



Perfect Timing for Air Quality & Emissions Show

AQE 2015, the international Air Quality and Emissions show that took place in Telford, UK, during April, could not have been better timed. Taking place just a few days after the Supreme Court judgement on air pollution and a few days before the UK General Election, AQE 2015 provided a focus for the air quality sector; helping to publicise this critical issue and providing delegates with the latest information on monitoring standards, techniques, regulations, research and technologies.



Gam Gurung, joint winner of the poster competition, speaks with visitors to the show

With visitors from over 50 countries the show attracted even more visitors (9% extra) than the previous record-breaking AQE in 2013, and delegates were unanimous in their approval. See www.aqeshow.com for a video summary of the event.

During the UK elections and in the aftermath of the result, many senior politicians referred to a citizen's right to breathe clean air. This was a reference to the Supreme Court judgement which instructed the new UK Government to speed up initiatives to meet European air quality standards, particularly for nitrogen dioxide, and in the light of 29,000 premature deaths in the UK that result from air pollution every year. However, the UK is not alone in failing to meet air quality objectives in major towns and cities, and some commentators believe that similar court cases could now take place across Europe.

According to the World Health Organisation, in 2012 around 7 million people died - one in eight of total global deaths - as a result of air pollution exposure. However, few people are aware for example, that in the UK, air pollution causes more deaths than obesity, alcohol or road accidents. However, the Supreme Court judgement has raised the profile of the air pollution crisis. On 19th May for example, the ITV Tonight programme entitled 'The Air We Breathe' featured black carbon monitors collected from Air Monitors during the AQE Show, and demonstrated how the normal lives of city dwellers expose them to dangerously high levels of air pollution.

Diesel engines have been blamed for the urban pollution problem, but the automotive industry highlights the fact that diesels emit less carbon dioxide than petrol engines. They also point to the level of emissions from the power industry. "One thing is certain," says AQE organiser Marcus Pattison, "Monitoring has a vital role to perform; if regulators are to ensure that new policies improve air quality, they must be confident that accurate and reliable monitoring is being undertaken; not just in large industrial stacks but also at street level, where people live and breathe. Existing monitoring infrastructure is unlikely to provide the spatial resolution required, but some of the technologies on display at



Those who attended AQE had the chance to learn about the latest developments in Air Quality and Emissions Monitoring

AQE 2015 offer a solution, and generated a high level of interest among visitors."

AQE 2015 was the eighth in a series of specialist air monitoring events and included two CPD approved conferences covering emissions monitoring and ambient air quality. Visitors were also able to access over 50 free walk-in/walk-out workshops and an exhibition featuring hundreds of the world's leading organisations in air quality and emissions monitoring products and services, in addition to regulators, standards organisations, test houses, environmental consultants and pollution abatement providers.

Visitors to AQE 2015 travelled from all over the world and came from a wide variety of sectors including central government, local authorities, industrial process operators, test houses, consultants, researchers, academics, instrument manufacturers, the media and anyone with a professional interest in air quality.

Stack Emissions Conference: 'Emissions monitoring challenges facing operators and manufacturers'

The Conference began with a presentation from Dr Steve Griffiths from E.ON Technologies, who explained that under the Industrial Emissions Directive, the thermal rating of a large Combustion Plant is defined by the size of the different units that emit from the same stack, regardless of whether the flues are separate or combined. However, in practice, he said that the process of defining permit emission limits under the IED aggregation rules often requires a pragmatic approach, involving agreement with the regulator on a site specific basis. The Medium Combustion Plant Directive regulates emissions from boilers, engines and turbines with a thermal rating of 1-50 MW and is currently being reviewed under European Commission procedures.

Jonathan Clark from Syngenta then outlined the equipment sizing and flow measurement challenges facing operators with small stacks in relation to periodic monitoring and compliance with standards.

AQE 2015 contact details:

Marcus Pattison
AQE Organiser
Oak Court Business Centre
Sandridge Park, Porters Wood
St. Albans, Hertfordshire
AL3 6PH
ENGLAND
Tel: +44 (0) 1727 858840
Email: info@aqeshow.com
Web: www.aqeshow.com

Further information on MCERTS can be found at:

<https://www.gov.uk/government/collections/monitoring-emissions-to-air-land-and-water-mcerts>



AQE provided an excellent networking opportunity

Summarising the challenges for monitoring from large stacks, Dan Jones, also from E.ON Technologies, explained why the sample location requirements defined in EN15259 are more challenging in larger stacks. For existing plant, the sample location should be the best available, taking health and safety, access and historical use into consideration. He said that novel solutions are often required; by adapting procedures or by using alternative techniques such as tracer flow measurement.

In the afternoon, Derek Myers from REC provided an overview of the challenges facing test laboratories and others, when sampling dust from wet stacks. He said that consideration should be given to the sampling point and the location of the analyser, in addition to factors such as flow rate and the proximity of scrubbers and fans which can compromise results. In some circumstances, dynamic dilution may be necessary, for odour or speciated VOCs for example, and isokinetic sampling is necessary for moisture droplets. Further complications are possible where parameters such as HCl, HF, SO₂, NH₃ and NO₂ may dissolve in the water and may also react with other compounds. Multipoint sampling may also be necessary to improve the representativeness of samples. A heated sampling system is required but this has implications such as salt formation and a high probe temperature can change the kinetics of the gas and result in side reactions. The filter may also be exposed to steam which could cause fibre loss.

Finally, Rod Robinson from NPL summarised the regulatory requirements for the measurement of flow from stacks and outlined the main drivers for the development of a new flow standard, EN ISO 16911. For example the EU Emissions Trading Scheme requires measurement uncertainty on mass emissions of up to 2.5% when using a direct measurement approach, whereas research has shown flow measurement has been measured with uncertainty of up to 20%.

EN ISO 16911 follows similar procedures to those in existing emissions standards, and covers a variety of different measurement techniques including differential pressure measurement, vane anemometers, tracers and calculation methods.

The guidance on EN ISO 16911-1, which is currently available for comment, interprets and clarifies certain requirements of the Standard and suggests different requirements based on the uncertainty requirements of different monitoring objectives.

Ambient Air Quality Conference: “The latest developments and tools”

The height of monitoring station sampling points vary depending on local conditions and with the type of equipment installed, and since most vehicle emissions tend to occur less than 1m above ground, current sampling may not adequately reflect vertical variations in air quality. Stephen Stratton from Ricardo AEA therefore reported on the development of an air quality platform in Glasgow to measure a number of pollutants at child buggy height (0.8m) and adult height (1.68m) simultaneously, including black carbon, ultrafine particles, particulate matter and nitrogen dioxide, in addition to recording meteorological conditions, GPS and video. The results have not yet been published but Stephen said that there was significant variation between pollutant levels at the different heights. His team also conducted mobile monitoring, using a low cost system developed by Air Monitors, and he said that this revealed much higher levels ('hot spots'), in some locations, of PM_{2.5} and PM₁₀ than those recorded by the fixed station.

Jacqueline Barr from IBI/Transport Scotland delivered a presentation on a collaborative Sensor Rotation Project in which new monitoring technologies were compared with reference monitoring sites, with a view to integrating air quality with traffic management in the future.

In the final presentation of the morning, David Green from Kings College London reported on a series of PM Speciation Studies looking at the makeup of particulate matter measured across the UK and how it varies. He explained how recent advances in instrument technology have allowed the measurement of aerosol chemical composition to be undertaken at an hourly and sub-hourly resolution and, by combining a number of measurement techniques; it is possible to speciate nearly all of the aerosol mass. This has improved understanding of the sources and processing of atmospheric aerosols in the urban environment by allowing them to be linked to the more rapidly changing source activity such as traffic, as well as meteorology.

In the afternoon, Martine Van Poppel from VITO Belgium, explained the results of the CARBOTRAF EU Project in Glasgow and Graz, which examined ways in which black carbon and carbon dioxide levels can be reduced by the latest monitoring technologies and effective traffic management. She said that black carbon levels have been reduced by up to 5% across a network, and by higher amounts at junctions and in traffic corridors.

In the final presentation, David Carlsaw from King's College London described 'OpenAir' which is free, open-source software developed for the innovative analysis of air quality data. David described new developments concerning bivariate polar plots that improve emission source characterisation, and said that Openair continues to develop and that courses will be available in the future.



Exhibitors at AQE 2015 enjoyed the opportunity to showcase their products to visitors from over 50 countries

International Exhibition

The centre of the AQE Show exhibition arena featured a new larger demonstration area featuring a life-size stack, complete with an array of continuous analysers. In addition, an array of new technologies was on display in the ambient air quality section; all under a 'monitoring on the move' theme. For example, an electronic vehicle had been equipped with a new high-speed multigas analyser, DUVAS, which enables spatial air quality measurements through mobile surveys. However, the most eye-catching display was provided by Air Monitors' remote control quadcopter which had been fitted with tiny carbon dioxide sensors, providing a vertical profile of concentrations. Similarly, a helium balloon had been fitted with a microaethalometer for measuring black carbon at differing heights. Low cost AQMesh units had also been located at various locations in the hall, providing live air quality data via the web.

Exhibition visitors were provided with free lunches and refreshments, which were closely scrutinised by a culinary expert...

With more than 90 stands (10% increase on AQE 2013) featuring hundreds of the world's leading organisations in air quality monitoring, the AQE exhibition provided a unique opportunity to see all of the latest developments in instrumentation and monitoring services. For example, in the emissions monitoring sector, DURAG demonstrated the D-R 320 back-scatter optical stack monitor. ABB featured the new ACF5000 hot/wet FTIR extractive continuous emissions monitoring system, and AMS Analytica (Italy) presented the combination of a new portable sampler with a new portable Isokinetic Calculator. Pollution SRL launched Polaris, a lightweight FID analyser, heated to 180°C, and designed for VOC monitoring, and SICK showcased a total mercury monitoring solution in addition to 'the perfect solution for pre-abatement monitoring on difficult processes.' EiUK's RAS1800 emissions analyser has recently received MCERTS certification and this instrument featured on the company's stand.

The Quantitech stand included continuous emissions monitoring technologies and heated sample lines, in addition to three unique portable technologies: the Gasmeter portable FTIR analyser; the Torion portable GC/MS and the FROG PID/GC, all of which enable site measurements to avoid the cost and delay of laboratory analysis. Quantitech's Dominic Duggan, said: "As a specialist event, almost every visitor to AQE 2015 was a potential customer for Quantitech, so the quality of the leads that we received was extremely high." Antti Heikkilä from Gasmeter Technologies in Finland agreed: "I was delighted with the number of enquiries that we received from outside of the UK. As a dedicated event, AQE 2015 is obviously very attractive to anyone with a professional interest in air quality and emissions monitoring."

PCME's stand featured new technologies such as a controller for communications with PCME's dust, leak and flow measurement sensors, and a new digitally networked multi-compartment baghouse monitoring system. Following a successful event, the company's Antony Sumner said: "AQE is the 'must go' show for anyone interested in air quality and emissions, both in the UK and the rest of the world."



Visitors enjoy their free lunch whilst this gentleman makes an impression...



Record attendance to AQE meant even busier talks and workshops than the 2013 show



The demonstration area, featuring a "Monitoring on the Move" theme, included this van, equipped with a high speed multi-gas analyser

The UK's test house industry was extremely well represented, offering visitors a comprehensive selection of services across almost any industry. For example, Alastair Wolff from Exova Catalyst commented: "As the leading stack testing contractor, we are proud to have a long association with AQE, the leading show of its kind."

Several of the exhibitors offered new technologies for ambient air quality monitoring. For example, Air Monitors demonstrated AQMesh pods – low cost, battery powered, wireless ambient monitors, that also featured in some of the conference presentations. Expressing his pleasure with the success of the event, Jim Mills from Air Monitors said: "We certainly caught the attention of everyone that visited the show and were delighted with the quality of the enquiries that we received. Our workshops were also very well attended with high levels of interest in the performance data that we unveiled for AQMesh."

Enviro Technology showcased the latest cutting-edge technology for measuring NO₂ and Greenhouse Gases as well as real-time metals in air and total gaseous mercury. Matts Monitors displayed Thomson Environmental's dust and diesel particulate samplers for construction dust and roadside monitoring applications. The company's Peter Sherfield said: "This was the first AQE show for Matts Monitors and I am very encouraged with the number of new, potential and existing customers that we met."

In a break with tradition Ashtead Technology did not bring examples from their rental fleet of environmental monitoring equipment, focusing instead on the benefits of instrument rental. Ashtead's James Carlyle, said: "I attended AQE 2015 during the first day of the event and was pleased to note the number of visitors to our stand. The quality of the enquiries that we received was good, with most people genuinely interested in the latest monitoring equipment technologies and the advantages of equipment rental."

AAC Eurovent used AQE 2015 to showcase its NITROSORB® technology which is able to remove harmful nitrogen dioxide in ventilation systems. The company's Robin Elshout says: "Today's air pollution is largely invisible and most people are unaware of the thousands of deaths that result from it, so the Supreme Court's judgement will help to raise awareness of NO_x levels in urban areas, and we anticipate a high demand for our technology from urban employers, architects, consultant engineers and planners seeking effective solutions for indoor air quality mitigation."

The AQE exhibitors were clearly very pleased with the success of the event and the visitors also provided similar comments of approval. For example, David Ingram from Winchester City Council described AQE as "A great way to network and explore exciting new innovations," and Janet Bradley from Birmingham

City Council said "it was good for keeping up to date with available technology." From an industrial perspective, Sarah Grimshaw from E.ON UK said: "AQE was a really useful event for keeping up to date with the latest developments in air emissions monitoring," and from the University of York, Michelle Wang said: "AQE's exhibition and workshops gave a hands-on experience that is much appreciated in gaining a better understanding of the products."

The Exhibition area also featured a poster presentation section which ran a competition under the theme: 'Air Pollution is bad for our health – taking personal responsibility and local action to deliver clean air.' The competition was sponsored by Environmental Protection UK (EPUK) and Enviro Technology Services, and the joint winners were Gam Gurung of Birmingham City Council for his poster entitled: 'Exposure to Carbon Monoxide (CO) and PM_{2.5} levels inside shisha premises,' and Paolo Leonisio and Matteo Masperi from the University of Brescia, Italy for their poster entitled: 'Air quality monitoring with bioindicators.'

Workshops

Over 50 free walk-in workshops, mostly provided by exhibitors, addressed a wide variety of air quality monitoring themes including ambient air, stack emissions, occupational safety, nuisance dust, fugitive emissions and boundary monitoring.

On the first day of AQE, the workshops covered the measurement of particulates, nitrogen oxides, TOC, dioxins and many other toxic gases. These presentations covered stack emissions as well as fugitive and fence-line monitoring, dust modeling and the employment of the 'Internet of Things' in environmental monitoring.

Visitors to the second day's workshops were treated to a practical demonstration of real-time simultaneous multigas analysis when Quantitech's Dominic Duggan enlisted the help of three attendees to assist in the demonstration of the Gasmeter portable FTIR gas analyser. Seeking to explode the myth that FTIR gas analysis is complicated, Dominic encouraged participants to conduct the analysis without any prior training. "The attendees were surprised to see how many compounds were in the 'Air' and how easily speciated data could be generated for a wide range of gases," Dominic commented.

Air Monitors unveiled the latest trial data on AQMesh pods at a number of sites including a project in Glasgow which ran two pods monitoring NO₂ alongside a reference monitor, demonstrating excellent correlation between the pods and in comparison with the reference monitor. Colin Craggs from Air Monitors ran an AQE Workshop to launch two new portable gas analysers; the Honeywell SPM Flex and the Thermo TVA-

2020. The SPM Flex is a portable gas detector that can also be connected to the mains and used as a short-term continuous monitor. Designed for industrial users, it employs Chemcassette tape technology to detect specific gases such as Hydrides, Mineral acids, Oxidizers and Amines. Colin explained that a selection of Chemcassette tapes is available to enable users to measure gases within different families of compounds. The Thermo Scientific instrument is designed for fugitive emissions and industrial hygiene and is available as an FID or dual detector FID/PID, depending on the target VOCs.

Gala Dinner & Awards

With a James Bond Casino theme, the AQE 2015 Gala Dinner provided delegates, exhibitors and guests with an opportunity to discuss air quality in a more relaxed atmosphere whilst celebrating some of the air quality and emissions sectors' greatest achievements.

The Source Testing Association (STA) Golden Stack Award was presented to E.ON at Blackburn Meadows in Sheffield for going the extra mile for STA members working on their sites, exceeding minimum requirements for co-operation, safety and welfare in the working environment. Simon Medhurst was awarded an engraved clock in recognition of 20 years of service to the STA, and STA Director Dave Curtis was presented with an engraved Bell in recognition of longstanding service to the organisation on the occasion of its 20th anniversary.

The STA is a non-profit-making technical trade association with a corporate membership of over 200 organisations including process operators, regulators, equipment suppliers and test laboratories. Looking back, Dave said: "We created the STA to give the emissions monitoring sector a voice, at a time when regulations and standards were changing quickly, and I am delighted with the success that we have achieved. Process operators have become responsible for emissions monitoring and through the development of new methods and standards, coupled with training and certification, the STA has made a major contribution to the advancement of the science and practice of emissions monitoring, coupled with improved procedures and safety."

AQE 2017 (17th & 18th May)

Summarising, AQE organiser Marcus Pattison said: "Following a 3-fold increase in visitor numbers at the 2013 event, it is extremely gratifying that we managed to grow the attendance even further. However, this sets a challenge for AQE 2017, at which we are planning to continue the trend!"



The Gala Dinner's James Bond "Casino Royale" theme was a hit with the guests

