

## **OCCURRENCE OF ARSENIC IN GROUND AND SURFACE WATER IN SOUTH DAKOTA**

S.K. Sando, U.S. Geological Survey, Huron, South Dakota

### **Abstract**

Arsenic is highly poisonous and a known carcinogen to humans. Exposures to arsenic are additive, and prolonged exposure to small concentrations may have adverse health effects including skin, liver, lung, and bladder cancer. Arsenic is a regulated contaminant, and recently the Environmental Protection Agency reduced the drinking water maximum contaminant level (MCL) from 50 to 10 micrograms per liter (ug/L). There are numerous drinking-water supplies in the U.S. with arsenic concentrations that exceed the new MCL, and the process of revising the MCL generated considerable interest throughout the U.S.

High concentrations of arsenic are known to occur in ground and surface waters in South Dakota, and thus there are concerns about the effect of the new MCL on drinking water supplies in the State. During the process of revising the MCL, an unfunded reconnaissance-level review was conducted of available arsenic data in the USGS National Water Information System (NWIS), to better understand spatial variability in arsenic concentrations throughout South Dakota. This presentation describes the results of that review, and also discusses results of a detailed study of the occurrence of elevated arsenic concentrations in ground water in an area of the Rosebud Indian Reservation in southcentral South Dakota (Carter and others, 1997).

NWIS contains arsenic data for about 220 surface-water and about 3,600 ground-water sites in South Dakota. About 90 percent of the South Dakota ground-water arsenic data in NWIS were collected during the period 1978-1984, when the Department of Energy National Uranium Resource Evaluation program and USGS county water-resources studies were most active. Most of the data were collected by USGS, but some of the data were collected by State agencies. Patterns in spatial variability in the ground- and surface-water arsenic concentrations are discussed, and related to water-quality, geologic, and land-use characteristics.

In the early 1990's, elevated arsenic concentrations exceeding 50 ug/L were found in a ground-water community water system on the Rosebud Indian Reservation in southcentral South Dakota. As a result, a comprehensive study of sources and processes related to the elevated arsenic was conducted by the USGS (Carter and others, 1997). Ground water, surface water, bed sediments, springs, and drill-hole cuttings were sampled and analyzed for arsenic concentrations (including speciation), as well as other selected chemical constituents and physical properties. Results of this study, including geologic sources of arsenic and geochemical processes are discussed.

### **Reference cited**

Carter, J.M., Sando, S.K., Hayes, T.S., and Hammond, R.H., 1997, Source, occurrence, and extent of arsenic in the Grass Mountain Area of the Rosebud Indian Reservation, South Dakota: U.S. Geological Survey Water-Resources Investigations Report 97-4286, 90 p.