Hanford Groundwater

The U.S. Department of Energy and contractor CH2M HILL Plateau Remediation Company are removing contamination from the groundwater beneath the Hanford Site to prevent it from reaching the Columbia River.

Background

Contamination in Hanford’s groundwater resulted from the site’s plutonium production for the nation’s defense dating back to the 1940s. Planned and unplanned releases from the site’s production facilities seeped into the soil and contaminated large areas beneath the surface.

Mission

Today, the U.S. Department of Energy (DOE) and CH2M HILL Plateau Remediation Company (CHPRC) use a combination of technologies to remove contamination from groundwater and shrink areas of contamination, called plumes.

Hanford’s groundwater program includes a network of more than 2,000 wells and other tools. CHPRC operates five pump and treat systems along the river and one at the center of the Hanford Site. The systems extract contaminated groundwater from the aquifer through a network of wells and transfer it to a facility for treatment. The treated water is injected back into the aquifer to help drive the contaminated groundwater toward the extraction wells.

Combined, these systems treat more than 2 billion gallons of groundwater annually — enough water to fill up trucks lined up from Los Angeles to New York. The treatment systems remove more than 500,000 pounds (252,651 kilograms) of contaminants per year.

Workers collect more than 25,000 samples a year to monitor soil and groundwater contamination. Modeling data shows that treatment technologies are effectively cleaning up groundwater and reducing the size of the plumes.
Progress

Through engineering and innovation, CHPRC expanded and enhanced Hanford’s groundwater treatment systems by:

- Installing new wells for monitoring, extracting and injecting groundwater
- Building three new pump and treat systems, including the 200 West Pump and Treat Facility, Hanford’s largest and most sustainably built system
- Expanding Hanford Site groundwater treatment capacity from 500 million gallons (1.9 billion liters) per year in 2010 to more than 2 billion gallons (7.6 billion liters) each year since 2016
- Using a new resin (a material used to treat groundwater) that has saved more than $20 million since 2013
- Expanding a chemical barrier below the surface that will essentially lock a contaminant, strontium-90, in place until it decays to a non-hazardous substance

Future

Groundwater treatment will continue to support Hanford cleanup activities to protect the Columbia River. Groundwater sampling helps inform decisions about future well placement and configuration to maximize treatment effectiveness.

Cleanup Legacy

Two main areas at the Hanford Site have contaminated groundwater: The area along the river, called the River Corridor, and the center of the site, called the central plateau. Pump and treat systems remove the following contaminants of concern:

River Corridor:
- Hexavalent chromium
- Strontium-90

Central Plateau:
- Uranium
- Carbon tetrachloride
- Nitrate
- Technetium-99
- Trichloroethylene
- Chromium
- Hexavalent chromium
- Iodine-129
- Tritium

The top map is from 2009; the bottom shows the same areas in 2017 with reduced concentrations of groundwater contamination along the Columbia River.