

# Visitor Numbers up by 300% at Air Quality Show

**AQE 2013, the air quality and emissions show, has been heralded a phenomenal success by organisers, exhibitors, speakers and visitors. With air pollution concern running high, this event could not have been better timed, and succeeded in attracting three times the number of registered visitors than the previous event in 2011.**

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In many respects AQE 2013 was an experiment; the 6 previous MCERTS events had focused on emissions monitoring at processes regulated by the Environment Agency, but AQE 2013 pulled together all aspects of air quality including ambient air, emissions abatement, and processes regulated by local authorities. The experiment was an astounding success as visitors flocked to Telford for the 2-day event. Every conference session was packed and the workshops were so busy that visitors often had to jostle for position in the doorways.

The AQE exhibition and workshops were free of charge, but there was a small cost for attending the AQE conferences. Nevertheless, attendance levels remained high throughout the event, reflecting a high level of interest in air quality. In addition, the sessions were recognised by the Institute of Air Quality Management as valuable Continuing Professional Development (CPD) for its members and other air quality professionals.

## Conference – day 1: Ambient Air Quality

Brian Stacey from Ricardo-AEA spoke on behalf of Defra, providing his interpretation of UK and EU air quality policy. He explained how EU air quality policy stems from the World Health Organisation (WHO) which sets limits etc. and the EU uses these to produce Directives which establish target levels for member states. Member states have their own monitoring networks which provide data that help inform policy. In order for monitoring data to be comparable between states, standard methods are applied according to the European Committee for Standardisation (CEN).

In the UK, monitoring data is supplemented with modelling. However, while the UK is not directly affected, Brian explained that modelling can be problematic in areas with variable topography, for example in the alpine regions of Europe. Speaking from the floor, Jack Pease, editor of Air Quality Bulletin, suggested that more monitoring sites might be required if the reliance on modelling is to be reduced. Brian said that in the UK, there is a balance between monitoring and modelling where the model is used to good effect to predict concentrations where monitoring is not routinely undertaken. Additional note – the number of monitoring stations in the UK is determined by the amount of supplemental assessment (eg. modelling) undertaken. This is a deliberate policy decision that is not likely to be subject to radical change in the near future.



The UK has been divided into zones and agglomerations for the purposes of air pollution monitoring. There are 15 regional zones and 28 agglomerations (urban areas with > 250,000 population) in the UK. The provisional data produced by these monitoring networks is freely available on the internet one hour after readings are taken (see <http://uk-air.defra.gov.uk/latest/currentlevels>).

Brian explained that monitoring data is assessed against target levels and the main issues of concern in urban areas are particulate matter and nitrogen dioxide. However, he said that work is continually ongoing to re-evaluate the effects of exposure. Looking forward, he speculated that very fine particles and dark particles are likely to be the focus of attention.

Providing an insight into the future of air quality monitoring Prof. Frank Kelly from King's College London, began the next presentation by reminding delegates that there are only a few days each year in the UK in which air quality is visible, but that on these days more people die from cardiovascular disease. London no longer suffers from the smogs of the 1950s but air pollution is still deadly. In 2010 the Committee on the Medical Effects of Air Pollutants (COMEAP) published a statement estimating the mortality burden of particulate air pollution. It said that up to 29,000 people in the UK die prematurely every year as a result of particulate pollution and that the average reduction in life expectancy from this was 6 months.

Prof. Kelly also cited work in the USA which demonstrated a link between the concentration of fine particles and fatality risk, and explained that this has helped to drive air quality legislation.

Explaining the need for a new approach to monitoring, Prof. Kelly said that exposure data is still regarded as the Achilles heel of environmental epidemiology. He referred to work in Lambeth which has shown varying NO<sub>x</sub> concentrations in different postcodes. However, he explained, since most people travel every day for work or social reasons, their exposure levels vary accordingly and portable monitors are therefore very useful in gaining a better picture of exposure.

Much of the fine particulate pollution that is the cause of greatest concern is derived from diesel engines. This was highlighted by black carbon measurements in London's Oxford Street during a period of traffic closure in November 2012. In addition, Dr Ben Barratt, also from King's College London, has used small portable aethalometers to continuously measure the daily black carbon exposure of a variety of people. His work highlighted the advantages of portable monitors and showed that the main risks occur during travel on busy roads. However, further research



will be necessary in order to evaluate the relative health risks associated with long term exposure and short term peaks.

Responding to a question from the floor concerning the UK's failure to meet some of the urban air quality standards, Prof. Kelly explained that there are many challenges in the UK and in almost every other country. However, he said that he is encouraged by the fact that as the Health Protection Agency becomes 'Public Health England' (from 1st April 2013), air quality (PM2.5) will be one of the 50 key measures that the new organisation will track.

Prof. Roy Harrison from Birmingham University delivered a presentation in which he explained how to gain added value from monitoring data by understanding air pollution processes. His talk illustrated some of the scientific advances that have been derived from the analysis of routinely collected data. For example, a study in London conducted over a number of years has shown particle number counts mirroring the temperature profile, which indicated that smaller particles are semi-volatile.

Other examples cited by Prof. Harrison included the reduction in diesel fuel sulphur content which led to a dramatic decline in ultrafine particle emissions. Other work has shown that secondary sulphate concentrations are related in a very non-linear way to sulphur dioxide emissions, hence contributing to the very slow decline in PM10 concentrations in recent years. Perhaps the most policy-relevant example given by Prof. Harrison was the inference made by Kings College London scientists from ambient air data that the fraction of primary nitrogen dioxide emitted by road vehicles had increased substantially and this explained the lack of decline in urban NO<sub>2</sub> even though NO<sub>x</sub> concentrations were falling. This was later confirmed by measurements in vehicle exhausts.

With most traditional particle monitoring technology focused on mass, Prof. Harrison explained that ultrafine particles, which are very important in terms of their health effects, have almost no mass but are present in large numbers, so Defra has established a project to measure particle count.

Responding to a question from the floor, asking what new areas of monitoring are required, Prof. Harrison suggested that organic component analysis would help identify the sources of particles and that we need more particle size distribution data.

Whilst the demand for environmental monitoring data grows, the funding for doing so is under pressure. Ruth Fain from Golder Associates explained how Section 106 agreements (section 75 in Scotland) can be used to secure the implementation of air quality monitoring programmes or other mitigation as part of the grant of planning permission. This would apply where air quality (as is the case with other environmental control issues) can be identified as being 'material' to the determination of the planning application and to ensure that development does not have a detrimental effect on the environment or amenity of the area.

Ruth explained that these agreements can be attractive to developers and local planning authorities to help overcome hurdles to the grant of a planning permission. From a planning authority's perspective, they can provide an opportunity to secure the implementation of on, or off-site monitoring or mitigation works required to support the development in accordance with the objectives of relevant development plan policies, or the



recommendations of consultees. These agreements differ from planning conditions because they are subject of a legal agreement in which the applicant is a participant, and can be used where a condition would be inappropriate, they are also more robust to challenge by interested parties than a condition.

A number of Section 106 examples were given including the provision of an air quality monitoring capability at a new waste treatment facility and for green measures on other projects including bus shelters, cycle lanes, highway restructuring etc.

The opening presentation of the day explained the importance of commonality of monitoring amongst EU member states and Emily Jarvis from SIRA closed the first day's conference by explaining the role of instrument equivalence and MCERTS certification of continuous ambient air quality monitoring systems (CAMs).

The EU Ambient Air Quality Directive requires CAMs to undergo product certification or type-approval before they can be accepted for use and Emily explained that the Environment Agency's Monitoring Certification Scheme MCERTS is designed to meet this requirement, and that there are three levels of MCERTS approval for ambient air monitoring: Indicative Dust Monitors, CAMs, and UK Particulate Matter (Equivalence).

Indicative dust monitors can be employed to measure particulate pollution trends, for source identification studies and for other measurements where an indicative result is acceptable. However, they are not substitute for use as CAMs and cannot be employed in national air quality monitoring networks for the EU Ambient Air Quality Directive.

Published in July 2012, Defra has developed an Annex to the MCERTS standard: 'MCERTS for UK Particulate Matter' which is an essential requirement of the EU Commission's Guide to Demonstration of Equivalence (GDE). Certification to the Annex constitutes approval from Defra for equivalence in the UK, and means that the instrument can be used in the UK national air quality monitoring network. Testing involves a minimum of four comparisons at a minimum of two different sites and each comparison requires at least 40 valid results.

Concluding, Emily explained that a wealth of further information is available on the MCERTS, SIRA and Defra websites.

### Conference – day 2: Emissions Monitoring

In a presentation which focused on the Industrial Emissions Directive (IED), Richard Vincent, Head of Industrial Pollution Control at Defra, explained that the IED should not necessarily be regarded as a new Directive because it recasts existing Directives covering integrated pollution prevention and control (IPPC), large combustion plants, waste incineration, solvent emissions and titanium dioxide production.

The IED contains much of the original text and applies to around 10,000 installations in England and Wales including a wide variety of processes from power stations to intensive pig farms, to dry cleaners. The IED was transposed in England and Wales by the Environmental Permitting Regulations 2013 and entered force on 27 February 2013.



Importantly, the IED tightens the implementation of best available techniques (BAT) through the progressive adoption of the BAT Conclusions reached in the BREFs (BREF = Best available techniques Reference document).

BREFs are produced by technical working groups and Richard emphasised the importance of industrial contribution to the work of these groups. Whilst completed BREFs can amount to several hundred pages, Richard urged those affected by them to pay particular attention to the Conclusions at the end of each document because emission limit values (ELVs) are set on the basis of published BAT Conclusions. These have been published for several sectors and more will be produced in the next few years.

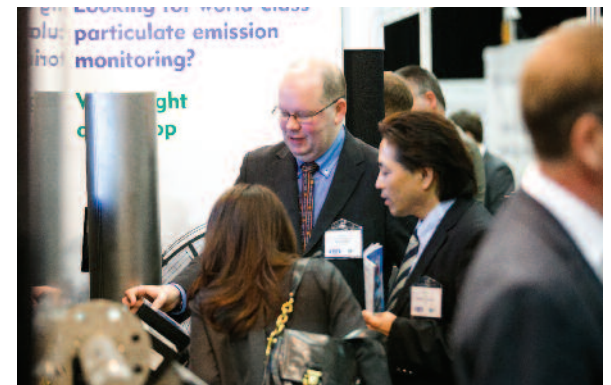
Derogation may apply only where an assessment shows that the achievement of BAT-associated emission levels in adopted BAT Conclusions would lead to disproportionately higher costs compared to the environmental benefits, due to the geographical location, the local environmental conditions or the technical characteristics of the installation.

Mirroring established UK practice, inspections of regulated processes will be at least triennially and annually for high risk installations. Monitoring requirements will not change significantly; however, the Monitoring BREF will be replaced by a Reference Report on Monitoring which is currently being prepared by the European IPPC Bureau.

Concluding, Richard reminded the assembled delegates that millions if not billions of expenditure is dependent on accurate monitoring and without good monitoring the IED would lack teeth.

In the following presentation Michelle Gallagher from the Environment Agency's national odour team explained that odour is a form of pollution and any Agency regulated process that creates an odour needs to develop an Odour Management Plan (OMP). Pollution is defined as an emission which may be harmful to human health or the quality of the environment, cause offence to a human sense, or impair or interfere with amenities or other legitimate uses of the environment. Guidance on odour assessment and control for many environmental permit regulated facilities is contained in the relevant Sector Specific Guidance Notes and Horizontal Guidance for A(1) facilities regulated by the Environment Agency; and Process Guidance Notes for Part B activities and Sector Guidance Notes for Part A(2) activities regulated by local authorities. The Environment Agency has published a document entitled 'How to comply with your environmental permit' which helps both holders and potential holders of permits to understand how to apply for, vary and comply with their permits.

Michelle explained that the provisions of an OMP are treated as part of the permit. The OMP must therefore demonstrate that the permit holder has assessed all of the factors relating to the creation of odour and has procedures in place to manage them effectively and to respond to any unforeseen circumstances. For example, contingency measures must be implemented when odour trigger levels are reached or when the public complains. The Plan must include an inventory of odorous materials, showing tonnages and any variations. Monitoring will represent a key component of the Plan, assessing the emissions of odorous substances, so that



effective control measures can be established. The monitoring regime should also assess the effectiveness of abatement and reflect actual or potential impact on the local community.

OMPs should always address the concerns of complainants and therefore communication with the public is very important. Michelle warned delegates that people adapt to smells and become accustomed to them, so while site staff may not notice certain odours, that would not necessarily mean that local people would not regard them as a nuisance. Furthermore, smell is an emotional, subjective response – as Michelle said: “There is no such thing as a universal stink bomb!”

The Environment Agency’s Rick Gould delivered a presentation outlining the development of Operator Monitoring Assessment (OMA), which provides a systematic tool for auditing the monitoring provisions required by an operator’s permit and scoring the degree of risk. OMA looks at all of the factors that affect the reliability of data.

OMA began in 2001 - initially for air emissions but it now includes effluent monitoring and Rick explained how OMA examines four facets of monitoring in a systematic way:

1. Management System Provisions for Monitoring
2. Periodic Monitoring and Test Laboratories
3. Continuous Monitoring
4. Quality Assurance

After significant field-experience OMA has been revised and Version 4 has been published. Rick’s presentation explained how OMA has evolved and explained the changes that have been applied in Version 4.

Summarising Rick said: “OMA is a risk-based auditing tool which has enabled us to provide guidance and focus attention where it is needed; however, OMA will be continuously improved and updated based on experience and feedback.”

In the afternoon session, Carsten Röllig from TÜV in Germany spoke on ‘Special aspects of approval testing procedures according to EN 15267’.

EN 15267 is a CEN standard for testing and certifying automated measuring systems (AMS). The standard applies to AMS for both stack emissions and ambient-air monitoring. CEN developed EN 15267 because there was a growing need for a unified set of standards for testing and certifying AMS, to support the requirements of EC Directives and the quality assurance standard, EN 14181, for AMS which measure stack emissions.

Carsten explained that the performance testing and certification of AMS according to EN 15267 have been established in Europe since 2007. His presentation outlined the requirements of the standard and summarised experiences to-date on the testing procedure and the auditing process. He placed particular emphasis on critical aspects such as uncertainty calculation, maintenance interval, correlation coefficient and the assessment of changes to certified AMS.

In the final conference presentation of AQE 2013, Rod Robinson from the National Physical Laboratory provided an outline of the emissions monitoring methods standardised in Europe, explaining how these fit with European Directives, Best Available Techniques and BREFs. He explained that BREFs are mostly rather large unwieldy documents but encouraged delegates to refer to the BAT Conclusions.

Rod also detailed current activities in CEN to develop new standards relating to emissions monitoring and in doing so expressed a hope that delegates would use this information to contribute to the work of Technical Committees and Working Groups.

Explaining some of the inconsistencies in monitoring requirements, Rod outlined areas that are in need of further work. For example, the IED limit for SO<sub>2</sub> is 5 mg/m<sup>3</sup> in LNG combustion processes, but the required confidence interval is 1 mg/m<sup>3</sup>, and the Standard Reference Method (SRM) is unable to meet this requirement – much less a CEM calibrated with this SRM using

EN1418. However, CEN TC 264 has identified research into performance of SRMs at low levels as a priority and NPL has a current research programme looking at this, and is proposing a European project to resolve the issue.

In his conclusions, Rod referred delegates to The Source Testing Association website which provides a list of active working groups, UK representatives, and a list of current standards published by BSI on emissions monitoring – see [www.s-t-a.org/?page=bsieh](http://www.s-t-a.org/?page=bsieh)

## Workshops

In total, there were nearly 50 free walk-in workshops, mostly provided by exhibitors, addressing a wide variety of air quality monitoring themes including ambient air, stack emissions, occupational safety, nuisance dust, fugitive emissions and boundary monitoring.

Perhaps the most popular workshop was given jointly by Amanda Randle from Geotech and Jim Mills from Air Monitors, who launched the new AQMesh ambient air monitoring technology. Portable, battery powered and wireless, the AQMesh pods can be positioned almost anywhere to provide ppb air quality data via the web. Reflecting the high level of interest in this technology, Jim Mills was interviewed by the BBC during the AQE show.

Further ambient monitoring solutions were presented by Gradko, Signal and Metrohm.

Particulates featured prominently in many of the presentations because of their major role in the damaging health effects of air pollution. For example, Jim Mills talked about a new fine dust analyser ‘FIDAS’ which is able to provide simultaneous measurements of PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>4</sub>, PM<sub>10</sub>, TSP and particle number. He also gave a presentation on the Black Carbon monitors that have been used in the research referred to in Prof. Kelly’s conference paper. A speaker from DustScan discussed nuisance dust from construction and mineral extraction sites and explained the advantages of a new low cost battery powered PM<sub>10</sub> sampler. In addition Scielutions introduced the Dekati instruments for particle detection from a variety of different sources including engine exhaust, combustion emissions, air quality and pharmaceutical aerosols.

Particulates in stack emissions were discussed by Dominic Duggan from Quantitech who explained the advantages of new technology for automatic sampling and a speaker from PCME provided an update on BAT for particulate monitoring. Quantitech also explained the advantages of continuous dioxins sampling at combustion plants in mainland Europe.

Several presenters including Siemens, ABB, TÜV and PCME provided information on how to improve the quality accuracy and reliability of monitoring, and others addressed specialist issues such as mercury, VOCs, isocyanates, bioaerosols, odour, datalogging and calibration.

## International Exhibition

With a much higher volume of registered visitors in comparison with previous events, and with visitors coming from over 38 countries, the exhibition, which featured over 70 stands, was a flurry of activity throughout both days.

In addition to the product launches mentioned above, Air Products unveiled a new range of multi-component ISO17025 gas mixtures including NO, SO<sub>2</sub>, CO and CO in Nitrogen. Turnkey Instruments launched the fourth generation of its Site Compliance Monitor the CM3, for monitoring noise and vibration. Horiba displayed the new PG-350E portable gas analyser and Kisters launched the latest version of AquisNet DAS – software for monitoring stations. Sigma-Aldrich/Supelco launched the new ASSET™EZ4-NCO Dry Sampler for isocyanate measurements in air which complies with ISO 17734-1.

The exhibitors included accreditation organisations, instrument manufacturers and software developers, test houses, laboratories, consultants, calibration gas providers and abatement equipment

providers, many of which described AQE 2013 as the best exhibition they had attended in years.

James Carlyle, General Manager at Ashtead Technology said: “Previous MCERTS events have provided a limited number of good quality rental enquiries for our fleet of environmental monitoring instruments. However, by expanding the remit of AQE 2013 to cover ambient monitoring in addition to emissions monitoring, the organisers substantially increased the number of visitors looking for access to the latest gas and particulate monitoring technology, and we were delighted with the number of enquiries that we received.”

Antti Heikkilä from Gasmeter Europe Oy in Finland said: “As a manufacturer of FTIR analysers, emissions monitoring systems have always been an important part of our business, so the MCERTS events have become important diary dates. However, our FTIR analysers are now utilised in a wide variety of ambient applications so we were delighted when this area was added to AQE 2013. The AQE show attracted a lot of visitors and I was delighted to meet customers and prospects from all over the world.”

Stefano Alberti from Tecora in Italy said: “I was very pleased to note the volume of visitors and exhibitors at AQE 2013 – it was a great opportunity to see the emissions monitoring industry in one place and it was gratifying to meet a large number of stack testers on the Quantitech stand that were interested in our new automatic isokinetic particulate sampling systems and our continuous Dioxin emissions sampling system.”

Jim Mills from Air Monitors in the UK said: “The new expanded remit for this event was obviously an outstanding success – our stand was incredibly busy and our workshops were all standing room only. The volume of enquiries that we received was undoubtedly due to the much higher visitor numbers, however, the new technologies that we launched at the event – AQMesh small, wireless, battery powered ambient monitors and the FIDAS, Fine Dust Analysis System – were both tremendously popular. In addition to the large number of enquiries that we received, several customers also placed orders during the event.”

Dave Curtis of the Source Testing Association (STA) was delighted with the new format of the event: “Local Authorities play a major role in the regulation of industrial emissions and in the monitoring and management of ambient air quality, so it made a lot of sense to expand the remit of the show to include every aspect of emissions and air quality. The trebling of visitor numbers and extremely positive comments from all participants demonstrate that the show has taken a major step forward.”

Several of the exhibitors took advantage of the central demonstration area which featured: a stack, complete with continuous samplers and analysers; a mobile monitoring station; a road sign fitted with an AQMesh pod and a mannequin with an FTIR multigas analyser on his back.

## Gala Dinner

The STA’s Golden Stack Award was presented by Richard Vincent, Head of Industrial Pollution Control at Defra, to Tata Steel, Scunthorpe, at a formal dinner attended by over 200 of the leading experts and participants in the air quality monitoring sector. Following the presentation, diners were treated to an indoor fairground complete with dodgems, popguns, a giant hammer and hoopla.

## AQE 2015 (22-23rd April 2015)

Following the extraordinary success of AQE 2013, organiser Marcus Pattison said: “I am absolutely delighted that the new format worked so well and I would like to thank all of the organisers, speakers, exhibitors and delegates for their hard work. Many of the 2013 exhibitors have already re-booked for 2015 and the only complaint during the entire event was that we will have to wait for two years until the next AQE!”

If you would like to exhibit,  
sponsor or present at  
**AQE 2015**  
please contact  
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