

Robots Rising in Gas Analysis

Static automatic gas analysis is crossing continents and many environmental sectors as producers select automatic gas analysis and secure data transmission via the Internet.

Automatic methane analysis for CDM/carbon credits verification is seen around the world but that is just a beginning. With anaerobic digesters making biogas, automation can aid digester management to maximise output as well as verifying methane production quantities. It is doing that with water-treatment sludge and food waste. Landfill gas producers are able to verify extracted gas volumes and demonstrate compliance, control and safety with round-the-clock unmanned, wireless automation. It can give CHP engine protection through H₂S monitoring and is in use for coal-bed methane production. The reliable robot-regularity of these automated systems is in demand - because it works!



Extracted landfill gas for CHP or flaring is analysed, measured and monitored with data logged and securely transmitted to producers' Internet screens.

Based on Geotech's 18-year history with its globally tried and tested portable gas analysers, its automatic extraction monitoring system uses the same proven technology. In timed, automated cycles it monitors and analyses gases, auto-purges and calibrates itself. It stores and transmits data which arrives, with full security, at a producer's Internet screen anywhere. Installations are at work in China, Egypt the Americas and in Europe and are illustrated by two UK case studies.

Case Study 1: Sewage Sludge Digestion Data - from An Armchair

Switched on in Blackburn or Bangkok - seen live in Warrington or Washington. It is that quick. United Utilities' managers are impressed. It was the first time they had seen their own data on methane gas output live and on-line from their anaerobic sludge digesters 40 miles away. "We could have been on the other side of the world - anywhere with Internet access, fixed or mobile and a secure logon," said Adam Guest, operational scientist, who added, "We set up the equipment and I went home, logged on and there it was, on screen, on display and working away." Adam Guest is not alone in checking gas output levels remotely. Operational staff now can do so as well. Once installed the static gas analysers continue to collect and transmit data every fifteen minutes.

Adam Guest had looked around for a supplier of wireless, unmanned remote operation, static (but also transportable), continuous gas analysers which handled several gases and auto purged. United Utilities (UU) already used the portable gas analysers from Geotech and saw their static and transportable analysers as right for task. UU selected the Geotech-Landtec Automatic Extraction Monitoring System (AEMS) package. Its development was originally fuelled by the demands of CDM carbon credit trading and is widely used throughout the USA and Canada, Latin America and South America under the brand, Landtec, Geotech's parent company.



Remote and wireless static gas analyser is an Automatic Extraction Monitoring System, AEMS to auto-analyses gases including: CH₄, H₂S, O₂, CO, CO₂ and auto-transmit secure data via the Internet.

United Utilities' methane comes from anaerobic sludge digesters. They feed a combined heat and power (CHP) engine. Optimising methane production is one driver of this development, especially as UU is also monitoring its Advanced Enzymic Hydrolyser in Blackburn.)

"The transportability of the analyser means that we will be able to move the equipment around all our sites when required and get continuous information on all parts of our gas production system, even allowing monitoring of individual digesters to increase performance," said Adam Guest. The analyser has had positive response from everyone who has used it with the benefit of continuous analysis, measurement and data logging to help with 'tuning and tweaking' production to optimise sludge treatment and methane output. Now they can check it on screen, from an armchair at home - or anywhere they choose. Colin Greenhalgh, UU's wastewater treatment specialist, said, "We placed our order with Geotech. It arrived on time it was exactly what we expected and paid for which is excellent and Geotech are passionate about what they do. We are very pleased."



Static analysis of biogas production from wastewater sludge in anaerobic digesters



Static field gas analyser and (right) field server unit logs and transmits data

United Utilities is the UK's largest operator of wastewater systems. In north west England the company treats 2,200 million litres of wastewater every day via a network of around 39,000 kilometres of sewers and 600 wastewater treatment works. More: www.unitedutilities.com

Case Study 2: Biogas Research Success with Automatic Monitoring

Automated biogas analysis has helped in a successful research project to determine methane gas yield from potatoes in an anaerobic digester. Data appears instantly on screen as collected and indicate the percentage of CH₄, CO₂ and H₂S in the biogas so measuring its quality. These measurements can be used to calculate the biogas methane yield per tonne of organic dry matter. At Greenfinch, researcher Becky Arnold said, "Data readings every thirty minutes from the static biogas analyser enhanced our depth of knowledge and understanding of digester behaviour and response. It transformed data acquisition." Greenfinch used Geotech's Automatic Extraction Monitoring System (AEMS) exclusively in a potato trial in a pilot-scale digester at its research facility in Ludlow.

Before using the automatic monitoring of the Geotech AEMS system set at 30-minute intervals, Greenfinch analysed biogas output volume and quality manually once a day before adding the potato feed to the digester. Now with 48 automated readings everyday for three months of the trial, Greenfinch biogas researchers were able to observe changes in the digester's response 24 hours per day and specifically look at its



Static gas analysis and data transmission at Greenfinch labs automatically gives researchers valuable digester performance data and transforms data acquisition enhancing research.

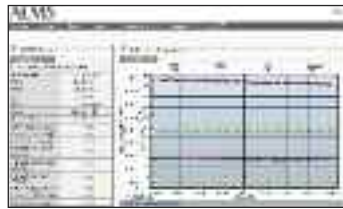
AEMS is with CHP engines where very accurate and regular monitoring of H₂S is needed in order to protect the engines. This also brings the benefit of constantly available data on the percentage of methane within the biogas. Given the significant investment in biogas plants and the ever-increasing value of the biogas, continuous monitoring may have much to offer to the bio-energy industry.

Greenfinch has its own Geotech GA 2000 portable gas analyser. It is used on site in laboratory and pilot-scale digester research for clients and at the South Shropshire Biowaste Digester where accuracy clearly

response following feeding.

Becky Arnold said, "Once commissioned by Geotech their equipment ran faultlessly. It gave us all the data we needed on screen with Internet browsers in our offices or from anywhere we needed it at any time of day or night. When we had queries, support from Geotech was excellent."

Looking at the role of automatic biogas analysis and monitoring, Greenfinch confirmed one likely beneficial use for the



'On a screen near you!' - Continuous gas analysis data for CH₄, H₂S, O₂, CO & CO₂

matters. With Geotech's equally accurate but fully automated, self-purging and self-calibrating AEMS installation, Greenfinch researchers were easily able to generate and analyse large quantities of data on a more frequent basis than they could do previously.

For a commercially-based research and development outfit that is a win-win situation. Where time, quality, accuracy and objectivity are precious, Geotech's dependable, reliable accurate automation has certainly won acclaimed appreciation from the UK biogas specialists at Greenfinch.

Last Word From a User

Fresh from a conversation with a multi-national waste management contractor trialling Geotech's AEMS system in the Middle East, Steve Billingham, sales and marketing director at Geotech, reported the customer as saying, 'They selected Geotech's AEMS system because reliable equipment and dependable supplier support are essential to project success.'

AUTHOR DETAILS

Steve Billingham,
Sales & Marketing Director,
Geotech
+44 (0)1926 338111
www.geotech.co.uk

Multi-Gas Monitor Receives CSA Approval



Industrial Scientific Corporation (USA) is pleased to announce that the Canadian Standards Association (CSA) has certified the MX6 iBrid™ multi-gas monitor as intrinsically safe for use in hazardous locations. The CSA mark is the most recognized mark of safety within Canada.

The MX6 meets CSA Standards C22.2 No. 152 and C22.2 No. 157 as intrinsically safe for use in Class I, Group A, B, C and D hazardous locations. This certification applies to the use of the instrument both in diffusion mode and with an integrated sampling pump.

The MX6 iBrid™ is the first gas monitor to feature a full-color LCD display screen. The MX6 color display improves safety with clear readings in low-light or bright-light conditions. It also supports on-board graphing and a menu-driven PEG (Portable Embedded GUI) operating system. This allows users to step through instrument functions using an intuitive menu and the instrument's five-way navigation button. The MX6 also adds flexibility for multilingual and international work forces with one of eight available pre-programmed languages.

The MX6 is designed to detect from one to six gases including oxygen, combustible gases and up to four toxic gases. With 25 field-replaceable "smart" sensor options, an integrated sampling pump, and interchangeable lithium-ion and alkaline battery packs, the MX6 can be set up in millions of different detection configurations. Such configuration flexibility allows it to measure potential hazards in any industry. The addition of a photo-ionization detector (PID) allows for the detection of the potentially "unknown" toxic hazards or volatile

organic compounds that may exist in some applications.

The MX6 iBrid is compatible with the award winning DS2 Docking Station™ and the iNet™ Instrument Network to further simplify and automate calibration, function (bump) testing and data management.

Now SIL 3 Approved for Gas Control Panel



Galileo SMS gas control panel from Sensitron (Italy) has been designed and approved to comply with the SIL (Safety Integrity Level) requirements according to the European Standard EN50402 on Functional Safety and has reached the SIL 3-C Level.

Extremely flexible and highly reliable, it allows monitoring gas detectors connected with both 4-20 mA transmission and on addressable loops.

The functional safety is aimed to supervise and manage the behaviour of a system in case of failures. When defining the system structure all possible different types of failures that may occur in any part of the system are to be considered and evaluated.

The control unit's main board is designed around 2 powerful microprocessors, that communicate one to each other the monitored data ensuring the complete availability of all main board functions even in the case of a failure in one microprocessor.

A broad range of self-testing facilities are implemented to detect and localize possible faults.

The redundancy offered by every module being part of the system, added the possibility to communicate with remote input/output modules via a redundant BUS and with each detector via double connection (analogue and addressable), makes this system comply with the Functional Safety requirements of EN 50402 up to SIL3.

The range is also completed by the GALILEO S 8 that has been designed for small systems up to 8 analog detectors and the GALILEO S 32 where up to 32 detectors are connected on a addressable closed loop.

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Meeting the Landfill Gas Challenge

Landfill gas analysers should be certified for use in Zone 2 hazardous areas according to the industry Code of Practice ESA ICOP 2nd Edition, a decision endorsed by the Health & Safety Executive.

Hitech Instruments (UK) were the first company to introduce a purpose designed, fixed analyser that is Zone 2 ATEX compliant. The GIR5000 analyser measures methane, oxygen and carbon dioxide as standard. Hitech Instruments design and manufacture according to customers applications and other sensors will be available on demand, hydrogen sulphide is a popular option. Alternatively if fewer parameters are required then the GIR2500 measures just methane and oxygen and there is a wide variety of single parameter instruments.

The GIR5000 uses Hitech's proven sensor technology and robust electronics making it highly reliable in field use. There are no consumables and the maintenance requirement is very low. Occasional checks will determine if calibration is necessary.

Hitech realise that the analysis is only as good as the sample presented to the sensors. Sample conditioning systems, flow alarms and pumps are all optional accessories depending on the application.

Hitech take great pride in the level of technical support they provide, directly in the UK and internationally through a network of distributors and agents. New distributor enquiries are always welcomed.



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