

ENVIRONMENTAL PROTECTION

Compiled by Clement Deane

Emission control not strict enough – burner supplier

Clement Deane | Features Reporter

South Africa is gravely behind with regard to emission control and the policing thereof, burner equipment supplier The Combustion Group (TCG) tells *Engineering News*.

Representatives of the company explain that, with the government looking into controlling gas emissions through the Air Quality Act (39 of 2004), industry is required to monitor its emissions and contain anything that is harmful to the environment.

However, the company believes that the act is not being sufficiently enforced and that companies are not monitoring their emissions effectively.

An article published in *The Mercury* in August last year, entitled 'Air Quality Act could be toothless watchdog for 5 to 10 years', suggests that the Air Quality Act may not necessarily take effect, or be as effective, for up to another decade.

In the article, a senior CSIR air-quality scientist, **Gregg Scott**, comments that there is a misconception that the act had taken effect in early 2005, when President **Thabo Mbeki** had assented to it.



PETER PAPE AND SUSAN SHEPHERD

Travelled to Dallas, Texas, for specialised training at Forney, as well as training on Fireye in the UK

He says that government had taken the decision to implement the law in stages because of a shortage of qualified staff to implement or police the legislation.

Even so, it is believed that the law will drastically change the management of emissions when it does come into full effect.

The current task at hand is the

effective monitoring and control of emissions from stacks.

Some of the products supplied by TCG are designed to monitor emissions from stacks and the data received from the stacks can be used to determine the efficiency of the burners.

Flame management and technical sales representative **Susan Shepherd** says that, if the burners are maintained properly, there will be a saving for the client in terms of cost and efficiency.

Inefficient burners can lead to harmful gases being released into the atmosphere and, with the energy sector seen as the number-one contributor to sulphur dioxide (SO₂), carbon monoxide (CO), and carbon dioxide (CO₂) emissions in South Africa, it is important that industry considers action towards limiting the release of noxious gases.

The amount of harmful gas released is often directly related to the efficiency of the burners.

An efficient burner releases far less harmful gas than an inefficient one.

Therefore, companies see the benefit in maintaining their burners, especially when reports show the emission of dangerous gases.

However, in most cases this applies only to SO₂ and CO emissions.

TCG director **Trevor Lotter** says that, even if a burner were to operate at optimum efficiency, nitrous oxide (NO_x) emissions could still be emitted.

"There's a problem with

• To page 34

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• From page 32

companies not seeing the benefit in limiting the emissions. They know that CO and SO₂ escaping through the stacks mean that the machine isn't running as effectively as it can. But, they'll often decline a low-NO_x burner because they do not see an efficiency boost with one."

The challenge now, says Lotter, is to create awareness in the drive for monitoring stack emissions.

He believes that companies need to have correlation curves for data reporting to monitor what is being let through in the process.

"South Africa has a problem with enforcing this legislation and there is still much left to do," says Lotter.

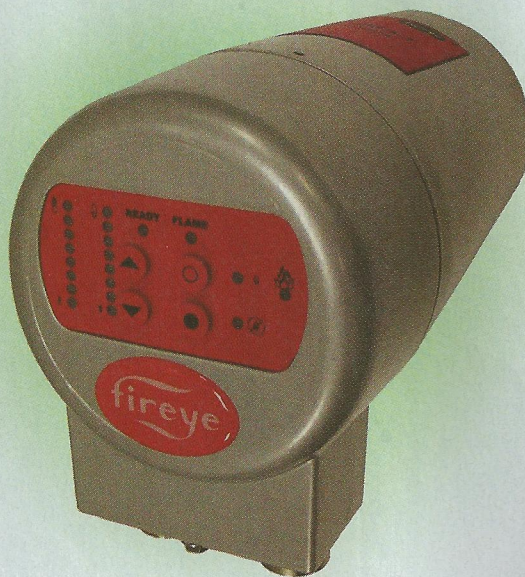
The company is currently busy with a final tender on a project where a portion of the project requires liquor destructors.

TCG is also looking into a potential project, with a big mining house, for the prevention of methane, which may mean the prospective earning of carbon credits.

Prevention and control

TCG represents a wide selection of international corporations dedicated to burners and monitoring equipment and supplies products designed to monitor stack emissions, as well as products to monitor equipment efficiency.

One such product is the Paragon Scanner, which, designed by commercial and industrial flame safeguard and combustion controls producer Fireye, is a microproces-



PARAGON SCANNER

Provides high-integrity sensing of multiple flame properties, including amplitude, flicker frequency and flame temperature

sor-based flame analysis device that uses solid-state flame detection sensors.

It provides high-integrity sensing of multiple flame properties, including amplitude, flicker frequency for flame safeguard, and flame temperature, for emissions information.

According to European operations manager **Dave Probyn**, this allows experienced operators to be informed of the changes in combustion, which occur occasionally owing to phenomena such as fuel variations and burner variations.

This information can be displayed on a PC screen to provide information about the burner operation in a single, and multiburner environment.

He explains that, in these environments, the variations of the individual burners are often far too difficult to notice from the conventional instrumentation.

"The Paragon adds the feature of flame temperature measurement, which is quite relevant in acquiring low NO_x, as NO_x creation increases quite dramatically from around

1 500 °C upwards. By measuring the temperature of individual flame, it provides advanced warning of combustion changes which are likely to create unacceptable levels of emissions," says Probyn.

With the fitting of an internal temperature relay, which can be set to operate based on detected temperature, a warning can be generated at the instrument which can be sent to the plant DCS to provide an alarm signal.

According to Probyn, "These two measurements, flame quality and flame temperature, are further tools available, above and beyond the basic requirement of flame safeguard, to the plant operators in their endeavours to maintain clean, safe, and efficient combustion."

Other products on offer include Maxon's SmartFire.


Supplier of burners and combustion equipment Maxon has developed a product that it says makes set-up and operation easy, which automatically compensate for changes in operating conditions.

Also, the company says that this product improves the fuel-to-air ratio efficiency, it has automatic, real-time continuous adjustment, and it minimises emissions.

Emission monitoring

The Forney corporation, in partnership with provider of mercury emission monitoring solutions and CEM system equipment Tekran, has developed a product designed to accurately analyse and monitor mercury levels in stacks.

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THE FACTS

According to research from the US Department of Energy (DOE), Africa is believed to be the world's second-largest source of man-made emissions of mercury, estimated at 425 t/y.

This accounts for nearly 20% of global man-made emissions, and **Richard Hovan** says that the volume is still on the rise – even when North American and European levels are on the decline.

African power plants currently under construction – the majority fuelled by coal – will alone have almost twice the entire electricity-generating capacity of the UK

The Forney/Tekran Series 3300 analyser uses atomic fluorescence and gold amalgamation, which is more sensitive than atomic absorption or direct atomic fluorescence.

It eliminates interferences from the stack gas matrix, and, according to marketing manager of Forney Corporation **Richard Hovan**, the exclusive benefit of pure gold precipitation means that the detector baseline drift does not affect results.

Also, the product is inherently linear, with a dynamic range that has over five orders of magnitude greater than other technologies, states Hovan.

"Mercury control is only as effective as the method of monitoring for system loop control."

He states that the installation of a highly accurate and reliable mercury continuous emissions monitoring (HgCEM) system is critical for proper control.

"In addition," says Hovan, "with [the] requirements of reporting and possible trading credits (typical for

the US), an extra return on investment can be realised."

He explains that real-time continuous measurement of mercury is far more challenging than measurement of compounds such as nitrous oxide and SO₂, and it requires more selective and controlled technologies.

Complicating factors include extremely low levels of mercury in the flue gas (gas that escapes through the stack), as well as potential interferences of flue gas constituents, such as the potentially toxic heavy-metal selenium, or other gasses including NO_x, O₂ and SO₂.

Under these conditions, simply diluting the stack gas only reduces the concentration of interfering constituents.

According to Hovan, the remaining stack gas concentrations are still high enough to impede the detection of mercury, potentially causing inconsistent reporting of mercury emissions.

ENGINEERING NEWS COUPON ON PAGE 60 E96008

Demand swells for analytic services

Clement Deane | Features Reporter

There has recently been a noticeable growth in the demand for environmental services, says global supplier of professional laboratory and commodity inspection services M&L Laboratories.

GM **Roy Cox** reports that he has seen a surge in interest in environmental analysis, and that a significant interest is being shown by the petroleum industry.

The company has a laboratory in the south of Johannesburg, where it analyses material for use in various projects.

In Cox's opinion, industry needs to catch up with recent legislation regarding environmental impact.

He says that M&L hopes to be a link in this process towards a cleaner environment.

"The company is independent from any organisation, and we usually work as a third party in material analysis. This, combined with being ISO 17025-compliant through the South African National Accrediting Service, means that we are in a position to provide acceptable and objective

results."

Accreditation is given to laboratories that conform to strict standards regarding the quality of applied analytical techniques employed for material analysis.

Also, Cox says that M&L Laboratories' state-of-the-art facility uses globally recognised methods for quantifying and analysis.

MD for M&L Laboratories **Fanie Nel** believes that with technological advancements, as well as elevated understanding and awareness, the country is definitely moving forward in its drive towards environmental protection.

"If we had in place 50 years ago what we have in place today, the world would look completely different. In fact, it would have probably been far better off. Already there are areas that are cleaning up their act because we now know more how we affect the environment than we did before. Imagine what it may look like in another 50 years if we keep this up," says Nel.

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