

# URANIUM from the tap

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As toxic levels of radioactive metal enter water in U.S. farm hubs, those drinking it get little warning

As supplies are depleted by drought, uranium is drawn to the surface. In a trailer park tucked among irrigated orchards that help make California's San Joaquin Valley the richest farm region in the world, 16-year-old Giselle Alvarez, one of the few English-speakers in the community of farm workers, puzzles over the notices posted on front doors: There's a danger in their drinking water.



PHOTOS: JOHN LOCHER/THE ASSOCIATED PRESS

**Residents of a trailer park near Fresno, Calif. have been warned that their well water contains uranium at a level considered unsafe by federal and state standards.**

Uranium, the notices warn, tests at a level considered unsafe by federal and state standards. The law requires the park's owners to post the warnings. But they are awkwardly worded and in English, a language few of the park's dozens of Spanishspeaking families can read.

"It says you can drink the water — but if you drink the water over a period of time, you can get cancer," said Alvarez, whose working-class family has no choice but to keep drinking and cooking with the tainted tap water daily, as they have since Alvarez was just learning to walk. "They really don't explain."

Uranium, the stuff of nuclear fuel for power plants and atom bombs, increasingly is showing in drinking water systems in major farming regions of the U. S. West — a naturally occurring but unexpected byproduct of irrigation, of drought, and of the overpumping of natural underground water reserves.

An Associated Press investigation in California's central farm valleys — along with the U.S. Central Plains, among the areas most affected — found authorities are doing little to inform the public at large of the growing risk.

That includes the one out of four families on private wells in this farm valley who, unknowingly, are drinking dangerous amounts of uranium, researchers determined this year and last. Government authorities say long-term exposure to uranium can damage kidneys and raise cancer risks, and scientists say it can have other harmful effects. In this swath of farmland, roughly 400 kilometres long and encompassing major cities, up to one in 10 public water systems have raw drinking water with uranium levels that exceed federal and state safety standards, the U.S. Geological Survey has found.

More broadly, nearly two million people in California's Central Valley and in the U.S. Midwest live within a half-mile of groundwater containing uranium over the safety standards, University of Nebraska researchers said in a study published in September.

Everything from state agencies to tiny rural schools are scrambling to deal with hundreds of tainted public wells — more regulated than private wells under safe-drinking-water laws.

That includes water wells at the Westport Elementary School, where 450 children from rural families study outside the central California farm hub of Modesto.

At Westport's playground, schoolchildren take a break from tether ball to sip from fountains marked with Spanish and English placards: "SAFE TO DRINK."

The school, which draws on its own wells for its drinking fountains, sinks and cafeteria, is one of about 10 water systems in the farm region that have installed uranium-removal facilities in recent years. Prices range from \$65,000 for the smallest system to millions of dollars.

Just off Westport's playground, a school maintenance chief jangles the keys to the school's treatment operation, locked in a shed the size of a garage.

Inside, a system of tubes, dials and canisters resembling large scuba tanks removes up to a pound a year of uranium from the school's wells.

The uranium gleaned from the school's well water and other central California water systems is handled like the nuclear material it is

— taken away by workers in masks, gloves and other protective garments, said Ron Dollar, a vice-president at Water Remediation Technology, a Colorado-based firm.

It is then processed into nuclear fuel for power plants, Dollar said. Before treatment, Westport's water tests up to four times state and federal limits. After treatment, it's safe for the children, teachers and staff to drink.

Other central California farm schools opt to buy bottled water in place of drinking fountains, which are off limits because of uranium and other contaminants.

"We don't have a choice," said Terri Lancaster, principal of the 260 students at Waukena elementary school in rural Tulare County. "You do what you have to do."

Until winning a state grant to pay for trucked-in drinking water, her school was spending \$10,000 a year from its general fund on bottled water.

Meanwhile, the city of Modesto, with a half-million residents, recently spent more than \$500,000 to start blending water from one contaminated well to dilute the uranium to safe levels. The city has retired a half-dozen other wells with excess levels of uranium.

State officials don't track spending on uranium-contaminated wells. But the state's Water Resources Control Board identified at least \$16.7 million the state has spent since 2010 helping public water systems deal with high levels of uranium.

In coming years, more public water systems likely will be compelled to invest in such costly fixes, said Miranda Fram, a researcher with the U.S. Geological Survey in Sacramento.

Fram and colleagues at USGS have taken the lead over the past decade in identifying the problem in farm centres including central California, which produces a quarter of the country's agriculture. Geologists and water experts are still piecing together the ways levels of uranium exceeding federal and state health standards are seeping into more public water systems and household wells in major farm areas.

Fram and her colleagues believe the amount of uranium increased in Central Valley drinking water supplies over the last 150 years with the spread of farming.

In California, as in the Rockies, mountain snowmelt washes uranium-laden sediment to the flatlands, where groundwater is used to irrigate crops.

Irrigation allows year-round farming, and the irrigated plants naturally create a weak acid that is leaching more and more uranium from sediment, said Fram and Bryant Jurgens, a fellow researcher at the federal agency's office in California's capital.

Groundwater pumping pulls the contaminated water down into the earth, where it is tapped by wells that supply drinking water.

California is now experiencing its driest four-year span on record, and farmers and other users are pumping groundwater at the highest

rates ever, helping to pull yet more uranium into areas of aquifers tapped by water wells.

And even if authorities were to intervene to somehow curb uranium contamination — and no such effort is underway — “we expect that it’s going to take many decades to reverse this,” Jurgens said.

The USGS calculates that the average level of uranium in public-supply wells of the eastern San Joaquin Valley increased 17 per cent from 1990 to the mid-2000s. The number of public-supply wells with unsafe levels of uranium climbed from seven per cent to 10 per cent over the same period there.

But the problem remains so unpublicized that even Fresno County farmer Mark Sorensen — who grows grapes and blueberries in one of the most impacted parts of the country, and deals with water issues routinely as a leader of the local farm bureau — admits to not knowing about it.

“To be honest, I have never spoken to anybody about uranium,” said Sorensen, a fifth-generation farmer. “I’ve never even heard of it in drinking water.”

Scientists have long known that uranium can damage kidneys and increase the risks of cancer when consumed over a year or more, which is why authorities have set maximum levels for drinking water.

Drinking water tainted by uranium is the chief concern — but uranium also sticks to potatoes, radishes and other root vegetables if they’re not properly washed. (While studies have confirmed livestock and people can ingest high levels of uranium by eating contaminated vegetation, scientists have yet to fully research the dangers involved.)

Though people think mainly about uranium’s radioactivity, the danger in water mainly comes from the toxic chemical effects of the metal.

Old public health models for uranium date back to the 1940s and 1950s, when the U.S. Atomic Energy Commission set off a nuclear-age mining boom in the Central Valley and other points West as the country sought to build uranium stockpiles.

Countless miners succumbed to cancer from breathing radioactive gas. But those models now need revising to deal with the larger population exposed through sources like drinking water, academics say.

“We should not have any doubts as to whether drinking water with uranium in it is a problem or not. It is,” said Doug Brugge, professor of public health and community medicine at Tufts University School of Medicine in Boston.

“The larger the population that’s drinking this water, the more people that are going to be affected.”

In California, changes in water standards since the late 2000s have mandated testing for uranium in public water systems, and the state frequently helps public water systems deal with wells testing at high levels.

For private well owners and small water systems, however, officials were unable to point to any public health campaigns in the most

affected areas or any help with testing or dealing with wells that do test for high levels.

USGS researchers recently sampled 170 domestic water wells in the San Joaquin Valley, and found 20 to 25 per cent bore uranium at levels that broke federal and state limits.

State and federal regulators say the U.S. Congress, outlining drinking water standards, has limited their enforcement authority to public water systems. "Your home's your castle. If you've got a well at home, that's your business," said Bruce Macler, a San Francisco-based water program toxicologist for the U.S. Environmental Protection Agency.

The Associated Press commissioned sampling of wells at five homes in the countryside outside Modesto, to look more closely at whether unregulated private wells that families depend on were as vulnerable as contaminated public water systems nearby.

The results: Water from two of the five wells contained dangerous levels of uranium.

None of the five families, however, had ever heard that uranium could be a problem in groundwater — let alone that it was a problem in their area.

Even for bigger water systems for which government help is available, accessing safe water doesn't always come quickly. That's true at the Double L Mobile Ranch outside Fresno, where Giselle Alvarez lives in the one-room trailer with her mother and father.

Authorities have recorded years of tests showing dangerous levels of uranium in the water provided to the Double L's low-income residents.

The park's owner, Carl Hunt, minimized the health risks to the families who live there.

"Not afraid of that water at all," Hunt told the AP.

An independent water test commissioned by the AP found water at Hunt's trailer park remained over the limits for uranium.

For now, families in the rural trailer park mostly throw away the regular water notices, unable to comprehend their meaning. Suspicious in general of the park's tap water, families at the Double L who can afford it buy bottled water.

That doesn't include Alvarez's family. "We can't really do anything about it," she says on the wooden steps of her mobile home. "As you can see, we're not rich."