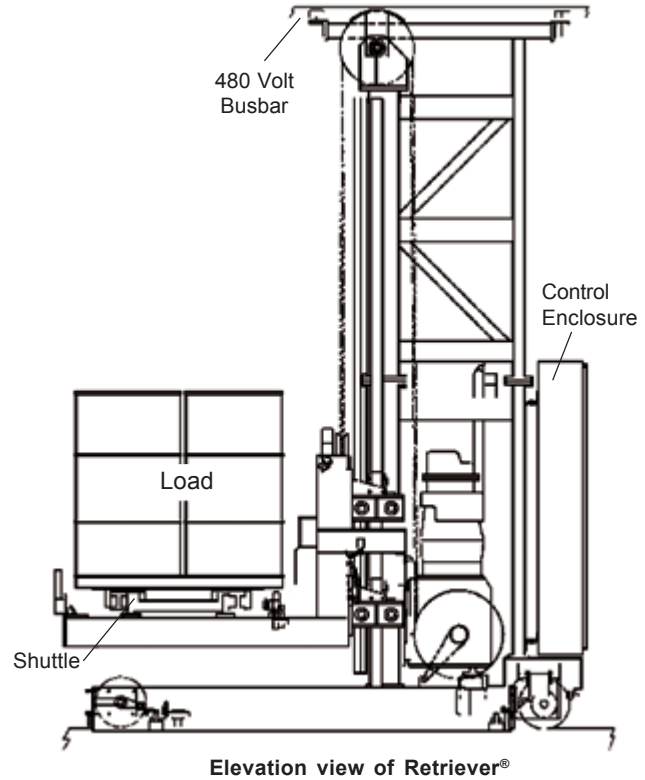


The SRM carries the loaded pallet away from the staging area (which has higher radiation dose rates) and sets it down on the pallet stand for the forklift operator to pick up. The throughput rate is expected to reach approximately 6,800 drums of waste each year when fully operational.

The S/R can be controlled manually or automatically. During normal operation the SRM responds to load movement requests from the computer system which records all pallet locations to facilitate immediate access to the proper bin and provides an accurate inventory of waste drums. Accurate inventory control and tracking are major benefits of an ASRS. Compared with the baseline scenario of an operator using a barcode reader, the automated tracking capability eliminates the possibility of human error regarding data feeds into the material control system. The ASRS's ability to automatically capture data also eliminates delays that occur when data must be manually tracked via barcode reader.

The implementation cost of the ASRS will result in a lower total dollar cost over the 30 year life of the facility. By automating the material handling operations the annual operating cost of the facility will be reduced, the clean up cost due to accidents involving mishandling of waste containers will be minimized and health /safety related expenses will be reduced, making the ASRS an economical option for this application.

The deployment of the ASRS at this facility has resulted in reduced employee radiation exposure, decreased potential for material-handling accidents, cost savings through lower operating costs and improved inventory control and tracking of the waste drums that are staged through this facility.



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