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NEWS STORY

Ensuring water safety

Automatic warning devices may be answer to Walkerton

Jeff Jedras
The Ottawa Citizen

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When seven people died and more than 2,000 became ill three years ago after an e-coli outbreak in Walkerton's water system, many people started to think how a recurrence could be prevented.

While cities invested more in water treatment and a provincial inquiry investigated what went wrong, a small group of Eastern Ontario researchers also went to work, trying to see if there was a technological answer.

Water-testing processes have been pretty much unchanged for more than 20 years. A small sample of water is sent to a lab, where it takes 24 to 48 hours for a result, which is then sent back to the municipality. If it's a long weekend, the results could sit on a desk for days.

"It was really the Walkerton incident that made people realize here we are in what we

CREDIT: Kyle Hoobin, For Techweekly

Kevin Hall, an engineering professor at Queen's University and head of Hall Coastal Canada, has designed an automated water monitoring system to avoid Walkerton-type tragedies.

think is a high-tech country, and something as simple as guaranteeing basic fresh water has been violated,'' says project leader Kevin Hall, a civil engineering professor at Queen's University and head of Hall Coastal Canada, one of the industrial partners in the project. Other partners include Queen's and Precarn, an Ottawa-based robotics industry association.

"There was never a need to evaluate this process until Walkerton, and then it was quite clear that the people operating the plant didn't respond as they should have,'' says Hall.

The team came up with an automated intelligent system, in a self-contained module. It eliminates the human reliability issue by taking a sample of water automatically into a testing chamber. Second, the e-coli test is performed automatically, and more quickly than before. Third, the intelligent system can take immediate corrective actions when a problem is detected, from notifying the appropriate persons to actually shutting down parts of the distribution system so no contaminated water is released.

The time for test results has been cut to 12 hours, and they're working to get it down to one to two hours. Also, with multiple devices testing on a staggered schedule, continual monitoring is possible. Most cities test their water once a week, and some of the larger ones once a day.

The cost of the system would depend on the size of the city, and the number of modules needed. Hall says for a city the size of Kingston, which spends about $150,000 annually on water testing, a one-time investment of $100,000 to $150,000 would buy a system to monitor levels in the treatment plant and another half-dozen locations throughout the city.

"It's a relatively cheap technology to ensure safe water, and it's a one-time investment,'' says Hall.

The prototype is going into testing with a number of Ontario municipalities, and is about six to 12 months away from commercialization. The certification process with the Ontario government, which would allow municipalities to replace their current regulatory testing regimes with the automated system, is also expected to take about a year. Until it is certified, municipalities can still use the system as a supplement to their current testing.

"We've had a lot of interest expressed by municipalities across Canada, and some in the U.S. as well,'' says Hall. "There's a number of municipalities that have said we'll continue to do our weekly test, but we'd like to know every day what the quality of our water is and if we have any potential problems.''

Details of the certification process are still being determined as part of a review of laboratory licensing under the new Safe Drinking Water Act, says John Lynch, director of the laboratory services branch in Ontario's

Ministry of the Environment.

However, Lynch says, automated systems could play an important role in ensuring water quality. He expects the new regulations to be in place by mid-fall.

"There's great potential for advances in science to add to our ability to monitor the quality and safety of our water supply, to ensure we have early warning of potential hazards, and assist us in intervening before a potential hazard becomes a dangerous situation,'' says Lynch. "We see it as part of a very dynamic process of continuos improvement, and we're trying to put in place systems that allow the public to gain the advantages they have to offer.''

Lynch says the system would have to be accredited through a laboratory-based accreditation system to ensure proper calibration and operation, and he sees a continuing strong human involvement in the water-testing process.

Even if it doesn't completely replace human testing, Ian Douglas, water quality engineer for the City of Ottawa, says he would certainly be interested in installing such an automated system in Ottawa.

Douglas says Ottawa does more than 5,000 e-coli tests a year, but that's really confirmation-type monitoring, testing after the fact. Samples are collected from more than 50 locations.

"However, if I took a sample today from a school and sent it to the lab, it would be processed overnight and we'd have to wait 20 hours to get a result,'' says Douglas. "Now if the next day we found we've got e-coli in it, you've already got some water out there that's possibly contaminated.''

At that point, another sample is taken to make sure the first test wasn't a false positive, and if the second test is negative as well, by that point the contaminated water has been out there for two to three days and people are at risk.

"If they have something that can do it in the order of an hour, then I think you're getting into the realm of more of a preventative tool,'' says Douglas.

Ottawa hasn't significantly changed its water-testing regimens or spent more on testing since Walkerton, since he says it already had set fairly rigorous standards. If an automated system proved to be robust, affordable and reliable, Douglas says he would use it as a supplement to the existing human testing.

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