



Winning the Battle Against Iron-Pipe Corrosion in the Shadow of Flint

By Bonner R. Cohen, PhD

With both the Trump Administration and Congress in broad agreement that dramatic steps need to be taken to fix the nation's crumbling infrastructure, prospects are bright that long-neglected problems that affect the health and safety of all Americans are going to be addressed.

Not a minute too soon. The residents of Flint, Michigan, still cannot drink the water the city provides because it has been contaminated by lead, a potent neurotoxin that can cause permanent brain damage to children. Corrosion of underground iron pipes is far and away the biggest problem faced by municipal water system managers, many of whom are fighting what is ultimately a losing war against corroded pipes.

Water systems can take a cue from federal efforts to combat corrosion in the energy sector. The U.S. Department of Transportation's Office of Pipeline Safety has long mandated tough standards to protect against corrosion in oil and gas pipelines. Similar anticorrosion standards in water and wastewater systems could ultimately benefit taxpayers while safeguarding public health.

Leaking, corroded iron pipes provide openings for pathogens to enter the water system. A recent study led by Professor Jeffrey Griffiths of Tufts University School of Medicine found that drug-resistant bacteria can live in corroding pipes. As reported by *HealthDay* (September 23, 2016), "These harmful bacteria include legionella, which causes Legionnaires' disease; pseudomonas, which can trigger pneumonia; and mycobacteria, which can cause tuberculosis and other illnesses, the researchers said."

Lessons From Flint

In retrospect, Flint's water system was a disaster waiting to happen. Flint's corroded water pipes have long been a breeding ground for human pathogens. According to Professor Marc Edwards of Virginia Tech, an expert on water treatment and corrosion, Flint's iron pipes are so corroded that they undermine chlorine's capacity to disinfect water.

Flint's corrosion crisis had deadly consequences. New statistics released by the Michigan Department of Health and Human Services indicate that the number of deaths attributed to Legionnaires' disease at the peak of the Flint water crisis may well have been higher than the 12 originally reported. The dramatic spike in deaths thought to have been caused by simple pneumonia may have included people who died of Legionnaires' disease. "We now know the untreated corrosive water created a perfect milieu for the overgrowth of such opportunistic pathogens like Legionella," Dr. Mona Hanna-Attisha, a researcher at Flint's Hurley Medical Center, told the *Detroit News*.

Turning Things Around With Open and Fair Competition

In the wake of the Flint disaster, Michigan Governor Rick Snyder ordered a comprehensive review of state and local water infrastructure issues. His *21st Century Infrastructure Report* shows that painful lessons have been learned. "Many government procurement specifications and policies do not include mechanisms to evaluate and utilize new technologies or alternative materials that provide cost savings and enhance environmental outcomes," the report says. Michigan's Department of Environmental Quality, municipalities, and utilities "should put in place a process to periodically review and update new technologies, procurement manuals or standard operating practices to allow

for open competition for technology and materials meeting relevant standards.”

Michigan’s Department of Environmental Quality already has guidance for municipalities applying for grants under the department’s Drinking Water Revolving Fund program. The Department of Environmental Quality recommends that applicants review alternative pipe materials; however, the guidance lacks teeth because there are no competitive bidding requirements.

Michigan cities plagued by corroded underground iron pipes are getting the message. Burton, contiguous to Flint, was confronted by a piping network that was decaying at an alarming rate. “Our iron pipelines were so brittle that we had to reduce pressure to avoid water main breaks,” says Burton Utilities Superintendent Dave Marshke. Like Flint, Burton had procurement specifications that effectively excluded any alternative solution or technology from the competitive bidding process.

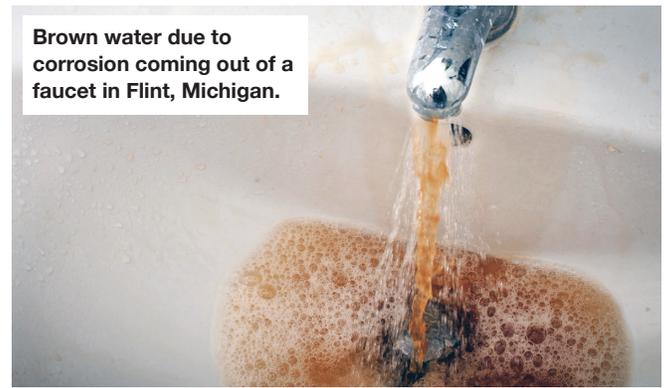
Operating under many of the same financial constraints that continue to bedevil Flint, Burton Mayor Paula Zelenko petitioned and fought Genesee County for her city to be allowed to have a procurement process for pipe replacement that included competitive bidding. Upon completion in 2019, her plan will replace 19 miles iron pipe with lead-free, noncorrosive PVC pipe at a cost that is \$2.2 million lower than the nearest bidder.

“I believe that responsible elected officials support open competition and the need for alternative products and materials in bidding processes for underground infrastructure,” says Mayor Zelenko.

Beecher Metropolitan District, an unincorporated community situated on Flint’s northern boundary, began to address its pipeline needs before the crisis in Flint. Its underground cast-iron pipes dated to the post-World War II era and had become brittle and leaky in the region’s clay soil. Pipe replacement began in 2013 and, aided by a \$1 million U.S. Department of Agriculture (USDA) grant, the community is currently installing 2 miles of corrosion-resistant PVC pipe at a cost of \$3.8 million. Beecher revised its procurement specifications to comply with USDA’s requirement that alternative pipe options be included in all bids. The community has a master plan to replace its entire 62-mile pipe network in the years to come and plans to stick with the USDA program to help defray the cost.

Two more Genesee County cities, Fenton and Mt. Morris, have turned to competitive bidding as a means to avoid the disaster that hit neighboring Flint. Both cities have revised their procurement specifications to allow for open competition for pipe materials to replace leaking iron pipes.

The savings to water utilities through competitive bidding can be substantial. A November 2016 study conducted by Massachusetts-based BCC Research compared the cost of pipe replacement in four Michigan cities: two with open competition (Monroe and Livonia) and two without (Port Huron and Grand



Rapids). The study found that communities with open competition enjoy lower pipe cost, on average, for water main installation or replacement projects, reaching average savings of 27 percent for 8-inch pipe and 34 percent for 12-inch pipe, compared with municipalities with closed competition practices.

A bipartisan group of lawmakers in Michigan is determined to tackle the problem of water infrastructure at the state level. Their bill, SB 157, increases the options for community drinking water asset managers by opening the competitive marketplace for pipe and pipe material. Specifically, SB 157 requires that any public drinking water system receiving state funding not adopt or adhere to any existing ordinances that restrict or prohibit the use of pipe and pipe materials that meet the engineering specifications for the project. In a time of tight budgets, the bill helps communities reduce the cost of water and sewer infrastructure projects while protecting public health.

Small wonder that a 2013 U.S. Conference of Mayors report on underground water infrastructure concluded, “Closed procurement processes lead to unnecessary costs, and may diminish the public’s confidence in a local government’s ability to provide cost-effective services.”

Municipal leaders know that, even in a time of heightened awareness about the condition of the nation’s infrastructure, there is only so much they can expect from a cash-strapped Washington. This is why forward-looking local officials should remove barriers that keep innovative and cost-effective technologies from providing safe and affordable drinking water for generations to come.

Bonner R. Cohen, PhD, is author of Fixing America’s Crumbling Underground Water Infrastructure, published by the Competitive Enterprise Institute.

