West Valley Demonstration Project

Permeable Treatment Wall Project

John Chamberlain
May 26, 2010
West Valley Citizen Task Force Meeting
Valley Cross Section

On the North Plateau, 10–30 feet of relatively permeable material occurs above a confining (low permeability) clay layer.

Precipitation that infiltrates in this area moves downward to the clay layer and then downgradient to the northeast. The groundwater surfaces at the edge of the plateau as seeps or springs.

Background – Groundwater Plume

- In late 1993, contaminated groundwater surfaced in ditches on the North Plateau.
- Geoprobe® investigation (small diameter wells) was conducted in the summer of 1994 to determine nature and extent of contamination.
- Contaminant involved is Strontium-90 (Sr-90) and has been attributed to a process line(s) leak(s) during reprocessing in the 1970s.
Pump and treat system installed in the fall of 1995 to mitigate surfacing and off-site movement of contaminated groundwater.

Between 1996 and 1998, surface water drainage changes made north of the Main Plant.

Pilot PTW installed in 1999.

Detailed evaluation of the pilot PTW completed in 2002.
Alternatives Evaluated

Alternative 1  Maintain Current Approach
Alternative 2  Interceptor Trench Drain
Alternative 3  Groundwater Extraction Wells
Alternative 4  Far Downgradient Interceptor Trench Drain
Alternative 5  Far Downgradient Groundwater Extraction Wells
Alternative 6  In-situ Plume Treatment with Passive PTW
Alternative 6A  In-situ Plume Treatment with Active PTW
Alternative 7  Far Downgradient In-situ Plume Treatment with Passive PTW
Alternative 6 Selected for Evaluation

In-situ Plume Treatment with Passive PTW

Note: 2007 concept for PTW location/dimensions was based on available field data.

Leading Edge Characterization

- Placed more than 80 borings and microwells (2008-2009)
  - Characterized geology, hydrogeology, geochemistry in area of proposed PTW (10,000 pCi/L area)
  - Refined understanding of Sr-90 distribution to northern edge of plateau
Laboratory Testing of Zeolites

- Two natural zeolites high in clinoptilolite content are being tested through the University at Buffalo (UB)
  - Grain size analysis
  - Permeability mineral composition
  - Cation exchange capacity
  - West Valley strontium specific removal (column tests)
    - Non-radioactive columns (at UB) using simulated groundwater; Sr-88 surrogate for SR-90, 5 key cations (Na, Ca, K, Mg, Sr)
    - Radioactive columns (at WVDP) using actual North Plateau groundwater (~50,000 pCi/L)
Bear River Zeolite - Idaho

Exposed section of zeolite

Truck being loaded with one ton bags of zeolite (20 bags/truck)

Bear River Mine

PTW Location

PTW Dimensions
~800 feet long
~3 feet wide
18–30 feet deep

Legend:
- Monitoring Well
- March 2002 Water Rock Carbons
- Roads
- Structures

1 inch = 80 feet
PTW Installation

- PTW installation is planned to be done with a continuous, one-pass trencher that cuts a trench and fills with media (zeolite) in one operation.
  - Trencher allows installation of PTW without use of support piles or in-trench slurry avoiding possible impacts to permeability at soil-zeolite interface.

Note: Trencher limited to approximately 30 foot excavation with 3-foot wide trench.

Concept to Design to Installation

- Following have been established:
  - PTW location
  - Media (zeolite) to use
  - Installation approach (one-pass trencher)

- Focus now on installation (construction):
  - Equipment access, operation, decontamination
  - Soil management
  - Surface water drainage
  - Contingencies
PTW Installation

- Projections (approximate)
  - 800-feet long, 3-feet wide, 18-30-feet deep
  - 75,000 cubic feet of soil excavated
  - 2,000 metric tons of zeolite

Status as of May 26, 2010

- Formal design done
- First shipment of zeolite received in May with shipments planned through mid-summer
- Work focused on requests for proposals for trencher and general contractor
- Site preparation targeted to begin in mid- to late summer
- PTW installation (trenching) fall 2010