
Abstract

This report presents the results of groundwater and vadose zone monitoring and remediation for fiscal year 1999 on the U.S. Department of Energy's Hanford Site, Washington.

Water-level monitoring was performed to evaluate groundwater flow directions, to track changes in water levels, and to relate such changes to evolving disposal practices. Measurements for site-wide maps were conducted in June in past years and are now measured in March to reflect conditions that are closer to average. Water levels over most of the Hanford Site continued to decline between June 1998 and March 1999.

The most widespread radiological contaminant plumes in groundwater were tritium and iodine-129. Concentrations of carbon-14, strontium-90, technetium-99, and uranium also exceeded drinking water standards in smaller plumes. Cesium-137 and plutonium exceeded standards only near the 216-B-5 injection well. Derived concentration guide levels specified in U.S. Department of Energy Order 5400.5 were exceeded for plutonium, strontium-90, tritium, and uranium in small plumes or single wells.

Nitrate and carbon tetrachloride are the most extensive chemical contaminants. Chloroform, chromium, cis-1,2-dichloroethylene, cyanide, fluoride, and trichloroethylene also were present in smaller areas at levels above their maximum contaminant levels. Metals such as aluminum, cadmium, iron, manganese, and nickel exceeded their maximum contaminant levels in filtered samples from numerous wells; however, in most cases, they are believed to represent natural components of groundwater.

Resource Conservation and Recovery Act of 1976 groundwater monitoring continued at 25 waste management areas during fiscal year 1999:

- 16 under detection programs and data indicate that they are not adversely affecting groundwater

- 6 under interim status groundwater quality assessment programs to assess contamination
- 2 under final status corrective-action programs.

Another site, the 120-D-1 ponds, was clean closed in fiscal year 1999, and monitoring is no longer required.

Groundwater remediation in the 100 Areas continued with the goal of reducing the amount of chromium (100 K, D, and H) and strontium-90 (100 N) reaching the Columbia River. The objective of two remediation systems in the 200 West Area is to prevent the spread of carbon tetrachloride and technetium-99/uranium plumes. Groundwater monitoring continued at these sites and at other sites where there is no active remediation.

Subsurface source characterization and vadose zone monitoring, soil-vapor monitoring, sediment sampling and characterization, and vadose zone remediation were conducted in fiscal year 1999. Baseline spectral gamma-ray logging at two single-shell tank farms was completed, and logging of zones at tank farms with the highest count rate was initiated. Spectral gamma-ray logging also occurred at specific retention facilities in the 200 East Area. These facilities are some of the most significant potential sources of remaining vadose zone contamination. Finally, remediation and monitoring of carbon tetrachloride in the 200 West Area continued, with an additional 972 kilograms of carbon tetrachloride removed from the vadose zone in fiscal year 1999.

This report is available on the internet through the Hanford Groundwater Monitoring Project's web site: <http://hanford.pnl.gov/groundwater>. Inquiries regarding this report may be directed to Ms. Mary J. Hartman or Dr. P. Evan Dresel, Pacific Northwest National Laboratory, P.O. Box 999, Richland, Washington 99352 or by electronic mail to mary.hartman@pnl.gov or evan.dresel@pnl.gov.