The Buffalo News

Demolition at toxic West Valley is on track, but moving slowly – by design

By T.J. Pignataro | Published January 9, 2018 | Updated January 9, 2018

WEST VALLEY – The building where the most highly radioactive materials at the West Valley Demonstration Project were once handled is being torn down.

The vitrification plant is where 600,000 gallons of liquid nuclear waste were turned into glass cylinders in the late 1990s and early 2000s. The cylinders were then packaged in fives and welded into steel canisters before being stored under 21-inch thick concrete casks and relocated to another spot on site.

In mid-September, contractors started peeling away the outside of the steel and sheet metal exterior of the building and the roof. That work wrapped up in early November, said West Valley officials.

“The (contractor) is making great progress with the safe completion of the first phase of this facility’s demolition,” said Bryan Bower, project director for the U.S. Department of Energy. “This accomplishment allows our team to continue its work in the completion of site demolition activities.”

West Valley was the nation’s only commercial nuclear reprocessing plant.

The waste was created when the site was operated by Nuclear Fuel Services between 1966 and 1972.

Workers perform some pre-demolition procedures in the vitrification building. (CHBWV)

Some of the most radiologically toxic elements at West Valley include cesium, strontium, thorium and plutonium. Thorium-232 is its longest lasting element. It has a half-life of more than 14 billion years.

The demolition of the 10,700 square-foot heavily fortified concrete cell where workers once turned highly radioactive waste into glass is now underway.

The 50-foot-high concrete and rebar-reinforced cell – with walls and windows up to 4 feet thick – is being taken down using shears and an excavator with a pneumatic hammer.

Officials said the process is slow and deliberate for a reason.

“The team is here to perform all work safely and compliantly,” said Joseph Pillittere, West Valley’s manager of communications.

Because it contains higher radiation levels than the outside shell of the building, an epoxy-like substance called Durasoil is sprayed onto the concrete as it is chiseled away to prevent any of the material from escaping.

The debris is carefully packaged into containers, which are shipped by rail to a certified landfill out west.

About 6,700 tons of low-level debris is expected from the demolition, officials said.

The main plant also will be demolished. Crews are working to deactivate the utilities in the plant, along with completing asbestos abatement, before the building can be torn down. About 80 percent of that work is done, Pillittere said.

The main plant at the West Valley Demonstration Project is also slated for demolition. (T.J. Pignataro/Buffalo News)

The demolitions are part of the first phase of decommissioning the West Valley site.

Other tasks involved in this phase include:

• Relocating 278 high-level waste casks to an outside concrete pad, work that was finished a year ahead of schedule in November 2016.
• Shipping low-level waste off of the site, which is more than 85 percent complete.
• Removing other ancillary facilities on the site. Of the 47 slated for demolition, 19 have been completed.

After tearing down West Valley's facilities, crews will remediate soil on the site.

The next phase, which includes making final decisions on the site's future, is scheduled to start in 2020.

Although federal law requires the high-level radioactive waste to be moved to a federal repository like the one once proposed for Nevada's Yucca Mountain, there isn't a place for it yet.

Until one is found, the waste could be stranded indefinitely on the concrete pads off Rock Springs Road.

The 16,000-square-foot, 3-foot thick concrete pad was poured in 2013. It's reported to have a minimum life span of 50 years.

(Note: The article also contained a video on Vit Demo.)

HLW CANISTER RELOCATION & STORAGE

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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 process 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 feet, 2" diameter
  - 2,865 Rihr average
  - 1,100 - 7,460 Rihr 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 can isters 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 can sters. 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; 3 inch bottom plate; 1 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

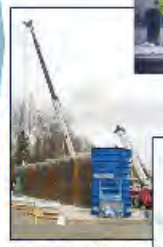
Vertical Storage Casks (VSCs)

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

- Modified ENF cask design with no ventilation ports
- Unloaded weight 55.8 tons
- Loaded cask weight 87.5 tons

Liners were fabricated off-site and delivered to the WVDP

Reinforcing steel



Upright liners with bottom 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. X-ray diffraction 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 a 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 shoreroadway

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 feet thick
- 133 tons of reinforcing steel, 1,993 cubic yards of concrete

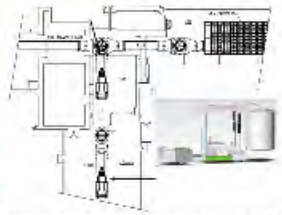
Approach Apron

- 90 feet by 170 feet by 18-inch thick
- 110 tons of reinforcing steel, 920 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 TL250 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 in NAC's Storage and Transport Cask, pictured at right.