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A way out of Flint's water quality crisis

By Bonner R. Cohen

Americans have reacted in horror and disbelief over reports that Flint, Michigan's drinking water system is dangerously contaminated by lead, a potent neurotoxin. In their April 25 article, in The Hill, Sarah Ferris and Peter Sullivan correctly point out that the problems afflicting Flint's decrepit underground water infrastructure threaten cities throughout the U.S.

To keep a tragedy like the one in Flint from happening elsewhere, it is important to understand what really happened there, and to appreciate what cash-strapped municipalities can do on their own to keep their constituents from suffering a similar fate.

Setting aside the bungling of officials at all levels of government, Flint's water system was a disaster waiting to happen. Lack of open competition for piping used in Flint's water system blocked innovation and was a key, if little-noticed, factor in the disaster.

Flint's corroded underground iron pipes have long been a breeding ground for human pathogens. Chlorine, a widely used and powerful disinfectant, is added to water to prevent growth of microorganisms that cause disease. According to Professor Marc A. 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. Iron corrosion consumes chlorine, Edwards explains, making it more likely that harmful bacteria will grow in the water. Reduced levels of chlorine cannot adequately protect the public from human pathogens. This contributed to the May 2000 e-coli outbreak in Walkerton, Ontario, which killed seven people and made thousands sick. It may also have played a role in the recent outbreak of Legionnaires' disease in Flint.

Iron piping is not only failing due to corrosion but is increasingly associated with public health and safety issues. Recent studies show, for example, that the cement mortar lining used in ductile iron pipes is a potential source of water contamination and that there is an association between iron corrosion and increased levels of lead in water.

Edwards and his fellow Virginia Tech researchers have identified corroding iron pipes as "the most expensive problem facing water utilities." A task force appointed by Gov. Rick Snyder found that the primary blame for the contamination in Flint lay with the state Department of Environmental Quality for failing to require the use of anti-corrosion chemicals in the water to keep the iron pipes from leaching lead and contaminating drinking water. Those chemicals require ongoing monitoring, and their use is absolutely necessary in cities burdened by corroding underground iron and lead pipes. But Flint was spending so much money repairing its leaking iron pipes that scant funds were available for anti-corrosion chemicals.

Mayor Karen Weaver has pledged to replace Flint's entire 550-mile underground piping network, but her cash-strapped city of 95,000 is hoping that Lansing and Washington will provide most of the funding. While some emergency aid will doubtless be forthcoming, Mayor Weaver can begin to put Flint on the road to recovery and self-reliance by addressing the real problem afflicting her city's drinking water. She need look no further than right next door to the city of Burton.

With its 30,000 inhabitants, Burton is contiguous to Flint and, until recently, its leaking, corroded underground iron and ductile iron pipes were decaying at an alarming rate.

"Our iron pipe lines were so brittle that we had to reduce pressure to avoid water main breaks," says Burton Utilities Superintendent Dave Marshke. "Residents were complaining of low water pressure and rusty sediments." Like Flint, Burton was saddled with procurement specifications that were as antiquated as its iron water pipes and which effectively excluded any alternative solution or technology from the competitive bidding process. Facing many of the same financial constraints that 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. Her plan to upgrade Burton's water system predates the Flint fiasco. The project, which began in June 2014, will, upon completion in 2019, have replaced 19 miles of corroded, dilapidated iron pipe with lead-free, non-corrosive PVC pipe at a cost $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. This is a fundamental right and responsibility of all municipal governments," says Mayor Zelenko. In recognition of her efforts to bring safe drinking water to the residents of Burton, she received the Genesee County Metropolitan Commission's 2015 Innovation in Infrastructure and Technology Award.

By following Mayor Zelenko's example, Flint and other cities can take a giant step toward providing residents with safe drinking water, and at an affordable rate made possible by open competition and sustainable underground water infrastructure.

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