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

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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
- Develop containers suitable for permanent disposal of the waste
- Transport the solidified waste to a federal repository for permanent disposal
- Dispose low-level radioactive waste and transuranic waste
- Decontaminate and decommission the underground high-level waste tanks, facilities and any material and hardware used in connection with the Project

**History**

- AEC establishes program to encourage development of non-federal spent fuel reprocessing capability in the United States
- 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
- Reprocessing plant shut down for modifications; operations never resumed
- WVDP Act signed into law by President Jimmy Carter in Niagara Falls, New York

**Completed**
- In Progress

**Timeline**

- **1962**: Spent nuclear fuel was reprocessed, resulting in 600,000 gallons of liquid high-level waste
- **1966-72**: Nuclear Fuel Services
- **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
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 m³
- High-Level Waste Canisters (~195 m³)
- Transuranic/Greater than Class C Waste (~2,280 m³)
- Waste Incidental to Processing (~380 m³)
- Low Level and Mixed Low-Level Waste (~4,000 m³)
- 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 m³ 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 (41m³ 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 m³ 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 m³ high-dose RH-TRU (27 containers) 450 to 4100 R/hr
- 24.7 m³ of RH-TRU sludge (19 containers)
- 2.77 m³ 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
    - 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

<table>
<thead>
<tr>
<th>Description</th>
<th>Volume</th>
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<tbody>
<tr>
<td>Waste requiring WIR determination</td>
<td>380.8 m³</td>
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<tr>
<td>TRU/GTCC</td>
<td>1949.87 m³</td>
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<tr>
<td>Spent Nuclear Fuel (2 containers)</td>
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<td>Melter evacuated canisters (2)</td>
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<tr>
<td>RH-TRU Sludges (19 containers)</td>
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<tr>
<td>RH-TRU liquids</td>
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<tr>
<td>High-dose RH-TRU (27 containers)</td>
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<tr>
<td>Vitrification canister samples (2 containers)</td>
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<tr>
<td>HLW canisters (275)</td>
<td>195 m³</td>
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