

How Optical Gas Imaging Tools Promote a Culture of Safety

Hazardous gas visualization provides actionable, shareable detail for personnel

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When developing or strengthening a culture of safety in an organization, the word “culture” should bear as much emphasis as “safety.” Without organizational dedication, safety protocols or procedures can risk seeming ancillary to the operation’s shared objective, when ultimately safety must be a core value of any operation dealing with potentially hazardous gases. Buy-in from all levels helps avoid weak links where a serious lapse in safety might occur. Safety protects not only the practitioner of safety but that employee’s coworkers and others as well. Upstream and downstream oil and gas operations, along with power plants and other industrial facilities, should partner with technology providers that emphasize safety. For example, FLIR, designer and producer of thermal imaging cameras and sensors, is determined to be “The World’s Sixth Sense,” a goal explicitly rooted in bringing about a safer future. Organizations that work with gas that can cause injury should seek to integrate effective and efficient technologies that ensure safe operational practices. Recent advancements in Optical Gas Imaging technology offers companies in a number of industries the opportunity to improve safety and bolster a culture of safety throughout the organization.

Implications of Safety Equipment for Culture

Many common safety practices depend upon safety equipment that operates solely within an area of relative unsafety. The wearable gas monitor plays an important function in protecting workers, but it only warns of a danger once the person wearing it is standing in a cloud of gas. There are several other technologies that allow operators to find an unsafe condition within a piece of equipment, but few of these operate until the user is within that unsafe condition. This holds true for low-tech but prevalent safety tools: namely, the common soap bubble. In sum, these technologies and their results could send a cultural message that some risk is acceptable and

perhaps inevitable, contradicting the message of safety.

Just as certain safety tools carry an apparent inevitability of personal risk, so do some routine safety tasks. A prime example from the upstream oil and gas sector is the practice of tank gauging. Employees must scale a ladder and walk out on a catwalk in order to extend a dipstick into the liquid. The worker stands directly over a tank, where a potentially high concentration of gas emissions may lurk undetected.



Example: Oil and gas industry worker on tank catwalk and inside gas leak from open thief hatch.

Downstream, the risk profile changes. Many of the hydrocarbon gases in refineries are more toxic than those present at upstream facilities. As a result, an employee who unknowingly enters an unsafe area could face more pronounced negative consequences, or negative effects in less time. A prominent method for detecting unsafe gas levels in this context are wearable gas monitors.

Even the most common safety monitoring equipment invites a level of uncertainty. A wearable gas detector begins to beep: Is the wearer at the edge of a gas cloud, or at its center? In which direction should the wearer go to get out of the hazardous area? More importantly for remedying unsafe conditions, where is the exact location of a leak? While these technologies may be good at detecting the presence of gas, they have their drawbacks. Using them could encourage, to some extent, a cultural feeling that close enough may be good enough.

Moving Beyond Traditional Uses for Optical Gas Imaging

Historically, Optical Gas Imaging (OGI) has been viewed through the lens of compliance. Regulatory parameters surrounding emissions must be met, so companies invested in OGI resources to identify emission sources. Now, more and more oil and gas leaders are adopting strategies to voluntarily reduce emissions to stem climate change. The CEO-led Oil and Gas Climate Initiative, for example, includes thirteen major corporations. In the United States, the ONE Future Coalition has set a goal to reduce emissions to 1 percent by 2025 across the natural gas supply chain. OGI provides an effective and efficient measurement technology for many gases targeted by these efforts, particularly methane. In this way, OGI contributes to operational safety and safeguards the environment. Companies continue to find that safety pairs not only naturally with environmental stewardship but also advantageously. For example, Wyoming-based Jonah Energy uses a FLIR GF320 infrared camera for methane and VOC detection. After implementing this program, Jonah Energy reduced fugitive emissions by 75 percent over several years while accruing cumulative gas savings that exceed \$5 million—more than covering the overall program costs.

Utilities and oil and gas companies have begun inspecting components with OGI that do not fall under regulatory requirements to reduce emissions at more points. A partial driver of this broader role for OGI is a major reduction in the cost of high-quality imaging systems. Uncooled infrared imaging devices such as the [FLIR GF77](#) are available at a vastly reduced price-point when compared with cooled OGI models. This affordability, along with the willingness to leverage OGI in new ways, has led organizations to rethink the relationship of safety equipment to personnel. Traditionally, a Leak Detection and Repair (LDAR) team alone would use OGI, with the possibility that the Environmental Health and Safety (EHS) team might have access to the technology at some facilities. Now, the lower price-point of handheld OGI devices allows more workers, such as maintenance repair technicians, to utilize the “sixth sense” of gas detection, giving more members of an organization a valuable tool in evaluating the safety of their workplace.

The Inherent Safety of Distance

A primary safety benefit that doubles as a safety *culture* benefit is the visual range of OGI cameras. Unlike other tools, an OGI camera offers the ability to visualize unsafe conditions from a safe distance. Equipped with OGI, refinery employees can judge whether an area contains a toxic gas build-up, sparing them exposure to the gas that would be required to set off a wearable, beeping gas monitor.

Likewise, workers tasked with gauging large tanks can assess the emission characteristics of the tank before placing themselves in any potential cloud. With OGI, employees in this situation can easily scan in the direction of the wind flow, giving them the opportunity to select a safer position on the catwalk or, if no gas is visible, give an all-around all clear for safer measurement. OGI gives employees actionable, precise information about the hazards that exist in their immediate surroundings, without endangering personnel.

OGI for Analysis in the Context of a Team

OGI also contributes value from an analysis and teamwork perspective. By comparing results from cameras, operators can identify consistencies between components that are failing in an operation to discover root causes to issues. For example, OGI could produce evidence that enables users to discover an incorrect parameter such as pressure. Or, perhaps a certain type of component consistently fails within an area. Because cameras like the FLIR GF77 are calibrated to measure temperature, they foster multi-variate troubleshooting that can aid problem-solving.



Images and videos from OGI devices such as the [FLIR GF77](#) can provide a fact-base for troubleshooting safety and operations issues.

OGI also provides data that's not possible with traditional gas detection equipment, empowering communications between team members with facts to easily reference. In particular, OGI videos are worth more than a thousand words for personnel. Videos give users a tool to easily highlight unsafe practices within an organization. The FLIR GF77's LCD touchscreen allows users to adjust images for better visualization, and its Wi-Fi communication protocol provides users the ability to immediately inform others of a hazard via smartphone to expedite the repair process.

Optical Gas Imaging Strengthens Safety Culture

The new affordability of OGI technology not only enhances safety monitoring for oil and gas applications but also strengthens an organization's culture of safety. OGI protects personnel by showing the safety threat from a distance, before a worker is necessarily in harm's way. It empowers any user to establish the facts of an unsafe situation in order to seek a swift remedy. Plus, as more personnel carry the capability, more vigilant eyes can contribute to the safety of an operation.

These benefits are not exclusive to upstream and downstream oil and gas facilities. The lower price-point of quality equipment allows new industries to make use of OGI as a tool for environmental stewardship and safety. In addition to the natural gas company, power plants that turn natural gas into electricity can use OGI to protect employees and operations from undetected leaks. Utility companies are now purchasing OGI cameras for this purpose, beyond using the technology for compliance only. In the same way, renewable energy companies can use OGI to monitor gas, increase safety, and improve the culture of safety.