Are you missing something?

The normal gas detection tools that many HazMat teams take in on "unknown" calls are a 4 gas confined space monitor, (typically containing O_2, LEL, CO and H_2S sensors) and a Photoionization Detector (PID). But these 5 sensors may not be able to find many gases and vapors, leaving responders to blame the call on "mass hysteria" or "it must have gone away before we arrived on scene." What is needed is a "sniffer" that can "see" many more gases and vapors than the normal 5 sensors used in HazMat. Typically, if a HazMat team can find "it" they can remediate the problem. But the challenge is often finding "it." The ChemPro100i provides an excellent tool to help locate, classify and sometimes even identify "it."

What do the normal 5 sensors miss?

Oxygen sensors can be used to find gases and vapors if there is enough of "it" to displace oxygen. To displace 0.1 % of oxygen, which is the smallest increment of change on an oxygen sensor, you need to have 5,000 ppm of "something else." If 5,000 ppm of something else is around it usually isn't hard to find it. Similarly, LEL (Lower Explosive Limit of combustible gases and vapors) sensors lack the sensitivity, and typically require 100's of ppm before they will respond to "it". CO sensors respond to CO at increments as low as 1 ppm; however, while they are cross-sensitive to a number of other chemicals they don't see everything. Similarly, H2S sensors respond in increments as low as 0.1 ppm and have some cross-sensitivities but they don't see everything. For a number of years PIDs have been sold as the sensor that can find the gases and vapors that fall between the cracks of the four gas monitor. But most people use a 10.6eV lamp in their PIDs so that they miss many gases and vapors like chlorine, methylene chloride, formaldehyde and many others with ionization potentials higher than 10.6 eV.

The ChemPro100i is a "PID on Steroids"

ChemPro100i users have demonstrated that this high-end Chemical Warfare Agent (CWA) detector is the solution they have been looking for to find "it" when their confined space monitors and PIDs fail them. With its license free Americium 241 source that ionizes at 60,000 eV it can "see" many more chemicals than a PID by

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using the unique "Trend" or "Sniffer" display on the ChemPro100i. Here are some real examples of when the ChemPro100i found "it" when other technologies did not:

- "Chlorine" smell

"Received call for odor of chlorine in the residence. Homeowner and his wife had been home for about an hour and a half when she noticed a haze in the kitchen and smelled chlorine. He had been napping and woke up feeling groggy and she complained of burning in her nose and mouth. On arrival we sent in a two-man recon team with ph paper, a Draeger Pac 7000 chlorine meter and (2) MSA SafeSite meters with chlorine sensors in them. After doing a recon of the dwelling and getting no readings we deployed a second recon team with the ChemPro100i. In trend mode it began to get readings that spiked in the kitchen and then came down elsewhere in the house. …we did a quick check without SCBA and found a burnt electrical odor. Upon closer inspection we found it to be the refrigerator-freezer." The initial search with chlorine sensors took about 1.5 hours. Using their ChemPro100i100 they found the smell in 5 minutes.

- "Chemical" smell

Another HazMat team got called to a house for a "chemical" smell complaint from the occupants. A HazMat responder entered the house using a 5 gas monitor with PID but not wearing SCBA. Finding nothing on the first floor the responder cracked the door to the basement and got no response from his meter. But after walking just a few steps down into the basement he reported that the smell "knocked me on my …" A second responder entered wearing SCBA and using a ChemPro100i quickly located the smell in just a couple of minutes. The homeowner had disposed of the contents of their medicine cabinet in the trash. Something broke and mixed to produce the smell. The responders bagged the contents of the trash can and turned them over to a remediation contractor.

- Locating a Freon leak

"Our call was a refrigerant leak at a supermarket. The leak was in a mezzanine level mechanical room that was well ventilated. We had 2 crews trying to secure the leak. The only meter that we had that picked up anything was the ChemPro100i. Prior to having this meter, the only way we could estimate the concentration of this gas would have been to use a 4 gas meter and calculate it by the oxygen depletion. We currently have the meter on our hazmat truck, which must be specially requested to respond on calls. I plan on relocating it to our heavy rescue…"

- Locating a "gas" leak

"We successfully used our ChemPro100i 100 meter on an incident last night. Units were alerted for an inside gas leak in a single family dwelling. The first arriving unit entered the home with a standard four-gas meter and checked all levels. They found no odor of natural gas and there were no changes in atmospheric readings on any of the sensors in their four-gas meter. After investigating the dwelling, the crew members exited and two of them began complaining of dizziness and headaches. At that time a hazardous materials response was requested alerting our special operations team. Based on the symptoms the members were describing, and a report from the homeowner that a loud pop and hissing sound were heard coming from the basement utility room, we suspected a possible Freon leak. The only tool in our arsenal useful for detecting any of the Freon blends is the ChemPro100i. Two of our members entered the basement using the ChemPro100i and a PID. The ChemPro100i, in trend mode, led our guys right to the a/c unit in the basement utility room where they found a leak coming from the copper supply line going into the coil. We continued to check the atmospheric conditions in the basement while using forced air ventilation to clear the Freon. The ChemPro100i allowed us to gauge the effectiveness of our ventilation efforts, and finally to determine when the atmosphere was safe for the residents to return home."

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- Fire house odor

A firehouse had an odor of “sewer gas” for 2 to 3 days and appeared to be getting worse. Upon entry into the building a strong odor of H2S or sulfur was in the air, but the entry was made wearing SCBA. The firehouse was kept closed to contain the odor and a 4-gas detector indicated no VOC’s or LEL readings and oxygen levels remained constant at 20.9%. A ppb capable PID and a ChemPro100i100 in Trend display were used to “sniff” out the problem and in a few minutes the odor was tracked to one of the engines in the firehouse. Further investigation showed that one of the batteries on the fire truck was cooking off and had even pushed the sides of the battery out. Excessive charging voltage of lead acid batteries causes the acid electrolyte to evaporate caused the release of –HCL, SO2, sulfuric acid , hydrogen and oxygen; this can build up pressure in the battery which vents to product a characteristic acid smell reflecting the sulfuric acid contained in the lead acid battery. While sulfuric acid does not have a vapor pressure and is not usually present as a vapor it is carried into air by the built up pressure in the battery. In the “TIC Classifier” library the ChemPro100i provides responders not only with an acid sniffing solution but also the ability to classify the vapors as “TIC Acidic”.

- “Sickening” tractor trailer

Workers at a “box” store complained of getting sickened while unloading a trailer on a hot summer day. When Hazmat arrived they sniffed the now closed trailer with their four gas monitor and PID but found nothing. They got a “Chemical Detected” alarm when they used their ChemPro100i. Upon unloading the trailer wearing SCBA and bunker gear they identified a “hot” pallet that they off-loaded onto the parking lot. They removed the shrink wrap from this pallet and it quickly off-gassed allowing it to be moved into stock in the store.

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- Sick Building

We responded at approximately 0830 for a report of occupants of an office building experiencing symptoms consistent with a corrosive atmosphere. The occupants were experiencing respiratory distress as a result of exposure to an unknown chemical. While responding our dispatcher notified us that two occupants were being transported to local hospitals for evaluation via personal vehicle. We were carrying the ChemPro100i on our apparatus that day as a trial to see if there was an application in everyday operations (versus leaving it on the Hazmat truck).

- The building was an office/warehouse for our state. There were no chemicals on scene except cleaning and household chemicals not unlike any other office building. As workers were sitting at their desks they started to experience respiratory discomfort including burning of the eyes, nose, throat, and mouth. The problem was concentrated in one specific area of the building approximately 60'X200' in size. A uniformed police officer of the (state agency) was already on scene as a worker had been dismissed the previous day. The worker was dismissed for erratic behavior that included drug and alcohol issues and extremely poor performance. He indicated as he was escorted from the building that they would be sorry. Based on this information we assumed this threat was followed through on and took every precaution to identify the product.

- The initial action was a recon of the building in full firefighting PPE with SCBA. As part of the Recon the initial entry crew took a four gas (monitor), pH paper (wet and dry), PID with a 10.6 lamp, and a radiation detector with a scintillator probe. Throughout the entire building the readings for all these devices were normal. The occupancies on either side of the target building was metered as well with the same result. We decided to try the ChemPro100i as a last resort using the trend display. We were able to get an unknown chemical detected alarm in the area where the occupants experienced symptoms. Directly above the desk area was a discharge for the HVAC system and when the probe of the ChemPro100i was placed near the discharge grate the trend display increased and went into an alarm. The assumption was made that the HVAC system was to blame and we activated the system to reproduce the results. The readings initially increased and then actually went down after activating the system. After a thorough review of the system it was determined that the system drew fresh air from the outside via a fresh air intake. An investigation of the surrounding properties revealed that a large cloud had passed by the building at approximately 0815. The adjacent occupancy had fired up a kiln at 0800 and had cremated several animal carcasses.

- It was determined that the byproducts of the cremation of animals had been drawn into the fresh air intake of the HVAC system and distributed into the office area in question. As the cloud was gone there was no way to capture readings directly from the kiln. Tedlar samples were taken and ran on a HazMat ID as well as an FID with no results. If not for the ChemPro100i we may have mistaken this event for a psychosomatic sick building call and would have never found the source of the problem We simply would have ventilated and had the occupants go about their day with no definitive answer. Our findings

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were able to help the emergency department of the receiving hospital treat the patients that were transported. While we were not able to definitively ID the product we were able to rule out several other products and locate the source of the problem using the ChemPro100i.

Conclusion

Without the ChemPro100i perhaps these gas detection riddles would never have been solved. Because of stories like these, the ChemPro100i has become a first out detector for many of our customers, and an important tool in their gas detection toolboxes. But the ChemPro100i is much more than just a sniffer. It can characterize unknown environments, identify a limited number of gases and vapors, measure radiation rate and dose and even provide protection against the rare CWA attack.

The good thing about the ChemPro100i is that it is not just a CWA detector. It can be used in routine HazMat so that neither the ChemPro100i nor your user skill set will be dusty when you really need it.

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