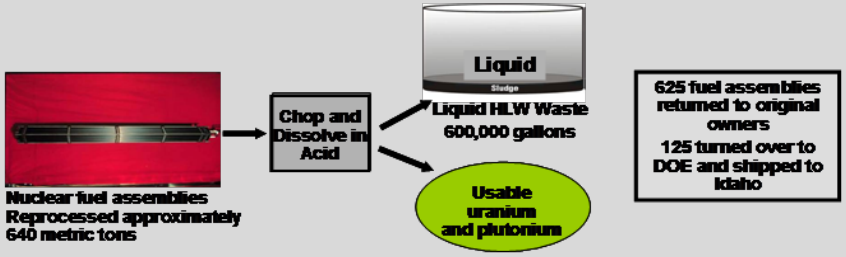
West Valley Environmental Services

Disposition of West Valley High-Activity Mixed Waste (and Orphans)

James Blankenhorn
West Valley Environmental Services LLC

History

The West Valley site was the only licensed commercial fuel reprocessing facility to have operated in the United States



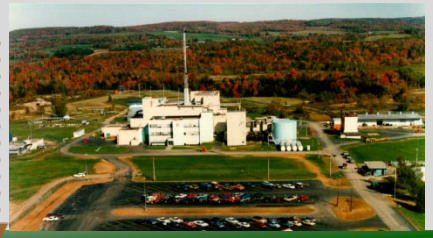
▪ Solidify the high-level radioactive waste at the Center	*Completed*
▪ Develop containers suitable for permanent disposal of the waste	*Completed*
▪ Transport the solidified waste to a federal repository for permanent disposal	*Pending Repository*
▪ Dispose low-level radioactive waste and transuranic waste	*In Progress*
▪ Decontaminate and decommission the underground high-level waste tanks, facilities and any material and hardware used in connection with the Project	*In Progress*

1962 — AEC establishes program to encourage development of non-federal spent fuel reprocessing capability in the United States

1966-72 — Nuclear Fuel Services reached agreement with Atomic Energy Commission and New York State to construct first commercial nuclear fuel reprocessing plant in United States at West Valley

Spent nuclear fuel was reprocessed, resulting in 600,000 gallons of liquid high-level waste

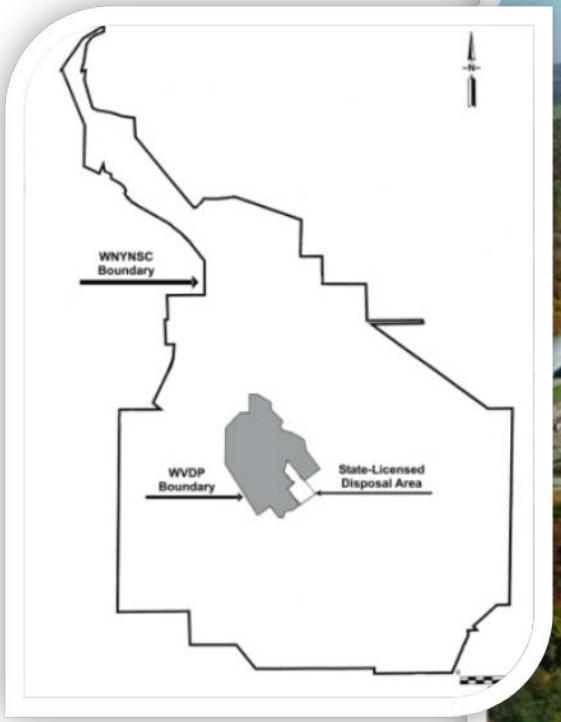
1972-76 — Reprocessing plant shut down for modifications; operations never resumed



1980 — WVDP Act signed into law by President Jimmy Carter in Niagara Falls, New York

WVES LLC

West Valley Demonstration Project



The WVDP is a 200-acre facility located 35 miles south of Buffalo, New York, as part of a 3,345-acre New York State-owned site
The project is managed by West Valley Environmental Services LLC for the Department of Energy and NYSERDA

Main Plant Decontamination

- 55 individual cells
- Removed over 1.6 km of asbestos-containing material
- Main cells:
  - Extraction Cells
    - Extracted reusable uranium and plutonium from reprocessed nuclear fuel
    - Equipment and piping removed from all three cells
  - Head-End Cells
    - Prepared used nuclear fuel for reprocessing
  - Hot Acid Cells
    - Dissolved used nuclear fuel
    - Equipment and removed and decontaminated in 2009

Waste Inventory

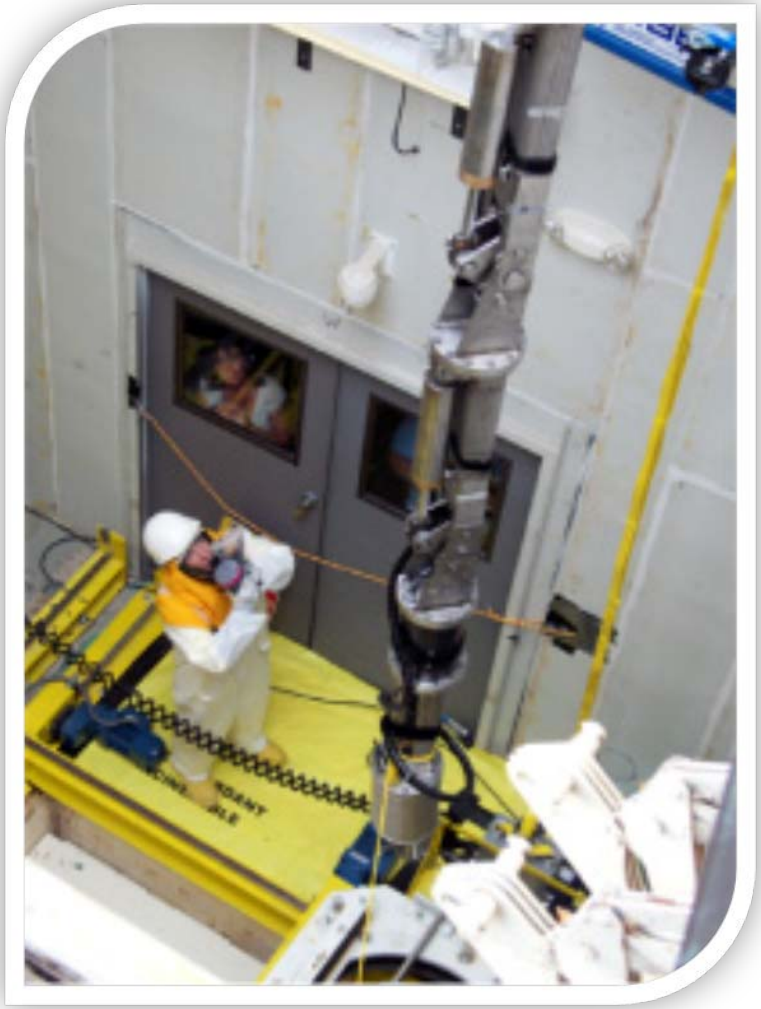
- Total ~ 6,500 m^3
- High-Level Waste Canisters (~195 m^3)
- Transuranic/Greater than Class C Waste (~2,280 m^3)
- Waste Incidental to Processing (~380 m^3)
- Low Level and Mixed Low-Level Waste (~4,000 m^3)
- Orphan Waste

Low-Level Waste

- Dispositioned 2,407 m^3 before suspending shipments in 2009
- 3,950 m^3 of low-level waste (LLW) in storage as of October 2010
- Resumed LLW offsite shipments first quarter FY11 (425 m^3 to date)
- LLW inventory includes both contact handled (CH) and remote handled (RH) and both solid and liquid waste streams
- Dose rates range from background to several R/hr on contact
- 210 m^3 of RH-LLW
- No onsite disposal capability
- Presents size and weight issues for packaging and transportation to offsite disposal at either federal or commercial facilities

Mixed Waste

- 236 m^3 of legacy waste inventory
  - Liquid and solid waste streams
  - Lead, mercury, cadmium, solvents
  - Clean-out activities and removal of hazardous material from facilities to be decommissioned
- New Generation (41m^3 from EIS Phase 1)
  - Laboratory wastes
  - Used chemicals
  - Waste from decommissioned facilities
  - Reclassified Mixed LLW (MLLW) from Transuranic (TRU) waste processing
  - Liquid waste disposition from aqueous tanks



Transuranic Waste

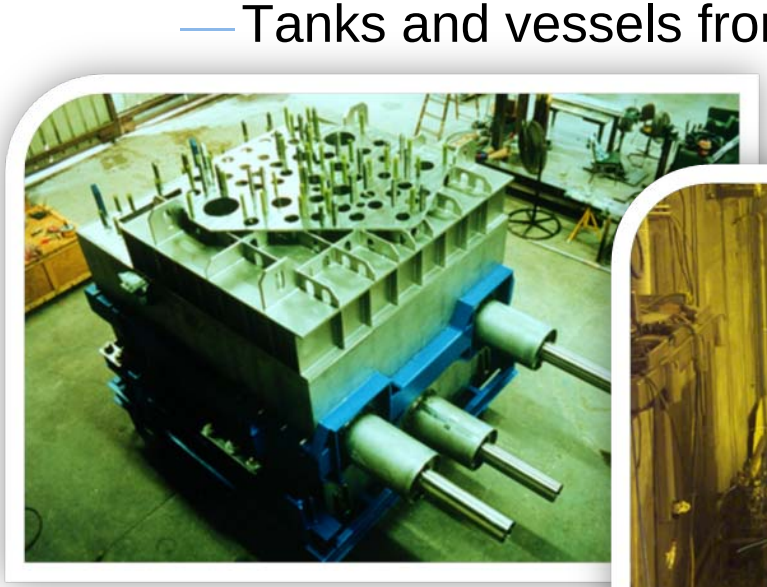
- 2,280 m^3 of Legacy TRU Waste (65% RH)
- Legacy TRU waste is processed and packaged in accordance with TRU Packaging Instructions
- All RH-TRU processed and packaged in 30-gallon containers
- No WIPP-certified program at West Valley
- Defense determination for West Valley waste on hold
- West Valley TRU waste Included in GTCC EIS
- 2.7 m^3 high-dose RH-TRU (27 containers) 450 to 4100 R/hr
- 24.7 m^3 of RH-TRU sludge (19 containers)
- 2.77 m^3 of RH-TRU liquids

High-Level Waste

- Reprocessing operations produced approximately 2,271,27 liters (600,000 gallons) of liquid HLW
- Radioactive Waste Treatment System separated LLW and HLW streams
- LLW Stream
  - Mixed with cement (1988-1995)
  - Produced 19,744 313-liter (71-gallon drums)
  - Disposed at NTS (2007)
- HLW Stream
  - Mixed with borosilicate glass using vitrification
  - Produced 275 stainless-steel canisters
  - Canisters contain over 15 million curies
  - Processed between 1996 and 2002
  - Currently stored in Main Plant Processing Building
  - Planned relocation to new on-site interim storage facility awaiting permanent federal repository

High-Level Waste

- 22 components awaiting WIR determination
- Melter component documentation submitted to DOE for review
- Remaining secondary wastes contaminated with HLW awaiting determination
  - Vitrification components
  - Tank farm pumps, risers, and spill cleanup
  - Tanks and vessels from extraction process



Problematic (Orphan) Waste

Waste requiring WIR determination	380.8 m^3
TRU/GTCC	1949.87 m^3
Spent Nuclear Fuel (2 containers)	0.3 m^3
Melter evacuated canisters (2)	1.8 m^3
RH-TRU Sludges (19 containers)	24.7 m^3
RH-TRU liquids	2.8 m^3
High-dose RH-TRU (27 containers)	3.7 m^3
Vitrification canister samples (2 containers)	0.3 m^3
HLW canisters (275)	195 m^3