



# GETTING TO “WHY” IN YOUR GAS DETECTION PROGRAM

Why comprehensive and real-time information is more important than ever to solve workplace industrial hygiene and safety challenges.

By Josh Futrell

For some of us, the board game Clue, or one of its many variants, was our first foray into the world of investigation. Participants move around the board, gathering facts about a recent murder and eliminating possibilities, to piece together a conclusion like “Ms. Peacock killed Colonel Mustard in the study with a candlestick.” This beloved, somewhat ominous children’s game highlights the importance of answering the big five questions when a critical event occurs: Who? What? When? Where? Why?

Safety leaders frequently are called upon to answer these same questions about incidents or near misses. Who encountered what risk at what time and at what location? Why did the hazard happen? All of this drives toward the ultimate goal of the profession; how can we make sure this never happens to anyone again?

Though the investigative process is something we are brought up to engage

in since childhood, we are not always effective at it. There are many obstacles that occur. We only get some of the facts at the outset. We have to do a lot of leg work to get to others. We deal with human factors like bias, forgetfulness and complacency. We find that information gets stale and harder to find over time. Persistence, a structured process and a little bit of luck are what’s required to get to “why.”

For gas-related hazards, these challenges especially are prevalent, given their ephemeral nature and the existing technology used to detect and gather data about them. It also assumes that a gas hazard is reported in the first place. Many gas detection programs rely on self-reporting. Workers are trained to stop what they are doing when an alarm occurs and report it to their supervisor. On the surface, this simple approach ensures that all necessary information is collected first-hand and allows teams to get to “why” almost immediately. It is a bit like getting to





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the right answer in Clue on your first turn.

In practice, manual reporting leads to alarm events vastly being underreported. An analysis of data from companies that have transitioned from manual reporting alone to automated systems like docking stations have shown as much five times as many alarms actually occurring vs. previously being manually reported.

There are many reasons for this. Workers have reported not noticing the alarms occurring in the first place. Others neglected to report an incident because they felt like they might get in trouble. Some were focused on getting their jobs done – “I just need one more minute to wrap up” – ignored the alarm or even turned the monitor off and then felt the ends justified the means when nothing bad happened. There are countless other reasons, behavioral and cultural, that stand in the way of a manual reporting program being effective. Without automating your gas

detection program with docking stations or other means of data collection, you may be very successful at winning the game of Clue, but you only are playing the game 20 percent of the time.

## Docking Stations and Data Gathering

When docking stations are introduced, safety personnel typically are inundated with more data than ever before. The docking station ensures they’re playing 100 percent of the games of Clue they should be playing, but it leads them to begin with limited information, to work on many different games at the same time and to fill in the gaps. This is because of the differences between information provided by docking stations and what is gathered with manual reporting policies.

While portable gas detectors are great at recording basic information like “what”

and “when” – “gas detector serial #1234 saw a high H<sub>2</sub>S alarm for five minutes last Friday at 9:14 a.m.” – they are not always well equipped to tell you “who” and “where.” In order to get the data in the first place, the gas detectors have to be returned to the docking stations by workers. This can happen hours, days or even months after an event has occurred.

These roadblocks can cause some employees to get discouraged and ignore the data coming from these systems completely. Still, many others have put the people and processes in place to manage these investigations such as working through the alerts coming in with the help of automated reports emailed to the appropriate people. SOPs encourage accountability and follow-up and a culture that drives incidents to closure. It is not unusual to see unwanted behaviors and events drop drastically after data starts being looked at and actions are taken as a result. For example, when a steel plant moves from 90 (gas monitor used without a bump test) alerts in their first month of reporting to less than five alerts per month on average for the next two years or an oil refinery goes from 24 gas alarms in its annual turnaround to two the following year. There are large payoffs for those who play the game of Clue all the way to the end.

The people who are most successful at understanding their data have taken advantage of the latest gas detection technologies. These technologies improve the data coming in when an alarm is first reported, helping people get to “why” sooner. To solve for “who,” many people assign gas detectors permanently to people and track that information manually either in spreadsheets or sign-out sheets or by setting it within the gas detectors’ software. Some monitors dynamically can even be reassigned to users in the field thanks to NFC or RFID tags, allowing for user names to be added to instrument data even if the instruments randomly are being grabbed from a shared pool of equipment. These methods quickly can turn information like “gas detector serial #1234 saw a high H<sub>2</sub>S alarm for five minutes last Friday at 9:14 a.m.” to “John Smith’s gas detector saw a high H<sub>2</sub>S alarm for five minutes last Friday at 9:14 a.m.” This information puts you one step closer to winning the game.

## Solving the Question of Where

The question of “where” has been more difficult to solve. Most industrial hygienists

or safety professionals rely on follow-up conversations. “John, where were you last Friday at 9:14 a.m.?” It sometimes is hard for workers to remember where they were, let alone the context of the situation. Some portable gas detectors can be equipped with GPS, which can provide a fairly exact location, though GPS is a notorious power hog and can limit the runtime of instruments. It also does not work well indoors or in complex, industrial environments.

Others use Wi-fi and complex triangulation calculations to determine location, but this requires a lot of installed infra-

structure to get accurate results. Another challenge of using GPS or Wi-fi-based locations can be worker unions whose members may have mixed feelings about being so closely tracked.

Some gas detectors offer a less-precise – but in some ways more actionable – method to determine location in the form of freeform text like “Tank 1” or “Coker, Northeast Corner.” These location assignments manually can be entered into instruments’ software, set by workers dynamically via NFC or RFID tags or automatically set based on an instrument’s

proximity to Bluetooth-enabled beacons. The game of Clue now can start with a lot of cards already on the table. “John Smith’s gas detector saw a high H<sup>2</sup>S alarm at Tank 1 for five minutes last Friday at 9:14 a.m.” Getting to “why” becomes much faster.

Even with all of this information, there still are additional areas in which gas detection manufacturers need to innovate to help safety leaders get to “why” faster. One is providing more contextual information to help confirm if a “what” even occurred and a game of Clue needs to be played in the first place. When we get an alert that “John Smith’s gas detector saw a high H<sup>2</sup>S alarm,” that doesn’t necessarily mean that John was exposed to a toxic gas or engaged in risky behavior. Perhaps he was safe and there is no action to take. Maybe he was wearing an SCBA and performing according to company standards and best practices. He may have been taking a remote sample as part of a confined space entry. John actually could have been in danger, signaling that administrative or engineering controls need to be put in place.

For now, it is left to safety leaders to investigate and gather these clues manually. In the future, equipment manufacturers might find ways to add more metadata to instrument logs and reports to filter out safe and unsafe behavior data automatically.

A final way that the industry is working to get to “why” faster is by getting data to users in real time, turning “last Friday at 9:14 a.m.” to “just now.” Wireless, portable gas detectors have been around for over a decade. Recently, more and more manufacturers are offering wireless solutions, and the technology is becoming easier and cheaper to implement. It is very possible for safety personnel today to get an alert on their laptops, smartphones, control panels, etc., saying, “John Smith’s gas detector is seeing a high H<sup>2</sup>S alarm at Tank 1” and act immediately to eliminate undue risks.

It’s like starting the game of Clue already knowing the answers, or rather, graduating entirely from playing the game and moving to the complex, rewarding task of asking “why” and “how do we keep people safe?” **EHS**

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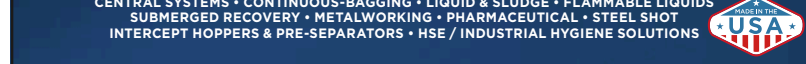
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