



TEEX Tackles Toxins

TEEX develops ECLOX protocols to detect toxins in drinking water.

Thanks to the Texas Engineering Extension Service (TEEX), utilities personnel across Texas can monitor water safety and quality using a highly effective machine—ECLOX—that was once shelved and forgotten because no one knew how to use it correctly.

In a joint effort by the Texas Commission on Environmental Quality (TCEQ) and TEEX, scientists have now enabled cities to use the ECLOX to detect a variety of toxins that could accidentally or intentionally contaminate a water supply.

After 9/11, many public water systems acquired an ECLOX field analyzer to measure drinking water contaminants. But there was a big problem, says TEEX Water and Wastewater Laboratory Associate Training Specialist Keith McLeroy: The equipment came with minimal instructions and no protocols for establishing baseline data for comparing the ECLOX readings.

TCEQ turned to the TEEX Water and Wastewater Program to establish baseline data for 24 public water systems in Texas, and to develop a protocol for measuring possible contaminants.

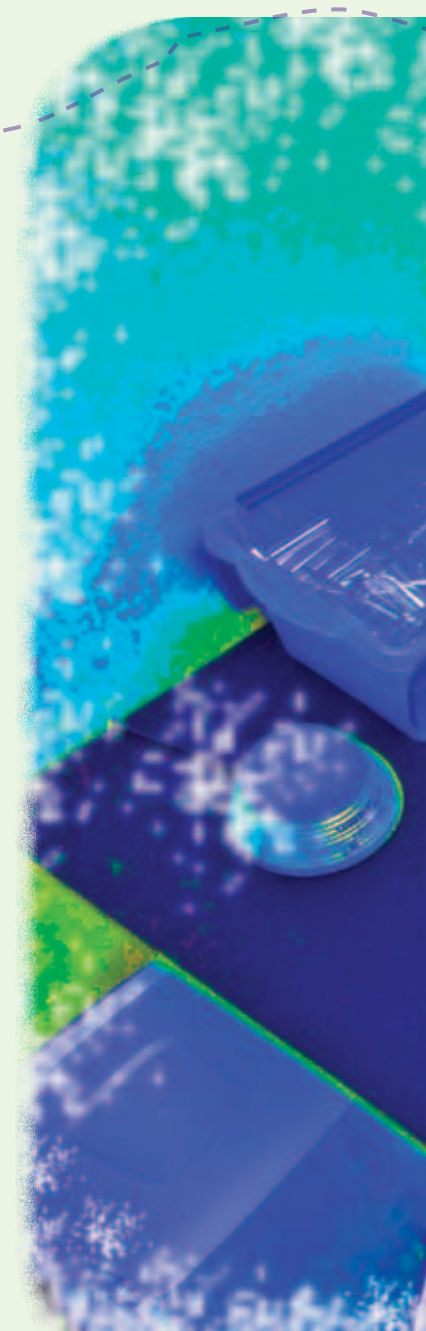
“We were able to establish, basically from scratch, all quality assurance and quality control protocols for running the ECLOX process on drinking water,” said McLeroy of TEEX’s Infrastructure Training and Safety Institute. “After many years of looking at every research paper with the word ‘ECLOX’ in it, we were the first to actually achieve this (developing the protocols) with drinking water—no one else had done that.”

After completing the joint project with TCEQ in which TEEX developed the specific ECLOX protocols, TEEX is now known for its expertise in ECLOX baseline data development, protocols, and training. McLeroy conducted a customized, one-day ECLOX training workshop for the city of Fort

Worth, after it acquired nine ECLOX units in 2008.

The ECLOX unit was originally designed by Dr. Gary Thorpe of the University of Birmingham, U.K., to measure contaminants in the effluent discharged by factories.

“In a nutshell, ECLOX stands for Enhanced Chemiluminescence Oxidation Reduction,” McLeroy said. “It’s basically a chemiluminescence process,





TEEX Training Specialist Keith McLeroy works with the ECLOX luminometer. Original photo by Martial Voltier, TEEX Photo manipulation Mary-Margaret Shread

which is two chemicals coming together to make a light. It's like those glow sticks that when you snap and shake them, they shine light, except this is a biochemical luminescence, similar to how a firefly combines two enzymes and that's what makes it light up."

When testing water samples, the luminometer records the light output. If the light is bright, the chemiluminescence chemical reaction is occurring

properly, McLeroy said. However, if a toxin, or some other substance that inhibits the chemicals coming together, is in the water, the light will dim or shut off.

"The ECLOX is an instrument, an analyzer—I liken it to a smoke detector," McLeroy said. "It's not going to tell you exactly what the toxin is in the water, only that something is wrong."

As TEEX and TCEQ are believed to be the only agencies developing drinking water protocols for the ECLOX, their reputation is growing.

"We've discovered that the ECLOX makes a great drinking water monitoring tool when used correctly," said McLeroy, who was assisted on the projects by Jeff Bowman and Marc Adams of TEEX's Environmental Training Program. ➔



“After years of work, Texas is now ECLOX central—there’s no other state with as much background data on drinking water. Other places have many ECLOX machines, but don’t know how to use them well yet,” McLeroy said. “So our goal is to get this technology and easy-to-understand training out to anyone around the globe who has an ECLOX machine.”

In the next two years, TEEX and TCEQ plan to develop ECLOX protocols for 12 more cities in Texas—helping ensure safe drinking water throughout the state.

“This work is important to Texas,” McLeroy said. “Because we have worked with TCEQ to develop ECLOX background data that is accessible and understood by ECLOX-using personnel, after the completion of this year’s cities’ protocols, that will be 36 cities that have the tools to maintain secure drinking water.”

**Some information from a TEEX news release*



Keith McLeroy holds the ECLOX, a device for detecting toxins in water.
Photo by Martial Voltier, TEEX.