The GuardianBlue Early Warning System

The first and only early warning system for drinking water certified and designated by the U.S. Department of Homeland Security.

The certification and designation by the U.S. Department of Homeland Security means GuardianBlue is approved as a security product and offers municipalities and their contractors litigation protection under the SAFETY Act.

The innovative GuardianBlue system uses patented technology to detect, alert and classify potentially harmful contaminants that can be intentionally or accidentally added into the distribution system.

While GuardianBlue’s benefits to the security of the distribution system are undeniable, the system can also detect, alert, classify and LEARN operational events, such as caustic overfeeds, roadwork, and pipebursts—improving your insight into the quality of the water within the distribution system.

The Complete System includes:
- GuardianBlue Agent Library (housed within the GuardianBlue Event Monitor)
- GuardianBlue Event Monitor
- GuardianBlue Water Panel (continuously measures pH, chlorine, turbidity, conductivity, temperature, and pressure with EPA methods)
- GuardianBlue TOC Analyzer
- Auto-Sampler (optional)
- Purge Gas Generator for TOC Analyzer
- First month of reagents
- Calibration standards
- Manual

For more information, call to request Literature #2573, or visit www.hachhst.com
All systems are vulnerable to a backflow attack.

Security is a real threat to the nation’s distribution systems. Several attempts to intentionally contaminate our nation’s water supply have been documented. For examples, please read Dan Kroll’s new book entitled, *Securing Our Water Supply: Protecting a Vulnerable Resource* (Prod. No. 6847600).

Hach recognizes this threat and has spent several years and thousands of hours of research developing a solution. GuardianBlue Early Warning System is the answer.

The GuardianBlue system analyzes 5 commonly measured parameters: pH, Conductivity, Turbidity, Chlorine, and TOC.

The system then develops a baseline for normal water quality for that site.

The GuardianBlue Event Monitor takes these 5 parameters, and through a highly sophisticated algorithm, it creates a dimensionless single signal vector called the trigger signal. Once a minute, the trigger signal is compared to the baseline, and if the user-set threshold is exceeded, a significant water quality deviation event has occurred.

The Event Monitor then compares the fingerprint of this event to its libraries, the Agent Library and the Plant Library.

The Agent Library has been created and developed by Hach Homeland Security Technologies through years of empirical data and testing. The Plant Library is developed on-site over time. These event fingerprints are learned and require the interpretation of operators who know the distribution system, so that the fingerprints can be properly interpreted and named. If a match in either library is detected, the Event Monitor reports the results. If the optional automatic sampler is purchased, it pulls a sample for additional forensic analysis.

For a demonstration CD, please order Lit. #2601
GuardianBlue = Water Security.

The GuardianBlue system has over 300,000 hours of real-world customer use. Extensive testing by Hach Company, the U.S. Army, U.S. Army Corp of Engineers and U.S. EPA ETV study have been performed. Testing at Edgewood Chemical Biological Center (ECBC), and the Army Corps of Engineer’s Construction Engineering Research Laboratory (CERL) were conducted using live warfare agents.

The following Event Monitor screen shots show the classification process of the threat agent.

A closer look at the trigger signal graph will determine the length of time and possible magnitude of the event. The individual sensor readings can be seen on this screen as well.

A water quality deviation is detected, and the fingerprint of this event is matched to a fingerprint within the Agent Library, causing the Agent Alarm annunciator to flash red.

The Agent fingerprint is classified as Dichlorvos or Dicrotophos or Methomyl with the greatest probability being Dichlorvos, and the automatic sampler has pulled a sample for forensic analysis.

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Detect changes before your customers do.

Ensure the health of your distribution system—build a distribution monitoring network for maximum surveillance capability.

- Detect cross connection in real time
- Detect contamination events—intentional or accidental
- Stay alert to quality degradation due to water age
- Identify degradation in water quality due to biofouling
- Locate and monitor dead ends and low flow areas of the system
- Detect corrosion by-products, improve corrosion control
- Alert operators and managers to undesirable changes in water quality
- Reduce labor costs associated with time and travel to perform grab sampling
- Troubleshoot distribution system issues remotely
- Identify trends and adjust operation parameters more efficiently

Caustic Overfeed Event
This event occurred when a plant experienced an operational problem that resulted in the feed of excess caustic. This affected pH and conductivity of the water, causing the Event Monitor to alarm. Operators named the event, and the Event Monitor learned and stored it in the Plant Library, so that a recurrence of the event can be identified.

Roadwork Event
Road work near a distribution line dislodged biomass and other particulate matter. This event illustrates the ability of the Event Monitor to detect and alarm on unanticipated events. This fingerprint for the materials adhering to the walls of the pipes in this location is automatically stored in the Plant Library.

Pipeburst Event
This graph depicts a 36-inch main break. GuardianBlue was 2 miles upstream and started to see significant deviations in water quality almost 3 full days before the catastrophic pipe break occurred.
The Event Monitor contains Hach’s patented water security algorithms and is the brains behind GuardianBlue Early Warning System. It integrates multiple sensor outputs from GuardianBlue’s Water Panel and TOC Analyzer. Every 60 seconds, the system’s patented algorithm analyzes deviations in five water quality parameters and uses the measurements to calculate a site’s water quality baseline. The system alarms when the trigger signal exceeds a user-set threshold, indicating a water quality deviation from the system’s normal operating baseline parameters.

**Agent Library—Detects Intentional Contamination**

The Event Monitor is equipped with a SAFETY Act designated and certified Agent Library which contains fingerprints of a wide variety of threat contaminants, ranging from cyanide and anthrax to arsenic and pesticides. The Agent Library provides the Event Monitor with the ability to classify contaminants that are nearly impossible to identify using current water quality monitoring techniques.

Municipalities will be able to update their Agent Library with new fingerprints through a subscription service when they are approved and released by Hach HST, allowing water utilities to take advantage of the latest research and development.

**Plant Library—“Learn” Water Quality Events**

The patented Event Monitor Trigger System identifies deviations in water quality due to operational fluctuations and calculates a fingerprint of each system event which is then catalogued in the monitor’s “Plant Library.” Operators can label event fingerprints for simplified identification should the event recur. With its demonstrated ability to “learn” specific system dynamics, the Event Monitor promises to become an invaluable tool for water utilities looking to quickly detect system events, lower system maintenance costs, and streamline plant operations, all while improving water quality and customer satisfaction.
INPUT FIVE PARAMETER SIGNALS

Baseline Data

OUTPUT TRIGGER SIGNAL

Trigger Signal of Event

ALARM REPORTING

Analyze

Software

LEARN

PLANT EVENT LIBRARY

Specifications*

Alarms
Trigger Signal Alarm, High/Low Parameter Alarms, Frozen Parameter Alarm, Sensor Off-line Alarm; Agent Alarm; Plant Alarm; Missing Sensor; Invalid Data

Power Requirements
115 Vac, 100 W

Operating Temperature
5 to 40°C

Storage Temperature
-20 to 65°C

Humidity
95% at 40°C max

Environmental
Industrial grade, splashproof, designed to IP62

Communications
RS-485 MODBUS®

Dimensions
18" high x 20" wide x 15.5" deep (46 x 51 x 39 cm)

For GuardianBlue Water Distribution Monitoring Instrumentation, see Water Panel pages 498-499, Automatic Sampler page 502, and On-line TOC Analyzer pages 500-501. For the WDMPsc as a stand-alone instrument, please see pages 420-421.

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