

The ChemPro as a Decontamination Tool

Most CWA Detectors Aren't Good "Sniffers" for Decon

The ChemPros are the only Chemical Warfare Agent (CWA) detection products that are also an excellent "sniffer." Traditionally CWA detectors only responded when they had reached the alarm threshold level. Levels below the alarm threshold level typically went unseen. Detection took time, as the algorithms were often written to provide good chemical classification and low false alarms at the cost of detection speed. This resulted in detection times of 30-120 seconds even when CWA detectors were used to sniff on "neat" or pure agent. Practically this meant that when using many CWA classifiers users had to scan very slowly with virtually unperceivable movement, like scanning for alpha radiation, in order to find and classify the contaminants.

PIDs as "Sniffers" with CWA Detectors

Because of lack of sensitivity and speed, CWA detectors could not be easily used as "sniffers" to determine where the agent was originating. To address this shortcoming, CWA detectors were often supported with sensitive and fast responding, broadband detectors like Photoionization Detectors (PIDs) to locate contamination and then CWA detectors were used to classify the contamination.

With "Trend" Display the ChemPro is the Only CWA Detector that can "See" Below Alarm Levels

The ChemPro is unique amongst CWA detectors because it is a sniffer and a classifier in one product. The "Trend" mode in the ChemPro allows it to be used as a sniffer to locate areas of higher concentration. By watching the rolling graph of the "Trend" display one can virtually see changes in concentration instantly. With the Trend display in the ChemPro family of detectors, the ChemPro can quickly and easily be used as a sniffer. The Trend display shows a rolling line graph where the left or "Y" axis represents relative concentration units and the bottom or "X" axis represents time.



In a clean environment one gets a relatively straight line across the bottom of this graph. However, when presented with a contaminant, the Trend graph will instantly generate a peak and then quickly recover when the contaminant is removed. By observing this graph of the concentration trend, the user can quickly differentiate a contaminated area from a clean area.

The Trend Display Still Provides Alarms

If the ChemPro goes into alarm while in the Trend display the nature of the classification alarm will be displayed in text at the top of the Trend screen so that users will never miss an alarm annunciation just because they are using the Trend display.

The ChemPro can "See" Much More than a PID

While the ChemPro is a multi-sensor or "orthogonal" detector, its core technology is Ion Mobility Spectroscopy (IMS) where chemicals are ionized, or broken down into positive and negative ions, and then the ions are sorted so that the unknown chemicals can be classified into functional groups. While PIDs also break down chemicals into positive and negative ions they only count the total ion flow and they don't sort ions to provide classifications of chemicals like the ChemPro. PIDs are usually limited to sniffing chemicals with ionization potentials of 10.6eV or less so they can't see chemicals with ionization potentials higher than 10.6eV like chlorine (11.47eV). The Americium (AM241) ionization source of the ChemPro produces 60,000eV so it can "see" many more chemicals with high ionization potentials (like chlorine and even Sarin) that go unseen or are poorly seen by most PIDs. AM241 is commonly used in smoke detectors and the ChemPro is covered by the same NRC exemption as smoke detectors. **The ChemPro isn't just limited to sniffing CWA, it can also be used on for Toxic Industrial Chemical (TIC) contamination.**

Don't Forget Nerve Agent Symptoms

When using the ChemPro on decon of personnel potentially exposed to nerve agents it is important to also note the symptoms of nerve agent exposure. Sometimes victims will start to display symptoms at contaminations levels that stress the capabilities of all CWA detectors. There are two major mnemonics used to remember human (and animal) nerve agent symptoms: DUMBHELLS and SLUDGEM. Each captures many of the same symptoms somewhat differently.

DUMBHELLS

- D**iarrhea (Diaphoresis-excessive sweating)
- U**rination (peeing)
- M**iosis (constriction of the pupil of the eye)
- B**ronchospasm (difficulty breathing)
- B**radycardia (slow heart beat)
- E**xcite skeletal muscle and CNS emesis (vomiting)
- L**acrimation (tearing)
- L**ethargy (fatigue)
- S**alivation (excessive drooling)

SLUDGEM

- S**alivation (excessive drooling)
- L**acrimation (tearing)
- U**rination
- D**efecation / diarrhea
- G**I upset (cramps)
- E**mesis (vomiting)
- M**uscle (twitching, spasm, "bag of worms")

Severity of symptoms is dose dependent.

Combining observed symptoms with the sensitivity of the ChemPro makes for fast scanning of victims in a decontamination line.