Groundwater Remediation Project

Restore the River Corridor - Transition the Central Plateau - Prepare for the Future

The White Bluffs along the Columbia River

Protecting the Columbia River

Leaking water main – symptom of an aging infrastructure. Surface water has pushed contaminates from the soil into the groundwater and in some cases the river.

Loading explosives for well decommissioning

Scope

Nearly 50 years of nuclear weapons production resulted in approximately 1.7 trillion liters (450 billion gallons) of liquid waste being released to the ground at the Hanford Site. Much of the contamination remains in the vadose zone, between the top of the water table and the surface of the ground, but some contamination has reached groundwater.

In general, groundwater is the supply of fresh water found in layers beneath the earth's surface. Currently, about 80 square miles or about 14 percent of the Hanford Site has groundwater contaminant levels greater that drinking water standards. This is improved from 17.5 percent a few years ago.

Significance

Although Hanford groundwater is not a source of drinking water and does not impact the overall water quality of the Columbia River, it does flow into the river . The Columbia is a major drinking source and could experience affects from contamination at specific river shore locations. "EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a time frame that is reasonable given the particular circumstances of the site. When restoration of ground water to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated ground water, and evaluate further risk reduction" (40 CFR 300.430(a)(1)(iii)(F)).

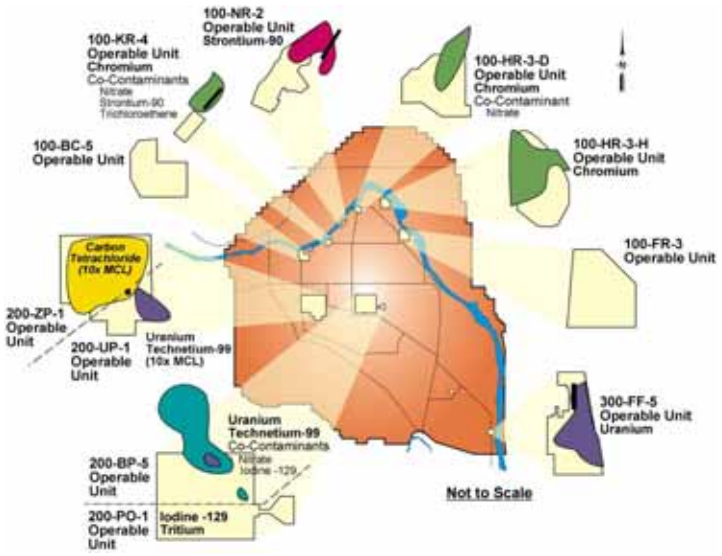
Hazardous Chemicals

Carbon tetrachloride was used in plutonium processing in Hanford's 200 West Area. Although carbon tetrachloride has not been found in monitoring wells near the Columbia River, a 3.8 square-mile plume could reach the river in the future. Sodium dichromate was used as a corrosion inhibitor in reactor cooling water. Today, chromium is present in about one square mile of groundwater in Hanford's 100 Area. Although Hanford is not the main source of nitrate in the Columbia River, nitrates are detectable in about 13.8 square miles of Hanford groundwater at concentrations above the drinking water standard.

Radioactive Constituents

With a low drinking water standard and long half-life, groundwater-mobile iodine-129 is detectable in about 30.6 square miles of Hanford groundwater, but has not reached the Columbia River in concentrations above the drinking water standard. A product of fuel processing, strontium-90 contaminates about one square mile of Hanford groundwater – mostly beneath former plutonium production reactors. Uranium plumes, totaling about 0.6 square miles, are in Hanford's 200 West, 200 East, and 300 Areas. Technetium-99 contaminates about 0.9 square miles and is very mobile in Hanford groundwater. Tritium – the most mobile and widely distributed Hanford radionuclide – is detectable in about 54.8 square miles of Hanford groundwater and has entered the Columbia River.

Groundwater Remediation Contaminant Plumes



Groundwater Remediation Project

Strategy

In the first few months of 2003, the Groundwater Remediation Project completed a plan of action for accelerating groundwater cleanup and protection. A link to the Hanford Groundwater Management Plan: Accelerated Cleanup and Protection can be found on the program's Internet home page . The plan focuses on three primary goals – aggressively cleaning up groundwater contaminants, avoiding future groundwater contamination, and preventing groundwater contaminants from migrating to the Columbia River. Attaining these goals will prevent further groundwater degradation and return groundwater to beneficial use, where possible.

There is a transition taking place in the Groundwater Remediation Project that will result in significant change over the next few years. Many of the 100 Area remediation efforts are being converted from interim systems that contained contaminant plumes and protected the river to more robust and targeted treatments that will result in final remedies.

The 200 Area plumes that have been primarily in the characterization phase with limited pump-and-treat actions will have records of decision written for them and final remedial actions started. Finally, the 300 Area contamination cleanup approach is being reevaluated and the record of decision revised to evaluate the impact to the environment.

Progress

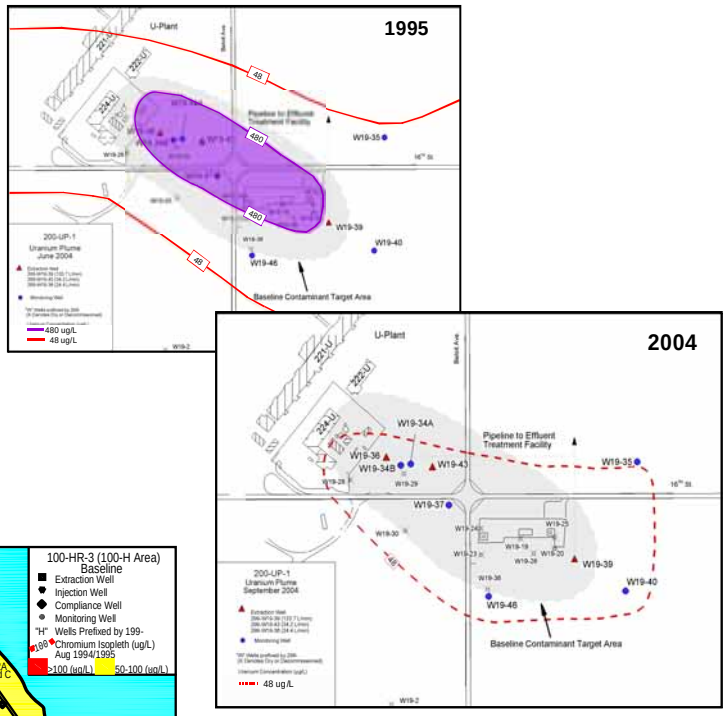
Significant progress has been made in cleaning up and protecting the groundwater. Several of the pump-and-treat operations are nearing or have met the remedial action objectives specified in the Record of Decision.

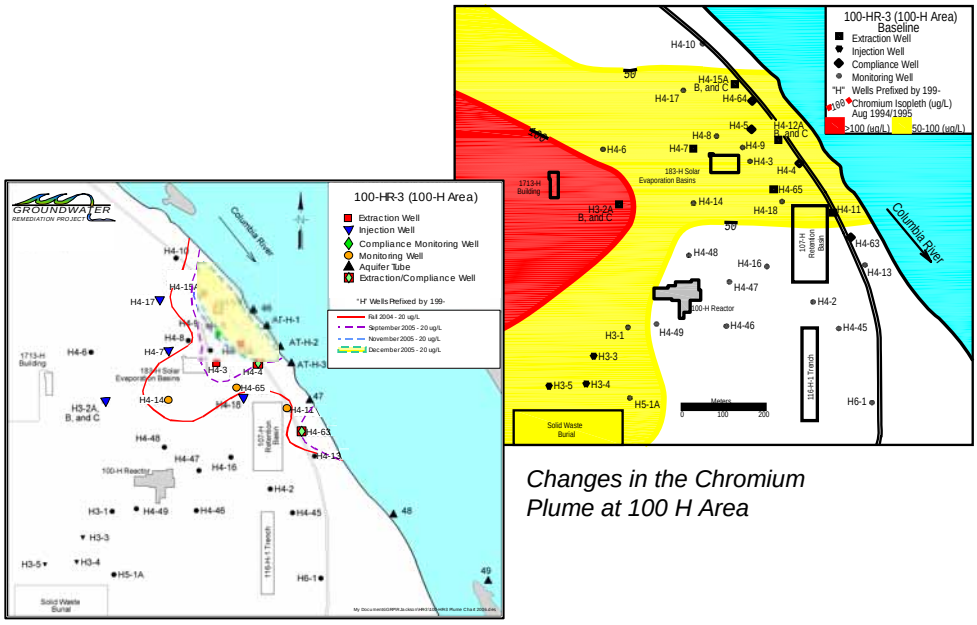
In addition, several actions have been implemented to avoid future groundwater contamination:

- 160 high-priority wells decommissioned
- 5,000 feet of water line repaired
- Flood control measures put in place in the Tank Farms

Pump and Treat Removal of Groundwater Contaminants

Location	Startup Date	Contaminant	Mass Removed (Groundwater Processed) through 1st Qrtr 2005
100-D	1997	Hexavalent Chromium	218 kg (1.28 billion L)
100-H	1997	Hexavalent Chromium	41.6 kg (1.22 billion L)
100-K	1997	Hexavalent Chromium	271 kg (3.11 billion L)
100-N	1995	Strontium-90	1.7 Ci (1.09 billion L)
200-ZP-1	1994	Carbon Tetrachloride	9,308 kg (2.76 billion L)
200-PW-1 including Soil Vapor Extraction	1992	Carbon Tetrachloride	78,710 kg
200-UP-1	1994	Uranium	203 kg (0.85 billion L)
200-UP-1	1994	Technetium-99	118.8 kg (0.85 billion L)





Changes in the Chromium Plume at 100 H Area

For more information

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