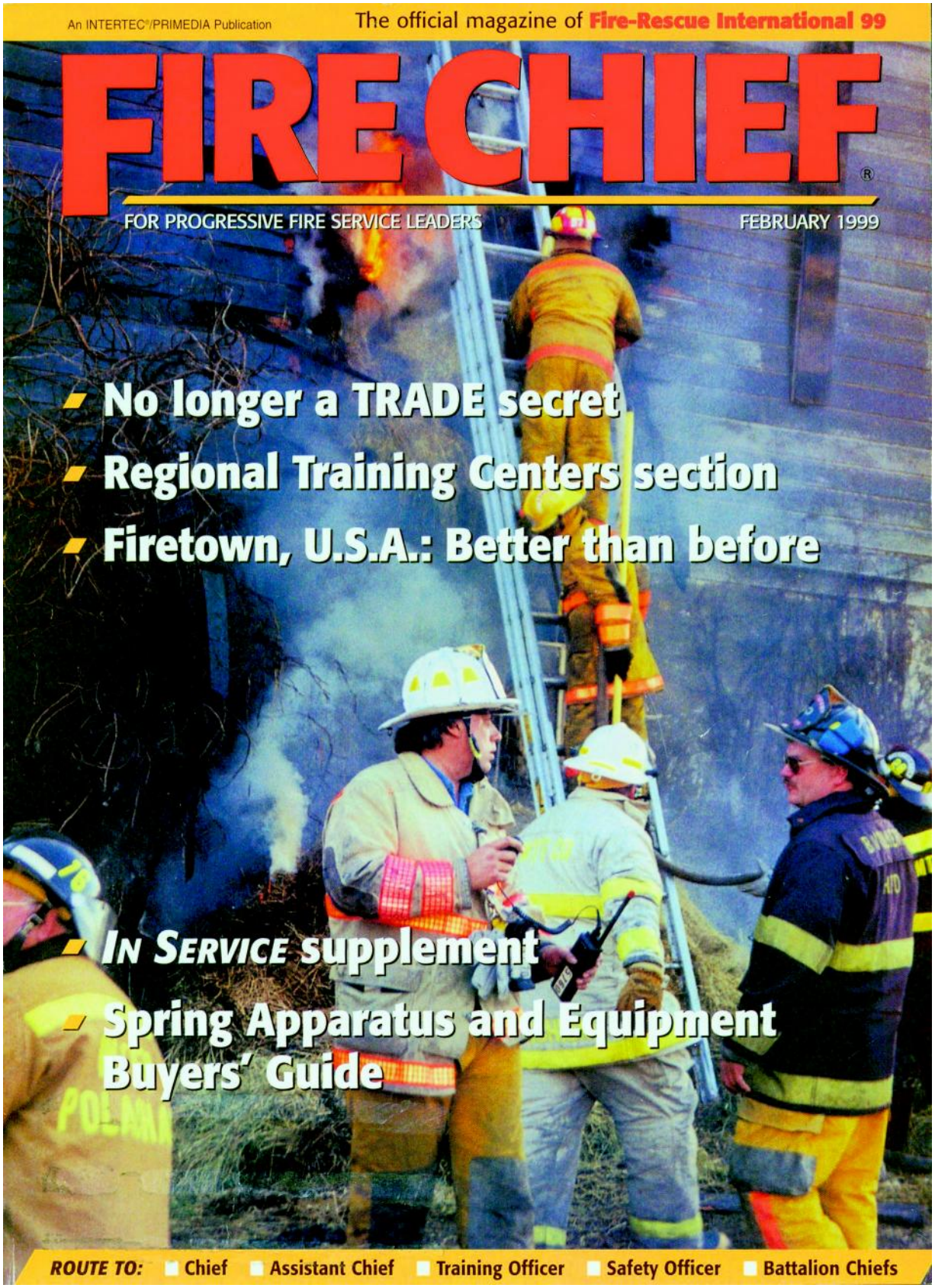
Page, Douglas
Rogue Firefighting Agent: Great Results, No Approval
Fire Chief
Vol. 43, No. 2 (February 1999)



Page, Douglas
Rogue Firefighting Agent: Great Results, No Approval
Fire Chief
Vol. 43, No. 2 (February 1999)

TECHNOLOGY UPDATE

By Douglas Page

Rogue firefighting agent: Great results, no approval

Despite its unapproved status, a water additive has shown great results in fighting fires that foam solutions and water alone couldn't handle.

On the morning of March 31, 1998, an unattended 65-car Norfolk Southern freight train began a silent, unstoppable roll from a rail yard toward the center of Lynchburg, Va., population 75,000.

When AFFF didn't work, Pyrocool was called on to fight a fire that broke out when a freight train carrying acetone crashed into another train in a Virginia rail yard. The unapproved foam was up to the challenge, using only 10 gallons of concentrate to put out the blaze.

Minutes later, the train, which included a tanker car filled with 20,000 gallons of acetone, slammed into the power-end of another unattended train. Fed by a spray of acetone and 7,000 gallons of diesel fuel onto the hot engines, fire erupted immediately. Toxic black smoke began to rise over an area surrounded by schools, homes and businesses.

Responding quickly, fire officials evacuated all civilians within a 50-block radius. Four engine companies from the Lynchburg (Va.) Fire Department, along with an apparatus from the community airport, began flowing AFFF. Even after responders applied 600 gallons of AFFF, the fire remained out of control.

Fearing an explosion and the resulting toxic cloud, Lynchburg Fire Chief Fred Mills ordered the application of a new, unapproved firefighting foam called Pyrocool, developed by Lynchburg-based Pyrocool Technologies Inc.

Within minutes, using less than 10 gallons of Pyrocool in a 99.6% water mixture, two firefighters extinguished the fire with a conventional nozzle on a single line.

Performance like this, measured against some of the world's most stubborn fires, is earning Pyrocool a reputation among firefighters. The product has more recently been used to help douse the Brevard County, Fla., wildfires and also a potentially toxic fire in a Campbell County, Va., recycling plant.

Whereas conventional fire extinguishment is based on oxygen deprivation, Pyrocool operates by eliminating the heat component of fire through a photochemical process. Wherever Pyrocool is applied, fire temperatures are immediately and drastically reduced.

In tests against magnesium, Pyrocool dropped the temperature from 1,354°C to 33°C in 30 seconds. On conventional hydrocarbons, temperatures are so dramatically cooled that, within seconds, firefighters can touch fire-containment vessels with their bare hands.

Advertised to be rapidly and completely biodegradable, the product has a 10-year shelf life, according to the manufacturer, and is designed for use where conventional foams are useless, such as against pressurized and three-dimensional fires.

Pyrocool can be easily batch-mixed in tanker trucks, and it doesn't contain fluorosurfactants that require clean-up. In fact, it's so environmentally benign that last year the product was given the 1998 Presidential Green Chemistry Challenge Award by the Environmental Protection Agency.

Approval for use in this country has been slowed somewhat while standards emerge to match the technology. According to Underwriters Laboratory, Pyrocool is on its list of approved wetting agents.

Bio-toxin detection technology a step closer, researchers say

Another new product that's not yet on the market could potentially have as dramatic an impact on toxic emergency response as Pyrocool has on extraordinary fires.

Researchers at the Department of Energy's Los Alamos (N.M.) National Laboratory have adapted the way cells naturally communicate with each other, packaging it in a sensing technique that's useful in the early detection of toxins.

At present the technique only detects the toxin created by the cholera bacterium, but the technology has been proved and what remains is detail. The new sensor is expected to work equally well at detecting other biological toxins, such as those that could be released by terrorist activity.

First responders may find the new fast-acting, highly sensitive detector vital in quickly identifying and minimizing the impact of terrorist attack. The method sniffs out specific proteins against an ocean of background molecules by mimicking the natural cell signaling processes. This is similar to our own sense of smell, in which a single recognition event triggers a cascade of signals.

According to lead researcher Basil Swanson, LANL Chemical Science and Technology Division, there's currently no such hand-held sensor that can be operated by a first responder. (This shouldn't be confused with the lab-based instruments currently available for the detection of pathogens or toxins.) "The closest thing is the Biological Integrated Detection System that the Army has, which is a Humvee with a bunch of instruments in it," he said.