THE HANFORD SITE

Hanford Cleanup Overview

Fact Sheet – January 2024

Aerial view of the Hanford Site's 200 East Area.

Background

The 580-square-mile Hanford Site in southeastern Washington state was created in 1943 as part of the Manhattan Project to produce plutonium for the nation's defense program. Today, waste management and environmental cleanup, including protection of the Columbia River, are Hanford's primary missions.

Waste Generation and Cleanup

The process of making plutonium is extremely inefficient in that a significant amount of liquid and solid waste is generated while only a small amount of plutonium is produced. Additionally, all the facilities and structures that were associated with Hanford's defense mission must also be deactivated, decommissioned, decontaminated, and demolished. That environmental cleanup project is the work that about 11,000 Hanford employees are involved in today.

Crews responsible for cleanup are dealing with several different kinds of waste in many different forms, with many of the wastes being potentially harmful to people and the environment. Precautions have been taken so that the waste does not contaminate the air, the ground, the water table underneath the ground, the Columbia River, the people who are doing the cleanup work, or the people and environment near the Hanford Site.

Hanford Cleanup Overview (cont.)

Solid Waste

Solid waste can be everything from broken reactor equipment and tools to contaminated clothing that a worker wore during plutonium production activities. The solid wastes were buried in the ground in pits or trenches. Some of the waste was placed in steel drums or wooden boxes before being buried, while some of the other waste was placed in the ground without a container.

Liquid Waste

Besides the tons of solid waste, hundreds of billions of gallons of liquid wastes were also generated during the plutonium production days. These liquid wastes were disposed of by pouring them onto the ground or into trenches or holding ponds. Unintentional spills of liquids also took place. Liquid and semi-solid wastes from the chemical separations processes at the end of the plutonium production cycle were put into underground storage tanks. There are 177 underground waste-storage tanks at Hanford, arranged in areas called tank farms.

Much of the waste currently stored in underground tanks will ultimately be transformed into a stable, glass-like product in a process called vitrification. The Waste Treatment and Immobilization Plant was constructed to perform this vitrification work. Once the vitrification process has taken place, the molten, glass-like material will be poured into steel cylinders where it will cool and solidify. Ultimately, cylinders containing the most hazardous vitrified waste will be taken to a national repository for permanent burial. The cylinders with less hazardous waste will be sent for disposal at Hanford's on-site Integrated Disposal Facility.

Facilities

Reactor buildings, support facilities and auxiliary structures needed during the plutonium production days must also be cleaned up. For many of these buildings, the work requires the use of bulldozers and other heavy equipment to demolish them. As some of these structures are either contaminated or were built using materials like asbestos, crews must take precautions to avoid being contaminated themselves or to avoid releasing contamination into the air, ground or groundwater.

Cleanup

Some of the solid wastes, contaminated soil and building debris will be taken to Hanford's on-site Environmental Restoration Disposal Facility. The facility stores waste in disposal cells measuring 70 feet deep and 500 by 1,000 feet at the base. Each cell can hold 2.8 million tons of waste. Once each cell is filled, the waste is covered with clean dirt and a soil fixative to ensure the waste will safely and permanently remain in the landfill. The facility is regulated by the U.S. Environmental Protection Agency.

Some of the more hazardous chemical or radioactive solid wastes, such as uranium fuel rods that came out of the reactors but never had their plutonium extracted, are stored in a Hanford facility called the Canister Storage Building. Ultimately these wastes will be sent off-site for permanent burial at a national repository designed to accept these kinds of materials.

Solid transuranic waste is the debris that is contaminated with plutonium or other materials that may remain radioactive for hundreds of thousands of years. This waste is securely packaged and is shipped to the Waste Isolation Pilot Plant in New Mexico, where it will be permanently and safely buried.

Any liquid waste that had been poured onto the ground or held in ponds or trenches has long since evaporated or soaked into the soil. In doing so, the waste did contaminate some of the soil and is thought to have also created "plumes" of contaminants in the groundwater. These plumes move in varying speeds toward the Columbia River. Hanford is actively involved in projects designed to prevent any of the contamination from reaching the river through pump-and-treat technology. Through this process, contaminated groundwater is pumped out of the ground and treated with chemicals. These chemicals change the chemical makeup of the contaminants, rendering them harmless to the environment. The treated groundwater is then pumped back into the ground. The groundwater treatment project includes many extraction and injection wells that feed six pump-and-treat facilities, the largest of which has a capacity to treat up to 2,500 gallons of water per minute. Together these facilities currently treat more than 2 billion gallons of groundwater every year.