

Abstract

This report presents the results of groundwater monitoring for the 15-month period from October 1, 2008, through December 31, 2009, for the U.S. Department of Energy's Hanford Site in southeastern Washington. The results of groundwater remediation are also presented. In addition, vadose zone characterization and monitoring results are summarized, and the status of well drilling, maintenance, and decommissioning are provided.

Contaminant plumes occupy an area of ~172 square kilometers at levels exceeding one or more drinking water standard. The most extensive contaminant plumes in groundwater are tritium, iodine-129, and nitrate. These contaminants originated from multiple sources and are mobile in groundwater. The largest portions of these plumes are migrating from the Hanford Site's Central Plateau to the southeast, toward the Columbia River, with concentrations generally declining. Carbon tetrachloride and associated organic constituents form a large plume that exceeds drinking water standards beneath the west-central portion of the site originating in the 200 West Area. Hexavalent chromium is present in plumes exceeding drinking water standards beneath the reactor areas along the Columbia River and beneath the west-central portion of the site. Strontium-90 concentrations exceed the drinking water standard beneath portions of all but one of the reactor areas. Technetium-99 and uranium plumes exceeding drinking water standards are also present in the Central Plateau. A uranium plume exceeding the drinking water standard also underlies part of the 300 Area. Small contaminant plumes with concentrations greater than their respective drinking water standards include carbon-14, cesium-137, cis-1,2-dichloroethene, cyanide, fluoride, and trichloroethene.

Levels of some contaminants exceed drinking water standards in water samples collected from aquifer sampling tubes along the Columbia River shore. The most significant exceedances were strontium-90 in the 100-N Area, chromium in the 100-D Area, and uranium in the 300 Area.

Highlights for reporting period include the following:

- Expansion of pump-and-treat systems in the 100-D/100-H Areas to clean up chromium contamination
- Optimization of pump-and-treat systems in the 100-K Area to clean up chromium contamination
- Issuance of the remedial design/remedial action work plan for the 200-ZP-1 Operable Unit, which provides the plan and schedule for implementing all of the tasks for the design, installation, and operation of the 200 West Area pump-and-treat system.

Monitoring for the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 is conducted in twelve groundwater interest areas. The purpose of this monitoring is to define and track plumes and to monitor the effectiveness of remedial actions. One groundwater operable unit in the southern portion of the Hanford Site (1100-EM-1 Operable Unit) was removed from the National Priorities List (40 *Code of Federal Regulations* [CFR] 300, Appendix B) because final remediation goals were reached. Interim groundwater remediation in the 100-K, 100-D, and 100-H Areas, using a combination of pump-and-treat and in situ methods, continued to reduce the amount of chromium reaching the Columbia River. An in situ treatment system for strontium-90 is being implemented in the 100-N Area. A pump-and-treat system for technetium-99 and uranium in the 200-UP-1 Operable Unit, near the

216-U-1/2 Cribs in the 200 West Area, operated during the reporting period, as did the pump-and-treat system near Waste Management Area T in the 200-ZP-1 Operable Unit. A pump-and-treat system for the capture of carbon tetrachloride in the upper aquifer, also located in the 200-ZP-1 Operable Unit west of Waste Management Area TX-TY, operated for most of the reporting period.

This report meets the annual reporting requirements for *Resource Conservation and Recovery Act of 1976* groundwater monitoring at 24 waste management areas:

- Fifteen waste management areas under interim or final status contaminant indicator evaluation or detection monitoring programs, with the objective of determining whether these units have adversely affected groundwater
- Seven waste management areas under interim status groundwater quality assessment programs to assess the nature and extent of contamination
- Two waste management areas under final status corrective action programs.

During the reporting period, drillers completed 52 new wells for monitoring, remediation, or characterization. One well that could no longer be used was decommissioned (filled with grout).

This report is available on the Internet through the Hanford Site Soil and Groundwater Remediation Project (<http://www.hanford.gov/rl/?page=1334&parent=1333>).