Hanford tanks: Leaks reach groundwater

In 1943, the U.S. military set up an enterprise near Richland, Wash., to create plutonium for warheads. Through 1989, activities at this Hanford Reservation yielded at least 55 million gallons of high-level radioactive wastes—more than half the total U.S. defense production of such wastes. For years, many tanks storing wastes at the now-defunct plant have been leaking. Despite efforts to stem the leaks, some of the more than 1 million gallons in leaked wastes have now reached groundwater, the Department of Energy announced on Nov. 25. That groundwater is not a source of drinking water, but it slowly carries contaminants to the nearby Columbia River, which is.

The newly documented leaks represent only a fraction of the environmental contamination at Hanford. Through the early 1990s, waste managers intentionally disposed of another 350 billion gallons of liquids, either directly on the surface or below ground. Many of those deliberate releases tainted the soil with the same radioactive wastes as those in the tanks, though usually in a far more diluted form. Moreover, some of the deliberate releases have polluted both groundwater and the Columbia River. As a result, identifying additional contamination from tank leaks proved a major scientific undertaking, explains K. Michael Thompson, groundwater manager at DOE's Richland Operations Office.

The first sign of a problem from leaking tanks showed up 4 years ago in sampling wells. The groundwater's conductivity, which is indicative of dissolved solids, near the tank site was higher in the direction of the Columbia River than in the other direction. This prompted a comparison, using computer models, of ratios of specific contaminants. "Although there was no smoking gun," Thompson tells SCIENCE NEWS, "there were some individual contaminants that we could tie to the tanks." Indeed, "there was enough information, a suite of evidence that, when you look at it as a whole, tells a pretty compelling story."

The good news, he says, is that many of the most long-lived and worrisome radioactive constituents—notably plutonium, cesium, and strontium—"don't move very far." Once they enter the water, they tend to grab onto soil or sediment and settle out. That's not true of the relatively short-lived tritium, a hydrogen isotope that is incorporated into water and moves with it, or for technetium-99 (Tc-99), a radionuclide with a half-life of 250,000 years. Tc-99 has been detected in three groundwater plumes below one tank farm known as 200 West.

"Some fraction of this [Tc-99], we can now say, is coming from tank leaks," says Thompson. Its travel time to the Columbia River "is projected to be about 100 years," he adds.

However, he notes that some groundwater newly identified as contaminated with Tc-99 from another tank farm could reach the Columbia in just 20 years. —*J.R.*

Fishy PCBs shorten menstrual cycle

New York health officials advise women of childbearing age not to eat fish from Lake Ontario because of their high concentrations of toxic pollutants, especially hormone-mimicking polychlorinated biphenyls (PCBs). Yet 12 percent of the women surveyed as part of a state study do eat such fish.

Now, an analysis of some 2,200 of the premenopausal women studied finds that the 280 who reported eating tainted fish more than once a month tend to have menstrual cycles that are 1 day shorter, on average, than those who don't. Pauline Mendola of the State University of New York at Buffalo and her coworkers report their finding in the Dec. 1 AMERICAN JOURNAL OF EPIDEMIOLOGY.

While the small menstrual cycle decrease probably does not jeopardize fertility or health, it "may indicate potential endocrine effects on a population level," Mendola's team says. PCBs can emulate some effects of estrogen, a sex hormone. —*J.R.*

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