

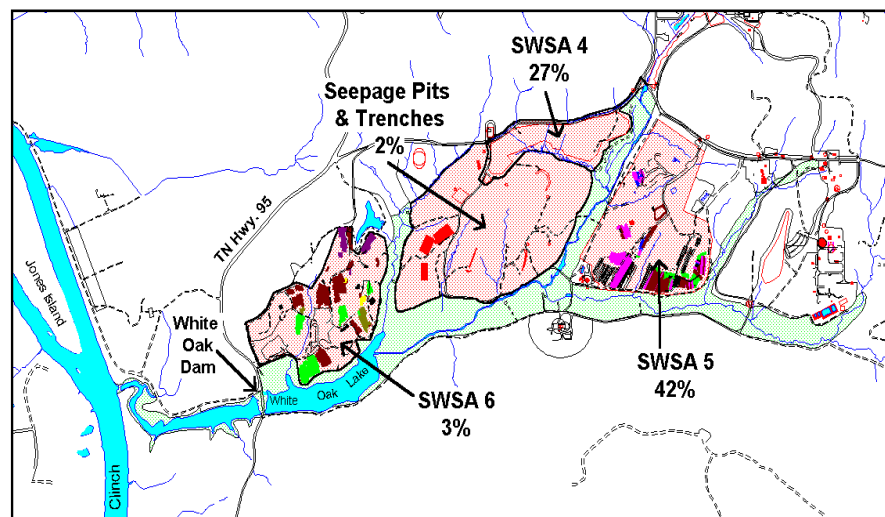
MELTON VALLEY COMPLETION PROJECT

BACKGROUND

Melton Valley was used between 1951 and 1986 for disposal of approximately 2 million curies of radioactive and mixed waste. The principal method for solid waste disposal was shallow land burial in unlined trenches. Deterioration of buried waste containers is ongoing, and contaminant discharges continue. Liquid radioactive wastes were disposed of initially by allowing them to seep into soils through shallow, unlined seepage pits and trenches. Later, the hydrofracture facilities were constructed to mix the wastes with cement grout and inject the grout-waste mixture deep under ground (800 to 1000 feet below the ground surface).

The combination of high annual rainfall (55 inches of annual rainfall), shallow groundwater conditions, and waste buried in or near the water table promotes the formation of contaminated leachate. The rate of water seepage through the uncapped burial trenches and through the shallow groundwater system to the nearby streams is rapid. Mobile contaminants can travel from source trenches to streams in hours when large storms occur.

Surface water is discharged from White Oak Creek into the Clinch River. Based on risk assessment models, approximately 80% of the human health risk in surface water at the White Oak Dam originates in Melton Valley. The figure at right shows the approximate contribution of risk to surface water from major contaminant source areas in Melton Valley.

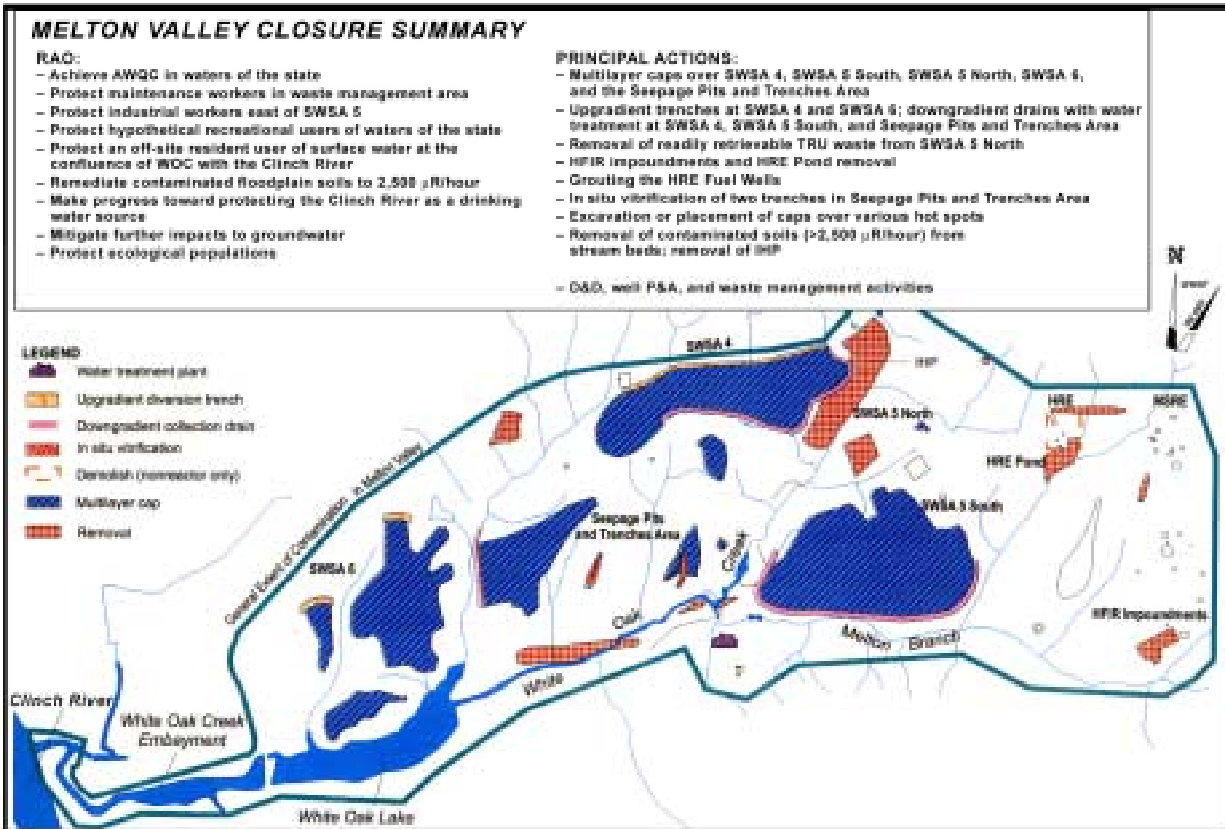


Risk Contribution of Primary Sources of Offsite Migration

MELTON VALLEY COMPLETION ACTIONS

The Melton Valley Closure Project has been widely reviewed and accepted by the public through the CERCLA process, and a signed interim record of decision is in place. Field work is already under way. We are collaborating with the EPA and the Tennessee Department of Environment and Conservation for successful implementation and are employing additional innovative work processes such as a streamlined decision-making process and subcontracting strategies designed to produce execution efficiencies.

Remedial actions are illustrated in the following figure and discussed below.



Remedial Actions for Melton Valley Completion Project

Capping

Multi-layer caps (125 acres) will be installed in Solid Waste Storage Areas 4, 5, and 6 and in portions of the Seepage Pits and Trenches Area. These caps will minimize infiltration during precipitation and protect ecological receptors and workers from exposure to the underlying soil and wastes. The caps are also expected to provide optimal site drainage and lower the water table (particularly the large caps in Solid Waste Storage Areas 4, 5, and 6).

Upgradient diversion trenches will be installed in Solid Waste Storage Areas 4 and 6 and in a portion of the Seepage Pits and Trenches Area to intercept upgradient storm flow and shallow groundwater before they flow through waste areas. Surface water will be routed around caps using perimeter ditches.

Collection drains will be installed downgradient of capped areas in Solid Waste Storage Area 4, Solid Waste Storage Area 5 South, and in the Seepage Pits and Trenches Area to increase the effectiveness of hydraulic isolation. These drains will collect contaminated leachate from the waste sites, preventing release to local surface water such as White Oak Creek and Melton Branch. The collected groundwater will be treated to meet discharge limits.

Transuranic Waste Removal

Readily retrievable waste will be removed from the lower 22 TRU trenches in Solid Waste Storage Area 5 North. The trenches contain 204 concrete casks, 18 boxes, and 12 drums of TRU waste. This waste was emplaced during the 1970s with the intent that it would be retrieved for ultimate disposal elsewhere. The removed waste will be segregated at the Transuranic Waste Treatment Facility; the TRU waste will be sent to Waste Isolation Pilot Plant in New Mexico for disposal.

Transuranic Waste Treatment Facility & Melton Valley Storage Tanks

The TRU waste treatment facility for the treatment of legacy ORNL TRU alpha low-level waste and newly generated TRU waste. The scope includes:

- Retrieval, processing, and certification of up to 1,200 cubic yards of remote-handled TRU sludge located in the Melton Valley Storage Tanks.
- Retrieval, processing, and certification of up to 1,300 cubic yards of low-level supernate located in the Melton Valley Storage Tanks.
- Repackaging and certification of 1,300 cubic yards of contact-handled TRU alpha low-level solids currently stored at ORNL.
- Repackaging and certification of up to 700 cubic yards of remote-handled TRU alpha low-level solids also stored at ORNL.

Soil and Sediment

Sediment and soil from the Homogeneous Reactor Experiment Pond and three High Flux Isotope Reactor impoundments will be excavated and disposed in the EMWMF. Floodplain soil and sediment that exceed agreed-upon levels in the Melton Valley Record of Decision will be excavated and either disposed in EMWMF or used as contour fill under the various multi-layer caps.

Hot spots in the waste management area (around Solid Waste Storage Areas 4, 5, and 6 and the Seepage Pits and Trenches Area) generally will be capped. Hot spots in the industrial use area (east of Solid Waste Storage Area 5) generally will be excavated and either disposed in the EMWMF or used as contour fill under the various multi-layer caps. Inactive waste pipelines will be isolated, stabilized, or removed, as necessary, to address residual contamination.

Small Facilities Demolition

The New Hydrofracture Facility and Waste Management Facilities in Solid Waste Storage Areas 5 and 6 will be demolished. Sodium and lithium shields from the Tower Shielding Facility currently in Solid Waste Storage Area 5 will be removed. Process equipment will be removed from the Triad Facility, and the building will be decontaminated for reuse.

Seepage Trenches 5 and 7 In Situ Vitrification

In situ vitrification will be used as a cost-effective treatment for Trenches 5 and 7 in the Seepage Pits and Trenches Area. In situ vitrification involves using electricity to generate extremely high

temperatures that melt contaminated soil into a matrix that traps radionuclide inventories for tens of thousands of years. In situ vitrification is planned only for Trenches 5 and 7 because they hold most of the curie content.

In Situ Grouting

In situ grouting will be used for the Homogeneous Reactor Experiment fuel wells in the Seepage Pits and Trenches Area. An auger or similar method will be used to mix grout with soil in the wells to reduce groundwater contact with the waste.

Hydrofracture Well Plugging and Abandonment

Plugging and abandonment will be used to isolate four hydrofracture injection wells and associated monitoring wells that interfere with installation of multi-layer caps and other cleanup activities. Plugging and abandonment seals the well in a way that maintains hydraulic separation among strata penetrated by the well bore.

Tank T1, Tank T2, and the High Flux Isotope Reactor Tank

Liquid low-level waste storage and collection tanks, T1, T2, and the High Flux Isotope Reactor tank, contain 5,500 gallons of waste sludge consisting mainly of ion exchange resin beads. Tank T1 contains 2,000 gallons of TRU sludge. Remediation of Tanks T1, T2, and the High Flux Isotope Reactor tank will complete the tank closure program at ORNL. These actions are part of the Bethel Valley Record of Decision selected remedy.

Spent Nuclear Fuel Disposition

As part of ORNL's role in the research and development of nuclear fuels, many types of nuclear fuels were sent to ORNL following irradiation in reactors for post-irradiation examination. Following examination, the Spent Nuclear Fuel was stored below grade in Solid Waste Storage Areas 5 and 6. The Spent Nuclear Fuel will be retrieved, repackaged, and transported to an offsite disposal facility for ultimate disposition.

Legacy Low-Level Waste Disposition

Approximately 6,100 cubic yards of low-level radioactive waste is stored in Melton Valley and consists of primarily dry active waste, scrap metal, process residues, sludges, and monoliths. This waste will be disposed offsite prior to capping the Solid Waste Storage Areas.

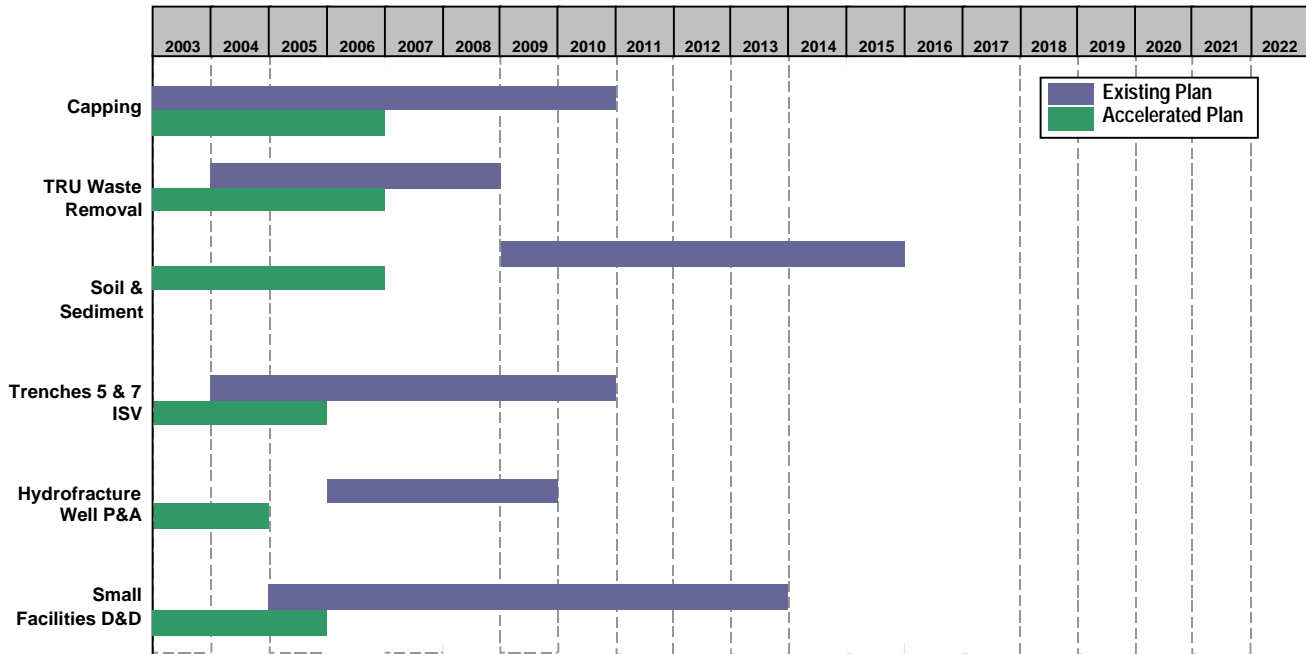
MELTON VALLEY CLOSURE SCHEDULING LOGIC

Melton Valley's schedule logic is shown in the following figure. This sequence of cleanup actions is based on several factors, including consideration of source unit contributions to offsite releases in the watershed (e.g., Solid Waste Storage Areas 4 and 5 are larger contributors to watershed surface water risks than Solid Waste Storage Area 6 and Seepage Pits and Trenches); construction sequencing requirements (i.e., some actions are logical precursors to other actions); combination of similar tasks

to facilitate cost-efficient subcontracting; completion of work as onsite and offsite waste disposal facilities come online (i.e., EMWMP, Waste Isolation Pilot Plant); coordination of the actions with national programs (i.e., Spent Nuclear Fuel shipped to an offsite disposal facility); and resource availability. As an example, before a cap can be installed on Solid Waste Storage Areas 6, Spent Nuclear Fuel has to be retrieved from subsurface storage located within the cap footprint; legacy waste must be removed from storage located within the cap footprint; waste storage facilities, located within the cap footprint, must be demolished; unneeded wells, located within the cap footprint, must be plugged and abandoned; and agreement must be reached to close Interim Waste Management Facility, Tumulus I, and Tumulus II under CERCLA. The sequence of actions shown in the Melton Valley Completion Schedule Logic figure is intended only to show that some actions are precursors to others and to convey an overall logic for major activities.

MELTON VALLEY COMPLETION SCHEDULE AND MILESTONES

As depicted in the figure below, all closure fieldwork will be completed by the end of FY 2006. Our accelerated plan expedites the existing plan by 9 years.



Melton Valley Completion Schedule

The following are the major milestones for the Melton Valley completion:

FY 2003

- Award cap design and construction subcontracts.
- Complete design of Solid Waste Storage Area 5 caps.
- Complete hydrofracture injection and monitoring wells plugging and abandonment.
- Complete excavation of Intermediate Holding Pond and disposal of waste.
- Complete design of T1, T2, and High Flux Isotope Reactor Tank remediation.

FY 2004

- Complete design of Solid Waste Storage Area 6 cap.
- Complete capping of Solid Waste Storage Area 4.
- Complete design of in situ vitrification.
- Completion demolition of New Hydrofracture Facility.

- Complete shipments of Spent Nuclear Fuel.
- Complete design for removal of TRU waste from Solid Waste Storage Area 5 North 22 Trenches.
- Complete removal of stored legacy waste.
- Complete grouting of T1, T2, and High Flux Isotope Reactor Tanks.

FY 2005

- Complete capping of Solid Waste Storage Area 5.
- Complete in situ vitrification of pits and trenches.
- Complete demolition of small facilities.
- Complete demolition of Homogeneous Reactor Experiment ancillary facilities.
- Complete removal of TRU waste from Solid Waste Storage Area 5 North 22 Trenches.

FY 2006

- Complete capping of Solid Waste Storage Area 6.
- Complete remediation of soil and sediment.

PREREQUISITES TO SUCCESS

Melton Valley is positioned for success: the watershed record of decision is signed, the scope of work is well understood, contractors are mobilized, and remediation work has already been initiated. Prerequisites for success include:

- Availability of an offsite disposal facility to accept Spent Nuclear Fuel and
- Availability of Waste Isolation Pilot Plant to accept shipments of TRU wastes.

MELTON VALLEY COMPLETION BENEFITS

This initiative will:

- Mitigate further impact to groundwater, reduce Melton Valley contamination offsite migration, and remediate the large inventories of contaminated materials.
- Ensure that human receptors are protected from exposure to hazardous substances from the Melton Valley watershed (these receptors include maintenance workers near the major waste management areas and industrial workers in the eastern portion of the watershed).
- Enhance overall protection of valley-wide ecological populations and sub-basin-level populations over most of the valley.
- Meet surface water remediation levels (Tennessee Ambient Water Quality Criteria and risk-based limits) to protect surface water in the Melton Valley watershed within approximately 10 years after all closure elements are in place.

- Achieve progress toward meeting Maximum Contaminant Levels for radionuclides in the Clinch River, which the state of Tennessee has designated for domestic water supply.
- Continue progress in mitigating risk posed by selected waste units at the inactive research reactor facilities.
- Eliminate the potential for future catastrophic releases of radionuclides to the Clinch River.