



Oil and Gas Companies: Safer Production through Gas Detection Technology

Companies that are involved with the discovery, production, processing, refining or transportation of oil and gas products might have unique gas detection needs, but gas detection programs share a similar architecture.

BY CARL MONDY

It's easy to think of oil and gas companies simply as producers of oil and gas. While this primarily is true, these companies are, in fact, complex and comprised of many divisions, including chemicals, exploration, gas processing, marketing, pipeline, production and refining.

These divisions sometimes are called upstream (exploration and production), midstream (gas processing and gathering), downstream (refining and chemicals) and transportation (pipeline, trucking or terminals). Each of these divisions can have very unique gas detection needs, but in many cases, the gas detection program architecture is very similar. This article discusses gas detection programs for exploration and production (E&P) operations.

E&P operations consist of teams or assets. There typically is a corporate office with a corporate staff, a division office with a division staff and field offices at strategic production sites. Groups of drilling engineers, reservoir engineers, survey engineers, environmental engineers, land men and financial

advisors work both separately and as a team to determine the viability of the play (production zones). Once the determination is made to move forward, the exploration or drilling process begins.

When the oil or gas is brought to the surface, production operations take over. The three preferred methods of oil and gas production are flowing (where bottom hole pressure is higher than top hole pressure), secondary recovery (water injection) and tertiary Recovery (such as CO₂ injection). The oil typically is sent through a flow line to a tank battery, which is a group of holding tanks where water and oil are separated. The oil is sent via pipeline or truck to a destination, where it is transferred to a pipeline company or nearby refinery. The gas is sent to a gas gathering system and then to a processing plant for cleanup. The natural gas is stored in pressurized or underground salt domes until delivery is needed. Eventually that gas finds its way to our homes, retail or industrial and commercial properties.



Sound easy? It's not. A host of professional oilfield service companies are contracted to the operators in order to make this happen, including drilling companies, well service companies, pumping unit service companies, geology and survey companies, logistics companies, supply companies, safety companies and hundreds more.

E&P GAS HAZARDS

The most common gas hazards in E&P operations consist of a variety of combustible gases, hydrogen sulfide

(H₂S), carbon monoxide (CO), carbon dioxide (CO₂) and other gases. Other hazards include oxygen deficiency or enrichment. Fixed or area monitors, confined space monitors, hot work monitors and personal monitors all are used together in a systematic approach for detecting these hazards.

Tank cleaning, trench work and cellar entry are a few of the operations in which confined spaces are an issue at E&P sites. Hot work is an even more common issue due to the transient nature of some services such as rig movement and well servicing. Personal

monitors are the most commonly used monitors. The type of personal monitor typically is single gas H₂S or LEL. However, there is data that supports the growing demand for small, four-gas personal monitors.

MAKING DO WITH FEWER ARMS AND LEGS

Once an operator has gas detection equipment, he or she has the additional responsibility of ensuring that the equipment is properly maintained. Maintenance includes repair, record-keeping, bump testing, calibration, inventory and employee training.

With fewer arms and legs available to safety professionals, outside help can be beneficial. A growing trend is the use of docking stations to do calibration, bump tests and documentation. Unfortunately, that removes only a small burden from the field safety representative.

Monitor maintenance and repairs

– E&P employees will bump and/or calibrate their monitor before each day's use. Docking stations are an easy way to automate these functions. However, that still leaves the service or maintenance functions of the monitor unaddressed.

You might ask yourself: How do I get it repaired? Who do I send it to? Do I have to issue a purchase order? Do we have replacement inventory on the shelf? E&P safety professionals manage these questions on an ongoing basis. Automation has been able to address each one of these common questions as part of a gas detection solution.

Monitor management – Making program decisions is difficult for anyone. Before deciding which program is best for your company, consider:

- Who should be a part of a committee that determines scope?
- Is buying our best option, or is there a better way?
- What is the ultimate goal of our program now and in 4 years?
- Who will manage our inventory?
- Why are all of our business units doing something different?
- What is our budget?
- What is our current program's cost?
- How can we manage 2,000 monitors in 12 different states?
- What solution best meets our company's needs?

Visibility – The most common question is, "What's really going on out

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there?" Automation and technology can answer that question. The data collected and stored by gas detectors can supply a wealth of information about a company. For instance, were all gas monitors in the field bump tested today? What asset had more alarm events this week? Within that asset, what work group had more alarm events? Within that work group, which individual had more alarm events?

Most gas detectors have this data collection ability built in. Thanks to technology, making sense of the data and how you can apply that information to make the workplace safer and more efficient is becoming a best practice in many up-stream oil and gas companies.

Three years ago, Ben, a safety professional for a major oil and gas producer, explained that E&P safety people are immediately at a disadvantage due to the nature of their business.

"In a plant environment, there are operators and contractors inside the fence all the time," he said. "There are many sets of eyes. In our world, a

pumper gets in a truck by himself (if a buddy system is not in place) and leaves the field office in the morning to check on his lease where some of the tank batteries have 200,000 ppm H₂S. The work sites have fixed gas detection systems in place. The pumper is provided with PPE, breathing equipment, personal and multi-gas detectors and ongoing training. There is that nagging sense of the unknown. We don't really know what's happening out there as far as gas detection is concerned. Managing remotely is a chore."

LOOKING FOR SOLUTIONS

Many E&P companies have chosen to go the route of gas detection as a service, choosing instrumentation like iNet from Industrial Scientific as a solution to their gas detection challenges. With multiple personnel involved in ensuring workplace safety, the solution has to meet several different expectations. Some users want a gas detector that is reliable, easy to use and always working properly. For others, it is impor-

tant to capture data from the devices to assist in exposure information. One training department representative procurement manager noted, "I want to make sure that we have one, consistent gas detection program that is sustainable. When employees transfer in and out, we don't have to re-train them to a different system."

While some end users are concerned with the cost of the program and want to make the best business decision possible, the bottom line for all end users of gas monitoring equipment, in the words of one safety manager, is "to make sure that the program is the best it can be and our employees are protected."

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