

# On the front lines

## Blowing Bioterrorism Out of the Water

Charles Stack wasn't supposed to be what he is today—an environmental epidemiologist working on an invention that has potentially lifesaving applications in public health and environmental protection. Instead, he planned to be a doctor. To prepare himself for medical school, he enrolled in UIC's School of Public Health graduate program. Shortly thereafter, he abandoned ideas of medical school.

"Professor Janet Holden taught my first environmental science class at UIC, and she lectured about making energy out of waste. I thought that was so cool," Stack said. "She also taught bioterrorism. We were studying dirty bombs in 1979. The program was way ahead of the curve, and I was just pulled in."

Today, Stack is co-founder and vice president of Constant Compliance Inc., a Chicago-based biotech development company creating technology for early detection and containment of poisons in our water and food supplies.

While in graduate school, Stack initiated a collaborative project between UIC's School of Public Health and the environmental biotechnology program at the nearby Illinois Institute of Technology. The project studied the conversion of waste to methane. It was through this venture that he met Prasad Kodukula, an IIT student pursuing a doctorate in environmental engineering. At 26, while still a student, Stack formed Energene Inc., a company dedicated to marketing waste-to-energy technologies. He hired Kodukula, and together they counseled companies—including their first client, Kraft Foods—before their lives took separate directions.

For years Stack worked as an environmental scientist and consultant. Later conversations with Kodukula revealed that they both held patents relating to alternative energy and biotechnology. They decided to collaborate once again and formed Constant Compliance, uniting their common efforts and interests. Shortly thereafter, Sept. 11 happened.

"We were in the environmental business and tied into government chatter," said Stack. "After 9/11, we learned that the U.S. government was looking for technology to safeguard the public, so we were inspired to expand our services into public health and homeland security."

Stack and Kodukula turned their attention to BioCoil®, a patented device Kodukula developed to detect toxic substances in sewers. As the federal government examined the country's vulnerability, "We thought, we can modify what we have to protect the drinking water supply," said Stack.

Based on the technology of BioCoil®, they developed a patent-pending sensor, AquaCoil™, which detects toxins in drinking water supplies and beverages. The AquaCoil™ continuously samples liquid for poisons such as cyanide, nerve gas or ricin. If it detects contamination, the sensor transmits alarms to

cell phones and e-mail addresses of public works directors, government regulators, law enforcement officials—anyone who can take corrective action. Because the sensor offers immediate detection, authorities get the early warning that helps them prevent massive public health emergencies.

"It's the canary in the mine shaft," said Stack.

In January 2005, Constant Compliance received a patent for an addition to the AquaCoil™. A computer-based control system, SCADAR® (Supervisory Control and Data Acquisition with Response) detects poisons in the water and automatically triggers response actions, such as shutting of valves, diversion of flows and isolation of contaminated liquid supplies.



Charles Stack, MPH

"People assume that our government has ways to ensure the safety of our water," said Stack. "But if there was an attack on the water supply today, very likely it wouldn't be detected in time." Stack's invention provides the government with the necessary technology to detect contaminants immediately and ensure that the water supply is protected.

Now Stack's sights are set on getting the technology fully patented, obtaining funding to expand staff and research capacity, and getting the AquaCoil™ into use to defend our water supplies.

"This technology is going to change the way we live the same way safety seals changed our lives after the cyanide killer," Stack said, referring to the 1982 deaths of seven Chicago-area residents who took Tylenol capsules that had been laced with cyanide. "That was a threat we never thought about before it happened. I hope the threat [of drinking water contamination] is never substantiated by an event, but we're public health people; we want prevention." ■