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For the Subcommittee on Energy and Mineral Resources
House Committee on Natural Resources
On
Oil and Gas Development: Impacts on Air Pollution and Sacred Sites

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Subcommittee Chairman Lowenthal, Ranking Member Gosar, and members of the committee, thank you for the opportunity to speak on behalf of FLIR Systems regarding impacts on air pollution and sacred sites with oil and gas developments. As a member of the Center for Methane Emission Solutions (CMES), we work with numerous entities to provide a voice for business that offer innovative solutions for methane mitigation. FLIR Systems designs, develops, manufactures, markets, and distributes technologies that enhance perception and awareness. We bring innovative sensing solutions into daily life that provide the world with a sixth sense, helping people around the globe save lives, protect the environment, and enhance productivity. We're building more than innovative technologies; we're striving to build a more sustainable, more efficient, safer future.

INTRODUCTION

With over 50 years of experience providing sensing solutions to a variety of industries, FLIR Systems has proven itself as the leader in the Infrared (IR) market and beyond. We began our journey introducing the first commercial infrared scanner to the market for electrical powerline inspections in 1965. In the many years to come FLIR has revolutionized the industry with a variety of products related to infrared like the first portable IR scanner, first dual wavelength system and the first uncooled infrared cameras, to name a few.

FLIR GasFindIR™

Infrared thermal imaging cameras have been used for decades in a variety of oil and gas applications, including electrical/mechanical inspections, tank level inspections, and even examinations of pipe integrity within process equipment. Almost 14 years ago on June 8th, 2005, FLIR entered the emissions reduction industry introducing the first commercially available Optical Gas Imaging (OGI) camera,

the GasFindIR.[1] This product was the first commercially available infrared camera capable of detecting volatile organic compound (VOC) gas emissions. Sources of VOCs at that time included petrochemical facilities, natural gas pipelines, transfer stations, tankers, railway cars and even landfills emitting methane gas and other toxic chemicals into the environment. Through the years this technology has been utilized by industry to proactively mitigate emissions throughout a variety of applications including meeting emission reduction requirements, ensuing safe work practices and complying with regulatory requirements. OGI cameras offer a safe and efficient way of visualizing hydrocarbon emissions in a timely manner as you can quickly check a large number of components.

On April 17, 2018, FLIR received the Inaugural Leadership & Innovation Award at the Oil and Gas Methane Leadership Awards in Toronto. [2] This award ceremony, sponsored by The Pembina Institute, Environmental Defense Fund and others, honored actions to reduce methane emissions from the oil and gas sector.

TECHNOLOGIES FOR REDUCING EMISSIONS

The U.S. natural gas industry as a whole emitted 162.4 million metric tons CO2 equivalent of methane in 2015.[3] In addition to regulatory compliance issues, this equates to lost product for operators. The industry is faced with how to best find and repair natural gas leaks at potential escape points, including compressor stations, processing plants, hydraulically-fractured wells, and along transportation lines.

Before the development of OGI cameras, most oil and gas facilities used a toxic vapor analyzer (TVA), otherwise known as a "sniffer," to analyze gas concentration levels and quantify gas emitted to the atmosphere. TVAs are reliable, relatively low cost, and can identify most gases. The disadvantage compared to an OGI camera is that the operator must know exactly where to go to look for the fault – and physically touch it. Often you must point the TVA exactly where the leak is originating to find it whereas with an OGI camera you can easily identify the leak location and source quickly. On one study, OGI was found to be considerably (up to nine times) faster than a sniffer.[4]

Image of an operator working inside methane emissions

Optical gas imaging also offers several safety advantages over a traditional TVA. It enables remote detection of a gas that could potentially explode or cause health issues to those

breathing in the gas. OGI cameras enable operators to remain at a safe distance away during inspections. Rather than standing in a cloud of gas, they can remain on the ground, point to a spot 10 or 20 feet high, and determine if it is leaking gas into the atmosphere. Ron Lucier, an instructor at the Infrared Training Center in Nashua, NH, cites the importance of being able to check for gas plumes from a safe distance. "Methane and other hydrocarbons are not only flammable, but in high concentrations they can cause asphyxiation," Lucier explains. "With TVA gas 'sniffers' you know the gas is there, but you don't know how much. OGI users can immediately see the size of the gas plume – something that's impossible to do with a gas sniffer."

REGULATROY HISTORY OF OPTICAL GAS IMAGING

After the announcement of the GasFindIR, and this new technology, some regulatory agencies began researching the utilization of this advanced way of detecting emissions. On April 6, 2006, the United States Environmental Protection Agency (USEPA) proposed voluntary alternative work practice for leak detection and repair using a newly developed technology, optical gas imaging. This proposal was to allow for OGI cameras to be utilized in lieu of traditional Method 21 leak detection instruments, also known as Toxic Vapor Analyzers (TVAs) or sniffers. On December 22, 2008 the final action of this proposed alternative work practice was effective with the amendment of the rule to require an annual monitoring utilizing the current Method 21 leak detection equipment.[5] The result of this allows operators to use OGI three times per year to better locate emissions in a more efficient and effective manner.

In 2015, the USEPA proposed amendments to the New Source Performance Standards (NSPS) at 40 CFR Part 60, Subpart OOOO and set out to establish new standards at 40 CFR Part 60, Subpart OOOOa in the Oil and Natural Gas Sector. These new emissions standards focus on new, reconstructed, and modified sources. On June 3, 2016 it was announced that the final rule of these new standards, commonly referred to as OOOOa or QuadOa, would be effective on August 3, 2016.[6] Related to OGI, one unique determination by the EPA in OOOOa was the designation of Optical Gas Imaging as the best system of emissions reduction (BSER) for reducing emissions of greenhouse gases, specifically methane.

While the EPA has been on the forefront of emission reduction regulations and the acceptance of OGI as technology, other entities are adding their own standards. From city to state and even other federal agencies, like the Environment and Climate Change Canada (ECCC), there are many entities accepting new technology as a primary way of reducing emissions.

NEW OGI TECHNOLOGY IDEAL FOR OIL AND GAS APPLICATIONS

Optical gas imaging has been in the market for less than 15 years making it a fairly new technology. In that time, there have been many advancements in the technology including those by FLIR. In February 2019, FLIR added multiple solutions to the OGI portfolio further helping the industry detect, locate, and quantify fugitive emissions.

One historical challenge with the technology has been the high cost to manufacture an optical gas imaging. FLIR recently launched the first uncooled, low cost methane detection camera to

the market, the FLIR GF77. This imager has a price point less than half of the legacy OGI cameras with some additional benefits like a lower cost to manufacture and longer lasting design which could benefit those interested in continuous, 24/7 operation. Of course, with lower cost solutions comes some limitations. These include less sensitivity, feature restraints and fewer gases that can be visualized with the imager. One key restriction of this new technology is that the camera is not able to meet current EPA regulatory standards, like OOOOa.

FLIR GF77 Optical Gas Imager

Another newly released product from FLIR is the GF620 including our patented Q-Mode feature. This imager is four times the resolution of other OGI imagers in the market providing the best image possible for hydrocarbon emissions applications. It includes the newly released Q-Mode feature allowing a FLIR OGI camera to store files in the field that can be utilized with a QL320 quantification solution from Providence Photonics.[7] The QL320 product allows users to effectively measure gas emissions with optical gas imaging up to 5 times more accurately than Method 21 technologies according to a European study performed by Concawe.[8] The combination of the QL320 from Providence and Q-Mode from FLIR removes the need for the physical tablet in the field and makes quantifying gas leaks in explosive environments an option with FLIR GFx320.

INDUSTRY USE CASES FOR OPTICAL GAS IMAGING

While optical gas imaging has been used by operators to comply with regulations, there are additional benefits. There are many examples of companies saving money and improving operator safety with OGI, often while also meeting regulations. One example is Wyoming-based Jonah Energy, which began using optical gas imaging technology in 2005 to find fugitive emissions at its production facilities.[9] The company inspects 150 facilities every month and inspects the 1,700 wells within a one-year period. Since 2010, Jonah has reduced fugitive emissions by 75 percent. It also reduced repair time from 705 hours to 106, cut labor costs from $58,369 to $7,500, and dropped its gas losses from $348,000 to $20,500. Emissions in tons went from 351 to 31. Jonah Energy says that their monthly Leak Detection and Repair (LDAR) program using OGI technology has been both effective and consistently profitable. Their cumulative gas savings exceeded $5 million in the past six years, which more than covered the overall program costs.

Another example is ConocoPhillips, which performed an optical leak detection and measurement pilot study at 22 CPC facilities to test best management practices for fugitive emissions management. The study findings were used to evaluate the benefits of using OGI technology as part of fugitive emission management plan for the company's Canadian operations.[10] The study identified 144 leaking components, which collectively amounted to about $358,000 in lost product. The lost product resulted in methane leaks contributing more than 21,000 tons per year of carbon dioxide equivalent (CO_2e) to greenhouse gas (GHG) emissions. The study estimated that 92 percent of the sources could be repaired economically, resulting in net present savings of more than $2 million.

Inspectahire, a leading international supplier of specialist remote visual inspection technology and solutions, relies on the FLIR GFx320 optical gas imaging camera for both maintenance inspections and hydrocarbon leak detection in hydrocarbon production plants or for the inspection of any material that uses hydrocarbon as a fuel. They find the GFx320 camera can scan a broader area much more rapidly and monitor areas that are difficult to reach with contact measurement tools.[11] "We have been using certain contact measurement tools like laser detectors or leak sniffers," says Inspectahire's Cailean Forrester. "But the problem is that you have to go right up to the object, which is not always safe or even possible. In other words, this approach is limited and not very precise. With an optical gas imaging camera like the GFx320 however, you can keep a safe distance and still detect gas leaks with great precision."

FLIR GFx320 Class 1; Division 2 Optical Gas Imager

CONCLUSION

FLIR has led the technology revolution of optical gas imaging allowing the industry to reduce emissions for almost 15 years and with the recent market introductions is positioned to continue that leadership for years to come. With optical gas imaging you have a proven solution that is compliant to regulatory standards and more efficient than historical inspection methods. With our products, we are proud that our solutions empower this industry to proactively mitigate methane emissions and have a positive impact on the environment. Allowing users to detect, locate and quantify gas emissions ensures a safer work environment for operators and a better understanding of the challenges related to methane emissions our world currently faces.

Moving into the future, FLIR will continue our innovative forward thinking as we work to deepen our impact on this industry and, in turn, our world. From organically developed solutions to technology advancements through partnerships in the industry, like our current collaborative efforts to provide immediate, in field quantification of Optical Gas Imaging, we are excited about the future of Optical Gas Imaging and our positive impact to save lives and livelihoods.

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