

Optical Gas Imaging Gas Leak Detection using Infrared Cameras

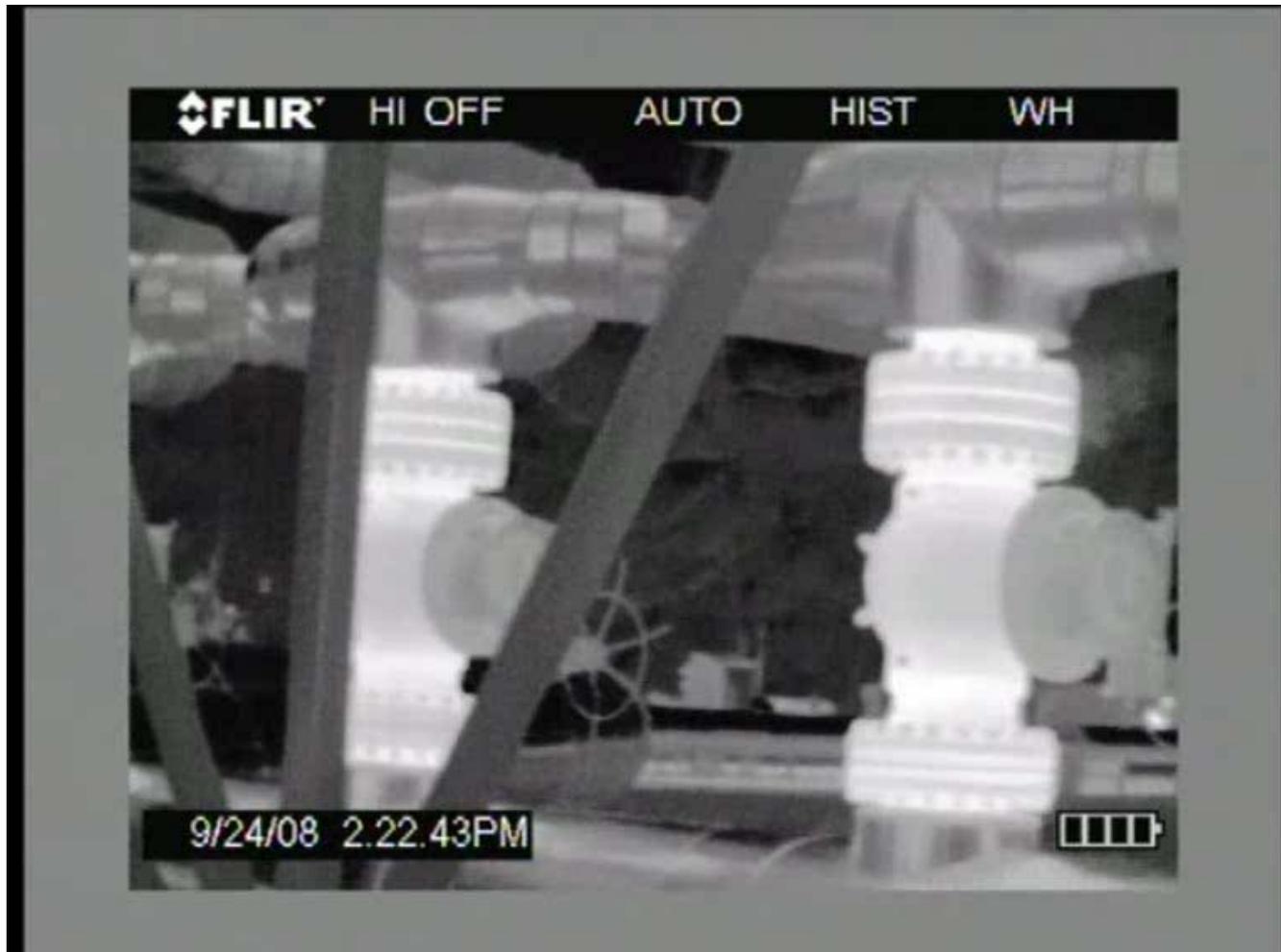
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What is Optical Gas Imaging?



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User Problems to be Solved

Finding Gas Leaks

- Environmental Compliance
- Safety
- Loss of revenue/product



Environmental Compliance

- State of Delaware uses Optical Gas Imaging on the ocean!



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Air and Waste Matters

Looking for Air Emissions Using New Infrared Imaging

The camera has innumerable applications that range from "looking" for VOC emissions from routine everyday activities such as refueling at gas stations to complex facilities such as the Delaware City petroleum refinery.

DNREC's Air Quality Management Section has begun monitoring fugitive volatile organic compounds (VOCs) emissions using a new Gas FindIR camera. This state-of-the-art infrared video camera uses energy, instead of visible light, to "see" VOCs. The camera has innumerable applications that range from "looking" for VOC emissions from routine everyday activities such as refueling at gas stations to complex facilities such as the Delaware City petroleum refinery.

In April 2006, DNREC staff observed a ship off-loading crude oil, a process called "lightering," from a tanker at the Big Stone Anchorage in the Delaware Bay, eight nautical miles north of Lewes. When crude oil is pumped into an empty vessel, VOC vapors are displaced and pushed out through the stacks called "mast risers" into the atmosphere. As soon as pumping began, the camera revealed the VOC vapors as black "smoke" (see photos below). The prevailing winds blew those emissions, invisible to the naked eye, west towards Delaware.

Recently, DNREC successfully negotiated an agreement and air pollution control permit with Maritrans Corporation. Maritrans has committed to a process of vapor recovery to prevent these VOC emissions and has invested more than a half billion dollars to replace their fleet of ships with state-of-the-

art vessels containing built-in vapor recovery equipment and other safety features.



FLIR Systems' Gas FindIR camera.

Manufactured by FLIR Systems, the Gas FindIR camera has been used on compliance inspections at several companies to help determine if VOCs leak from their equipment and whether the facility meets its regulatory obligations for leak detection and repair requirements. The new GAS FindIR-camera offers DNREC the ability to implement cutting-edge technologies in its aggressive efforts to achieve healthier air quality for Delawareans, and provide a level playing field for those companies that make investments in controlling emissions.

—Article by Bruce SteitzoerJim Werner (DAWM)



Crude oil tankers performing lightering operations.



VOC emissions visible during lightering operations.



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Safety

- The number one (#1) reason that ExxonMobil purchased GF Series was for safety!
- GF Series allows to scan a large area and check for potential gas leaks before entering.
- Personnel can work at safer distance from potential leaks.
- Climbing to reach for probing can in many cases be avoided.



Loss of Revenue

- Leaking Relief Valve: ~ \$50.000 per year!



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Gas Imaging Cameras from FLIR

Gas Detection of >20 VOC gases
I.e. Methane, Propane, Butane
Radiometric, Accuracy ± 1 °C
Temp range -40 °C to +350 °C



FLIR GF320



FLIR GF306



FLIR GF346



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Gas Detection with IR Cameras

User Benefits

- Visualize and trace gas leaks
- Reduced inspection time
- Improve worker safety
- Efficiently reduce revenue losses



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Let's Fix the Leak!

Industry: Petro Refinery

Application:

- Fixing leaking isolation valve

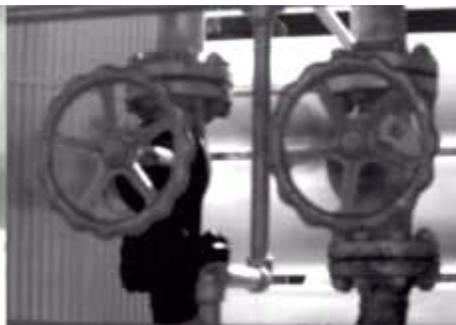
Inside story:

This leakage was found during a quick scan of the plant area. As you can see this is a relatively small leak but the TVA indicated 150.000 ppm. This leak was an easy fix and the repair could be verified with the OGI camera from FLIR.





Seeing is Believing!



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