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One city's solution to drinking water contamination? Get rid of every lead pipe.

By Darryl Fears and Brady Dennis May 10, 2016

MADISON, Wis. — Long before Flint, Mich., faced a water-contamination crisis, this city dealt with one of its own. The local utility had sampled residents' tap water in accordance with the federal government's new Lead and Copper Rule and discovered unacceptable levels of lead.

But Madison's response was like hitting a gnat with a sledgehammer. It was so aggressive that only one other major municipality in the United States has followed its approach so far. It's also why some people now call Madison the anti-Flint, a place where water problems linked to the toxic substance simply couldn't happen today.

Madison residents and businesses dug out and replaced their lead pipes — 8,000 of them. All because lead in their water had been measured at 16 parts per billion — one part per billion over the Environmental Protection Agency's standard.

That's a microliter, one-millionth of a liter of water. The utility's water quality manager, Joe Grande, explains the reasoning in seven words: "The safe level of lead is zero."

Radical though it was, what occurred from 2001 to 2011 in this state capital could help guide cities across the country as they consider taking action to protect public health. The extreme, months-long leaching of lead into Flint's water supply has highlighted the danger of the estimated 6 million or more lead pipes that remain in use nationwide — by more than 11,000 community water systems that serve as many as 22 million Americans.

Increasingly, voices are calling for complete replacement of these lines. As Madison showed, it's possible, but not easy.

"As long as there are lead pipes in the ground or lead plumbing in homes, some risk remains," David LaFrance, chief executive of the American Water Works Association, noted when its board voted unanimously in March to back such efforts. The association, which represents water utilities, regulators and plant operators, drew more than 100 managers to Washington this week to discuss various strategies.

"As a society," LaFrance said, "we should seize this moment of increased awareness about lead risks to develop solutions for getting the lead out."

Madison's solution was to go for broke. The Madison Water Utility dismissed the easy fix recommended by the EPA regulations, which entailed treating pipes with phosphates to lower corrosion that releases trace metals. The company instead ripped out every lead line it owned. Then it made some 5,500 of its customers do the same.

Dozens of streets were torn up for a decade of digging and copper-pipe replacement at a cost of nearly $20 million. It was noisy, messy and disruptive, but successful.

"People walk up to me in the streets now and say, 'Thanks,' " said Susan J.M. Bauman, who as mayor helped persuade the City Council to force property owners to act.

Five years after the project's completion, Madison's lead levels are well under the Lead and Copper Rule's "action" threshold of 15 parts per billion. Its highest measure since 2011 is 3.5 parts per billion, which is so low that the EPA requires the utility to collect water samples every three years instead of annually.

Only Lansing, Mich., is known to have taken a similar all-out approach. As Gov. Rick Snyder's administration remains under fire for its mishandling of Flint's water debacle, the city where he lives is about to finish removing 14,500 lead pipes. That 10-year, $40 million program will end in June, said Stephen Serkaian, a spokesman for the Lansing Board of Water and Light.

One advantage for the effort there: The local utility, unlike many, owns every pipe in its system, even those leading up to houses.

Other cities have called both Madison and Lansing in recent months for advice.

"Our phone is ringing off the hook from utilities across our state and the country," Serkaian said. Utility executives from Iowa flew in last month to study the program's scope and approach.

And Lansing's mayor has asked the utility to provide technical assistance to Flint, 60 miles to the east. Hit hard by its water contamination, which could have serious and permanent health consequences for many of its children, Flint is now pushing to replace 15,000 lead service lines. Yet city officials want to accomplish that in a single year, not 10. The projected expense is $55 million.

"For every Lansing and Madison, there are thousands of other cities that simply have not kept up with the problem," said Erik Olson, health program director for the Natural Resources Defense Council.

While the greatest concentration of lead service lines is in the Midwest, the

pipes can be found nationwide. The cost of replacing them could exceed $30 billion, and the American Water Works Association understands that homeowners won't be eager to help pick up the tab.

"It doesn't increase value like granite countertops or a new deck," said Tracy Mehan, its government affairs director. "Homeowners are going to have to be convinced that this is an important thing to do."

In the wake of Flint's crisis, Washington's water utility found itself on the defensive at a congressional hearing in mid-March when a Virginia Tech professor declared that its lead problem in the early 2000s was up to 30 times worse.

D.C. Water did not dispute Marc Edwards's testimony before a House committee. In a report to its board that same week, officials said lead pipes have been replaced at more than 20,000 addresses since 2004. But a nearly equal number of lead pipes remain, the property of either the utility or individual homeowners.

That's no longer the case in Madison. The city of 245,000 sits on an isthmus between two large and scenic lakes that give the area its easygoing character. Planners put the city's long shoreline to good use, with paths, running trails and boat ramps.

Back in 1992, when the elevated lead levels were detected, the EPA's fix called for Madison Water to inject phosphate into the water supply. At the local wastewater treatment plant, which was under state orders to remove phosphorous, officials were stunned.

For one, phosphate pollutes lakes by causing algae blooms that suck away oxygen and suffocate marine life. "We did tell them that would not be a good idea," said David Taylor, director of ecosystem services for the Madison Metropolitan Sewerage District.

There was also a good chance that the chemical would fail. A chemist hired by the city tested the lead pipes to determine whether adding phosphates would lower lead contamination. In some cases, levels instead increased.

"I kept testing things in the field and drawing conclusions that were opposite of what I was told in the literature," Abigail Cantor recounted last month. "The Lead and Copper Rule said you have to use one of these chemicals — polyphosphate or orthophosphate. None worked."

Finally, after four years of testing, Cantor told the utility in 1996 that there was only one sure solution. "You have to get rid of the lead," she said.

The utility opted to take out all suspect pipes, which dated to the 1920s and earlier. The next step was even more challenging. Backed by the city and state, Madison Water required its customers to remove the lead pipes that connected their houses and businesses to the system.

Grande says there was no alternative. Removing lead pipes only up to a property — a partial replacement — could make contamination worse because metals inside the pipe dislodge during excavation. It takes years to flush it out of the system.

"There certainly was a lot of opposition from people who thought it was ridiculous . . . who thought it didn't need to happen," Grande said of the project.

Thanks to utility rebates of up to $1,000 for homeowners who switched, their average cost was $1,300. Bauman said apartment owners paid more, but they likely passed on the cost to renters.

Yet for many reasons, Madison remains a tough act to follow. The capital is also home to the University of Wisconsin. The city is full of professors, students and highly educated residents who earn a comfortable living. More than 50 percent have undergraduate degrees, and the median household

income is about $50,000 per year.

"A relatively high willingness to pay for quality drinking water" among Madison residents made the lead-removal project easier for officials to sell, said Greg Harrington, a University of Wisconsin engineering professor who served on the Madison water utility's board during the project.

Lansing, another state capital and university town, is similar in many ways to Madison. The two are now linked by their extraordinary effort to go beyond the federal rule and protect their water supply from lead contamination.

Olson argues that the complete removal of faulty underground pipes, some of which date to the time of slavery, should also be the EPA's main focus.

"We're basically living off investments that were made by our great-grandparents," he said. "So many pipes are being used past their design date. You can only live on the edge for so long."

Dennis reported from Washington.

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