

Optical Gas Imaging Helps Improve Environmental Performance at Scottish and Southern Energy Power Distribution

SF6 (sulphur hexafluoride) gas is used in energy networks as an insulator in substations. Although SF6 is an excellent insulator, used all over the world, it is also a potent greenhouse gas. That's why the careful management of SF6 assets is a key priority for Scottish and Southern Energy Power Distribution. The company regularly inspects equipment containing SF6 to prevent leaks, and act quickly when a leak is identified. SSEPD have found a tool that can help with its SF6 maintenance program: thermal imaging cameras from FLIR.

“With the FLIR thermal imaging, we can find the leak ourselves immediately. This saves us a lot of time. During a familiarisation exercise, we were able to quickly detect a leak and the source. We made a short video and e-mailed it to our repair company. This way, they could directly start repairs and leave out the detection process, because they already knew exactly where to look.”

Scottish and Southern Energy Power Distribution (SSEPD) is responsible for maintaining the electricity networks supplying over 3.7 million homes and businesses across central southern England and north of the Central Belt of Scotland. The company owns one electricity transmission network and two electricity distribution networks, comprising 106,000 substations and 130,000 km of overhead lines and underground cables across one third of the UK. Its first priority is to provide a safe and reliable supply of electricity to the communities it serves in Scotland and England. As in many electricity distribution networks across Europe, SSEPD uses SF6 gas as an insulator in its substations. Across its two distribution networks and its transmission network, SSE Power Distribution has a total of 11,475 items of switchgear using SF6 gas. Switchgear is often insulated with SF6, which works by extinguishing sparks caused by operation of the switchgear. The possibility of leaks generally increases as equipment ages. Fugitive emissions can escape through valve fittings and at joints between flanges and porcelain bushings.



Thermal imaging cameras from FLIR allow SSEPD to detect possible leaks quickly and with high certainty.

Environmental impact

SF6 is over 23,000 times as potent as carbon dioxide as a greenhouse gas, so SSEPD wants to make sure that SF6 assets are carefully managed. “We take our safety and environmental responsibilities very seriously, with regular maintenance and protection of equipment. We have a very large fleet of switchgear and we work constantly to ensure its safe operation,” comments Tawanda Chitifa, Project Manager at SSEPD. “As part of an internal R&D project, we investigated ways to improve our environmental impact. The challenge was to be more efficient in

handling possible SF6 leaks. Thermal imaging cameras from FLIR have helped us reduce that risk, because they allow us to detect possible leaks quickly and with high certainty.”

Clearly pinpoint leaks

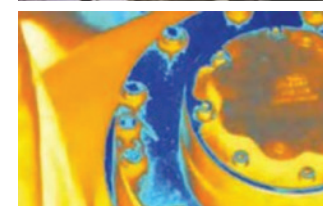
Conventional leak detection methods include the use of sniffers. While the use of sniffers can quickly detect that a leak is present, it can be difficult to pinpoint the source, according to Tawanda Chitifa. “The problem is that with a sniffer you cannot get close enough to the equipment you are investigating. That is why it is sometimes difficult to pinpoint exactly where an SF6 leak is. You are aware there is a leak somewhere, but it's hard to locate. SF6 gas is also heavier than air. This means that you have an indication of a leak but don't know the source.”

As part of the aforementioned R&D project, SSEPD learned about the existence of thermal imaging cameras that could do a better job in detecting possible leaks. After a thorough selection process, SSEPD decided to purchase two GF306 cameras from FLIR. The GF306 has a highly sensitive detector that is specifically designed to visualise SF6 gas.

“The FLIR cameras allowed us to work in a totally different and more efficient way,” says Mr. Chitifa. “With the GF306 camera, you can look at the switch gear equipment from a safe distance, allowing you to cover a wider area. At the same time, the thermal imaging camera allows you to exactly pinpoint where the leak is, up to the actual source. Even very small leaks can be detected clearly. This has proved to be invaluable and saved us a lot of time.”



Visual



Thermal



High Sensitivity Mode (HSM) - Reference US Patent US7649174

Author/Contact Details:

Steve Beynon

Business Development Manager EMEA

GF Cameras & Optical Gas Imaging

FLIR Systems Ltd

Evans Business Centre, Regents Pavilion,

Moulton Park, Northampton, NN3 6BJ, UK

Tel: +44 1604 641180

Mobile: +44 7921 699869

Email: steve.beynon@flir.com

Web: www.flir.com

Reducing downtime

Normally, in order to access the switch gear equipment, SSEPD schedules an outage. Mr. Chitifa: "It goes without saying that closing down the equipment results in an economical cost. Every hour of downtime is money lost. With the FLIR GF306, we can significantly reduce downtime, because you can just take the camera out in the field and start your detection routine while the equipment is live."

An important objective of the SSEPD R&D project was to be less dependent of third party suppliers. The company usually relies on third party companies to help them detect the gas leak, repair the equipment, replace it if necessary and do gas refills. The problem is that lead times can sometimes be very long, resulting in lost time and money.

"With the FLIR thermal imaging, we can find the leak ourselves immediately. This saves us a lot of time. During a familiarisation exercise, we were able to quickly detect a leak and the source. We made a short video and e-mailed it to our repair company. This way, they could directly start repairs and leave out the detection process, because they already knew exactly where to look."

High-end optical gas imager

In December 2013, SSEPD purchased two GF306 cameras. The investment quickly provided return. "We attended training courses organised by FLIR Systems to better learn the benefits

and operation of the thermal imaging camera. During the first FLIR training course, we took the camera out in the field and identified a leak on a recently installed high-voltage circuit breaker. Talk about return on investment!"

Users of the GF306 at SSEPD especially value the High Sensitivity Mode (HSM), which is included in all GF-Series optical gas imaging cameras. It is an image subtraction video processing technique that effectively enhances the thermal sensitivity of the camera. The HSM feature subtracts a percentage of individual pixel signals from frames in the video stream from the subsequent frames, thus enhancing the differences between frames, which make leaks stand out more clearly in the resulting images.



With the GF306, you can look at the switch gear equipment from a safe distance.

"To have the most reliable detection results, we make sure we capture the leak in different image modes: the IR image, the HSM mode and the visual image. This way, we are sure we don't miss out on anything and we can provide a reliable briefing to anyone who needs to repair the leak."



During their first FLIR training course, SSEPD identified a leak on a recently installed high-voltage circuit breaker.

Read, Print, Share or Comment on this Article at: Envirotech-Online.com/Articles



Flow Logging Upgrade for Landfill Gas Analysers



Recent developments to the GA5000 portable landfill and contaminated land gas analyser from **Geotech** mean users can now benefit from flow logging and gas analysis in one device.

Geotech is committed to understanding the applications of its customers and the legislation they need to comply with. As such, Geotech undertook research in order to assess the suitability of the GA5000's existing internal flow option for the contaminated land and landfill markets. The results of the research, now implemented within the GA5000, will prove beneficial for many consultants, councils and landfill operators carrying out flow monitoring on sites with low levels of flow, particularly where Phase II geo-environmental assessments and day-to-day monitoring are essential. Users can now easily assess whether the borehole being monitoring has depressurised and that a stable measurement of flow has been taken, and the results can be used to validate user procedure and findings. Errors due to measurement of higher flow rates generated

by pressure within the borehole are now removed with the new flow logging feature.

Existing users of the GA5000 with the internal flow option added can access this new flow monitoring method immediately by using the free remote firmware update facility from the Geotech website. All new Geotech GA5000s where internal flow has been chosen will have the feature automatically.

The new flow logging option facilitates faster site assessment and remediation prior to reuse of contaminated land, further enhancing the widely used ATEX, MCERTS and CIRIA compliant GA5000 portable gas analyser.

For More Info, email: 31385pr@reply-direct.com

New Radiation Shields Offer Reduced Measurement Error in Adverse Conditions



Campbell Scientific are pleased to offer a new range of Unaspirated Radiation Shields for housing temperature and temperature/RH probes in low power weather monitoring stations.

Whilst it is acknowledged that aspirated radiation shields provide the optimum measurement conditions they also require power. Therefore in many remote weather monitoring applications, where low power consumption is critical, unaspirated shields are an essential alternative. However, in certain situations such as calm, hot days or sunny days with snow on the ground, measurement errors can occur with these kinds of shields.

This latest range of shields offers, we believe, provides the best measurement of any shield on the market. In tests the shields outperformed established names with a 50% improvement in measurement errors.

The shield comes in three sizes, Rad06, Rad10 & Rad14 which together cover all the common probes on the market from all leading manufacturers.

For More Info, email: 33093pr@reply-direct.com

New Industrial Probes and Backpack for Portable Emissions Analyser



The **Testo 350** emissions analyser is now available with a choice of 3 unheated or heated industrial gas sampling probes. The Testo 350 is a portable 6-sensor flue gas analyser designed to measure gas emissions from combustion processes. Typical applications include landfill energy recovery, energy production, high energy manufacturing plants, district and local heating and more generally monitoring stack emissions in most types of combustion plant. The Testo 350 is MCERTS approved for measuring O₂, CO, NO, NO₂ and SO₂ and can be equipped to measure CO₂, H₂S and hydrocarbons.

The Testo 350 emissions analyser is now available with a choice of 3 unheated or heated industrial gas sampling probes for measurements involving high temperatures, high dust loads or wet flue gas. The new sampling probes have been specially designed by Testo engineers to be able to measure aggressive condensate, high dust concentrations or mechanical stress reliably and accurately, even at very high temperatures. The probes can be customised to the relevant measuring task by adding accessories.

Three options are available; modular standard gas sampling probes with options for different temperature ranges (500 °C / 1,000 °C) and probe lengths (35 mm / 700 mm); gas sampling probes for measurements on stationary industrial engines and high temperature industrial gas sampling probes, suitable for measurements involving high temperatures, high dust loads or wet flue gas.

Also available is a durable backpack transport case for the Testo 350, designed to carry the Testo 350 analyser box including control unit, gas sampling probe and accessories. The backpack is ideal for when the analyser needs to be carried around a large site, up and down ladders etc.

email: 32418pr@reply-direct.com