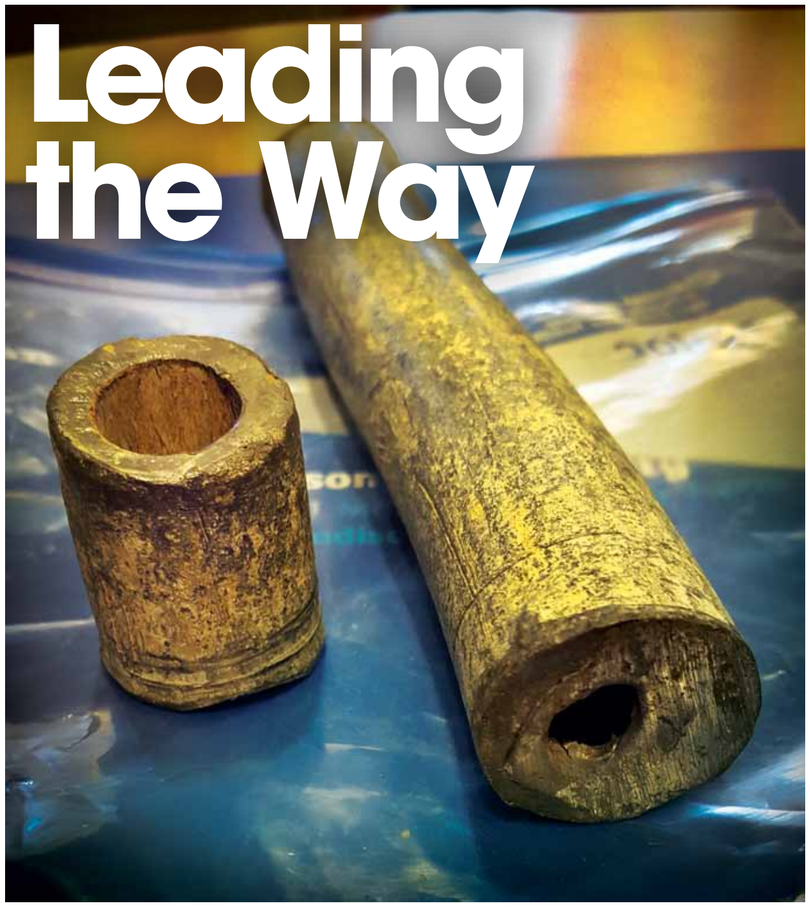
Leading the Way



By Amy Barrilleaux

Madison's once-controversial program may now become a model for other cities

"Those books are the lead service contracts," said Madison Water Utility Operations Clerk Amy Jones, gesturing over her shoulder to three massive binders stacked neatly on top of a filing cabinet.

The binders contain thousands of contracts, one for every Madison, Wis., property owner who replaced a lead service line, the pipe that leads from a water main to a home. In Madison, the practice of using lead pipe for water services was not discontinued until the late 1920s.

"Nobody in this day and age wants to have a lead service," Jones said. "People who are thinking about buying a house will call and ask if [the service] is lead."

But chances are it will not be. That is because of the utility's Lead Service Replacement Program, which was largely completed three years ago. On the surface, the program sounds like a resounding success. In a little more than a decade, the city spent $15.5 million to replace nearly all of its lead services—more than 8,000 pipes in all—bringing safer water to thousands of people living in older homes. Except that success almost did not happen at all.

"People at Madison Water Utility and I have made national presentations. We've made sure that everybody knows Madison's experience," said chemist and independent consultant Abigail Cantor, P.E.

The experience, Cantor said, was not an easy one. Now, three years after its completion, Madison's Lead Service Replacement Program is drawing the attention of the U.S. Environmental Protection Agency (EPA), which is taking a look at how Madison undertook the enormous and unlikely task of replacing thousands of lead pipes—more than half of which technically were private property.

Testing Madison's Water

The battle to get the lead out of Madison's water started in 1991 with the passage of EPA's Lead and Copper Rule, which required utilities to test drinking water inside older homes for lead. Although the rule is a federal law, it is enforced on the local level by the Wisconsin Department of Natural Resources (DNR).

In 1992, Madison ran its first round of tests under the new rule, and the results were not good. Elevated lead levels found in some of the homes meant the city had exceeded the EPA's action level for lead and would be required to bring those levels down.

"Madison was told that [it] need[ed] to optimize the lead in [its] water by getting [it] down to 5 ppb," Cantor recalled. She was working for a consulting firm at the time. "Madison wanted to do some studies, and I got assigned to do this."

It was common knowledge in the water industry that lead services could corrode, causing the dangerous heavy metal to show up in a home's drinking water. What was not common knowledge was exactly how to prevent it. Most water utilities turned to chemicals.

"The Lead and Copper Rule is written as if lead in the water is a simple thing. If you're over the action level, simply put in a chemical and you'll be fine. And that's the way it still is today," Cantor said. "I did some studies of Madison's water system to find a chemical that could be put in the water to control the lead. As far as anybody knew, that's what you do. You've got to alter the chemistry of the water so that the lead stops going in."

But Cantor said Madison soon found itself in a position where the simple answer was not the answer at all.

"I ran all these tests using the chemicals that are prescribed by the rule … One of [the chemicals] increased the lead four times the amount of untreated water. I thought, 'Something's not right here. Everybody's using this chemical, and yet, it can increase the level of lead.'"

One of the most common additives to control lead corrosion is phosphoric acid, but in Madison, that chemical was off the table because of growing concern over phosphorus contaminating area lakes and watersheds. So the city was left with just one option.

"Everything pointed to removing the lead service line," Cantor said. She reported her findings to Madison Water Utility in 1994.

"They said, 'Okay, we've got to talk to the DNR.' Basically, the Lead and Copper Rule says you must put some kind of chemical in the water first. Because you've done a study offline, it's not going to count. Then came years and years of discussion with the DNR about how Madison could skip the step of putting a chemical in the water."

More than four years later, the DNR finally relented. Madison Water Utility would be allowed to skip trying out phosphoric acid in the water supply and could move straight to lead service replacement. But that part would be the toughest of all.

The Public Pushes Back

It sounds simple: Replace all the lead service line in the city of Madison and solve the lead problem once and for all. But it was not so simple, largely because of property lines.

"The water service lines to people's homes are owned by the utility up to a certain point. It's up to the property line," Cantor said. "And on the property line, there's this little valve—it's called a curb stop. The utility can do anything they want with that. But from the curb stop to the house, it's the property owner."

The utility already had begun replacing water services on its side of the valve, but if the rest of the pipe was still made of lead, there was little hope that it would make a difference when it came to lead levels inside the home.

"We knew that the lead service line was the source of the lead. Until you remove the [entire] lead service, you're still going to have an ongoing source of lead," said Joe Grande, water quality manager for the utility.

So Madison Water Utility needed action from the Common Council. An ordinance would be necessary to require thousands of homeowners to replace lead services on their sides as well. To lessen the financial burden for homeowners, the utility would pay for half the cost of replacement up to $1,000. Money for property owner reimbursements would come from antenna revenue—money the utility receives by providing space on its water towers for cellular antennas.

The proposal instantly was met with criticism. Not only did many Madison residents feel that public money should not be used to pay for private pipes, some also did not believe that a real public health risk from lead services existed at all. Underscoring that belief was an opinion piece from the Wisconsin State Journal that ran days before the council vote, with the headline, "Lead risk rings hollow."

"It's fascinating. I'm mystified," Cantor said. "First of all, it's a federal law. Basically Madison had to comply. But the second thing is, if I had a lead service line, I would get it out so fast. And here was an opportunity to be subsidized to get it out."

But Grande was not as surprised at the pushback.

"Lead is not something that you can see. You can't taste it. You can't smell it. It's this kind of hidden contaminant," he said. "People will say, 'I've lived in this home for 50 years. It's not something that's affected my health … This is a waste of money.' I think that played into it."

'A Huge Success'

In the winter of 2000, after months of wrangling over how it would work, the Common Council narrowly green-lit Madison Water Utility's Lead Service Replacement Program, the first of its kind in the country. The seemingly impossible step of replacing 8,000 lead water lines was now underway. By the end of 2012, it would be one of the crowning achievements of the utility.

"Certainly it's something to be very proud of," Grande said. His department still regularly tests for lead in Madison's water, but he is not worried about complying with EPA's Lead and Copper Rule anymore. According to Grande, the problem of lead in drinking water has been almost completely eliminated in Madison because of the program.

"It's a huge success," he said. "Knowing that lead service lines are the principal source of lead in drinking water and doing what you can to remove lead services … We are light-years ahead of other utilities that have decided to do the corrosion control chemicals, which they'll do forever until they do replace the lead services."

Now, as EPA considers revising its Lead and Copper Rule for the first time, Madison is one of a handful of cities that it is looking to for information that might someday help others dealing with lead.

"Now we know what the costs were. We know what some of the hurdles were. But we also know what the positive outcomes are," Grande said. He said despite those hurdles, the city made the right decision.

"It was something the utility and the city decided was an important thing to do," Grande said. "In the end, I think this is where utilities are going to be pushed. There's a growing concern in the regulatory industry and the drinking water industry in general that we've been talking about lead for two decades now, and little has happened from a lot of people's perspective. In Madison, that's different. We made the decision, we went forward and we did it." w&wd

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