HLW Canister Relocation & Storage

Heatherly Dukes, Joe Ebert, Dan Meess, Lettie Chilson, David Kurasch, Cynthia Dayton, *CH2MHILL B&W West Valley, LLC*
Mark Bellis, *US-DOE-West Valley*

CH2MHILL • B&W West Valley, LLC
West Valley Demonstration Project

West Valley Demonstration Project

Project Overview

Construction of a high-level waste interim storage system was initiated at the West Valley Demonstration Project near Buffalo, New York in 2013. This system will provide outdoor interim storage capacity for 278 canisters of vitrified waste that has been stored within the facility for more than a decade.

Since continued storage of the canisters in the Main Plant Process Building is no longer practical, this project is being undertaken to allow the waste to be moved to a more suitable on-site location. The HLW storage system was designed by NAC International and constructed using specialized vendors and local labor. Canister relocation is scheduled to begin in 2015.

Strategy

Use "off-the-shelf" commercial dry fuel storage system design, modified for HLW storage

- Robust reinforced concrete storage casks for interim passive storage
- HLW canisters will be packaged and prepared for off-site shipment

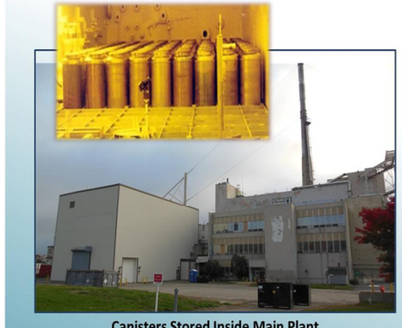
Challenges

Existing configuration requires modifications to prepare and relocate canisters

- Surface contamination on canisters
- Infrastructure upgrades required to support relocation
- Multi-year project due to funding limitations

Benefits

- Maximizes use of off-the-shelf technology
- Multi-packaging configuration reduces future handling and shipping costs
- Closed storage cask design eliminates potential for dose rate "hot spots"
- Low-dose storage (<1 mrem/hr at 1 meter)
- Passive storage design is virtually maintenance-free
- Design, fabrication and licensing activities meet high nuclear quality assurance standards
- System interfaces with NRC Type-B licensed shipping casks



Canisters Stored Inside Main Plant

Vitrified HLW Canisters

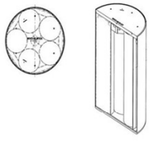
Vitrified waste was produced at the WVDP between 1996-2002

- 275 production canisters
  - 10' tall; 2' diameter
  - 2,665 R/hr average
  - 1,100 - 7,460 R/hr range
- 2 evacuated canisters and 1 end-of-process canister
- 1 container with miscellaneous debris

Canister Decontamination

Decontamination methods are being tested on the stored canisters to evaluate their efficacy for removing radioactive particulate on the tops of the stored canisters. The outcome of the testing will be used in determining a path forward for canister decontamination.

Microfiber Mop Method



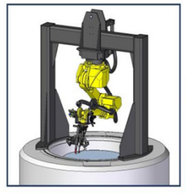
HLW Overpack

The HLW overpack is designed to maximize the containment capacity of the canisters. The five-compartment inner basket holds five canisters stable and facilitates direct loading of the package in a shipping cask.

- 5-compartment inner basket
- 304/304L stainless steel construction
- 3/8-inch walls; 2-inch bottom plate; 4-inch thick lid
- 7.25 ton unloaded weight
- Designed for direct loading into NAC-STC shipping cask

Overpack Welding

The loaded stainless steel overpack will be remotely welded and weld integrity verified.



Lid To Be Remotely Welded on Overpack

Vertical Storage Casks (VSCs)

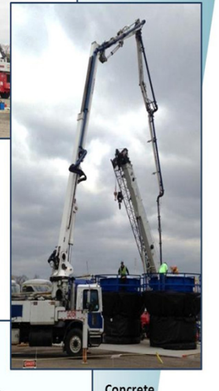
Steel-lined reinforced concrete storage casks designed for a minimum 50-year life-span. Cask liners are fabricated off-site and shipped to the WVDP for concrete fabrication. The first eight casks were fabricated in 2013.

- Modified SNF cask design with no ventilation ports
- Unloaded weight 59.6 tons
- Loaded cask weight 87.5 tons

Liners were fabricated off-site and delivered to the WVDP

Reinforcing steel

Upright liners with first form in place



Concrete placement

The first 8 Concrete Vertical Storage Casks

Cask Movement Planning

Building and infrastructure configuration, contamination control and storage cask weight are major considerations in planning for storage cask movements. All equipment and pathways between the current storage location and the HLW Storage Pad are under evaluation.

Infrastructure: Cranes, Cameras and Tooling

The HLW Relocation Project will involve prolonged use of the lifting equipment in the current storage area. Evaluations are underway to identify required maintenance and upgrades to support canister removal and overpack loading.

Floor Loading Evaluations

The structural capacity of the floors involved with loaded cask transport is under evaluation. A video inspection and soil samples are part of the investigation that will identify required modifications.

Sampling and analysis of soils beneath the Equipment Decontamination Room

Haul Path

The loaded storage casks will travel ½ mile from the current storage location to the HLW Storage Pad. The travel pathway is being evaluated to identify underground utilities and drainage features that will require modification for safe transport.

Geotechnical studies have been conducted along the site roadway

HLW Storage Pad Construction

Pad engineered for storage and future removal of loaded storage casks. Area excavated to native soils, backfilled and compacted. Reinforced concrete pad and approach apron, adjacent crane pads and perimeter lighting and security features.

Main Pad

- 144 feet by 110 feet by 3-foot-thick
- 133 tons of reinforcing steel, 1,800 cubic yards of concrete

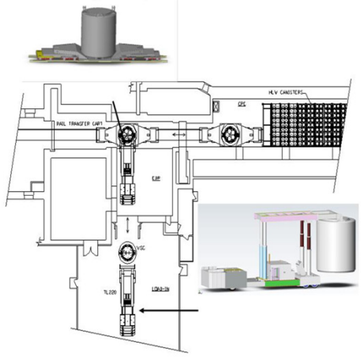
Approach Apron

- 98 feet by 170 feet by 18-inch thick
- 110 tons of reinforcing steel, 900 cubic yards of concrete

Five separate concrete placements and more than 300 concrete deliveries were involved in completing the HLW Storage Pad and Approach Apron.

Cask Loading and Handling

The canisters will be loaded into HLW Overpacks that are preloaded in the VSCs. Loaded VSCs will be moved into the Load in/ Load Out area, where the overpacks will be welded shut and the VSCs sealed. Loaded VSCs will then be transported along a ½ mile on-site roadway to the HLW Storage Pad. Specialized cask handling equipment will be used inside the current storage facility and outdoors.



A specially-designed rail cart and a TL220 cask handling vehicle will be used to manipulate and position the casks inside the building.

Transport and Cask Placement

A tow tractor and A-frame crane will be used to transport the loaded casks from the current storage location to the HLW Pad. An approach apron facilitates cask placement. The pad is equipped with adjoining crane pads to facilitate cask removal for future off-site shipment.

A tow tractor and A-frame crane for on-site relocation.

HLW Interim Storage

The packaged canisters will remain in passive storage on the secure pad until a federal HLW repository is available.

The fully-loaded pad will appear similar to the SNF storage pad shown above. The HLW Overpacks are designed for off-site transport via NAC's Storage and Transport Cask, pictured at right.