

# AIR QUALITY

May 2007 Issue 13

BULLETIN

## PREDICTIONS

### NO<sub>x</sub> shift lifts NO<sub>2</sub> by 20%

The realisation that modern engines produce more direct nitrogen dioxide has prompted the update of the official NO<sub>2</sub>/NO<sub>x</sub> calculator.

The calculator, held on the air quality helpdesk website, is used to derive current and future NO<sub>2</sub> levels from background NO<sub>x</sub> maps. Such calculations, and those made by the DMRB screening routine, are increasingly underestimating NO<sub>2</sub> concentrations.

While a slight adjustment in an obscure calculator may seem trivial, the change is important and may have widespread ramifications. Areas considered just below borderline NO<sub>2</sub> may now be pushed over the 40µg/m<sup>3</sup> limit.

Local authorities have been finding for some time that monitored NO<sub>2</sub> levels in congested streets have been far higher than predicted. Vehicle emission factors still seem unable to cope with slow or stationary traffic, and modern engine technology produces 20% or more NO<sub>2</sub> in the NO<sub>x</sub> mix as compared to the 5% assumed historically (*AQB September p1*). New engines reduce NO<sub>x</sub> emissions –

accounted for in calculations – but the increase in NO<sub>2</sub> has not been accounted for and air quality objectives are couched in terms of NO<sub>2</sub>, not NO<sub>x</sub>.

The current NO<sub>2</sub>/NO<sub>x</sub> calculator was released as part of the technical guidance LAQM TG(03). To bring the calculator up-to-date, Air Quality Consultants studied UK monitoring data for 2003-2006. Significant changes have occurred, as expected, and new relationships now apply. Two spreadsheets – one for London, and one for elsewhere – have been developed.

There is a worked example. If NO<sub>2</sub> is calculated using the TG(03) equation, road-NO<sub>2</sub> is predicted to be 13µg/m<sup>3</sup>, and total NO<sub>2</sub> is 36µg/m<sup>3</sup> – the objective is achieved by a margin of 10%. If in the same example NO<sub>2</sub> is calculated using the updated (outside London) equation, Road-NO<sub>2</sub> is predicted to be 18µg/m<sup>3</sup>, and NO<sub>2</sub> is 41µg/m<sup>3</sup> – the objective is exceeded. If NO<sub>2</sub> is calculated using the updated (within London) equation, Road-NO<sub>2</sub> is predicted to be 20µg/m<sup>3</sup>, and total-NO<sub>2</sub> is 43µg/m<sup>3</sup> – the objective is exceeded by 10%.

The changes will lead to further inaccuracies in the DMRB spreadsheet, which has not been updated to include the changes. However other improvements are underway (see news p2).

Officials say: “When using the new calculators it should be borne in mind that NO<sub>2</sub>/NO<sub>x</sub> concentration ratios are expected to continue to “drift” upward at roadside locations for some years to come. The revised approach is considered to be broadly applicable over the next few years, although it will become increasingly uncertain after 2010.

“The implications of this current study for assessments which have verified against NO<sub>2</sub> measurements (and not just NO<sub>x</sub>) and which do not project far into the future will thus be minimal. However, the results presented here do suggest that any modelling study that has verified against NO<sub>x</sub> without an additional check against measured NO<sub>2</sub> might have under-predicted NO<sub>2</sub> concentrations by, on average, 20%.”

● [www.uwe.ac.uk/aqm/review/mfaqroad.html#ROAD13](http://www.uwe.ac.uk/aqm/review/mfaqroad.html#ROAD13)

## ACTION PLANNING

### Monitors miss NO<sub>x</sub> eating effect from paint

Monitors placed to record the impact of NO<sub>x</sub> eating paint in the City of London have failed to see any effect.

The Corporation of London used photocatalytic paint on the side of a school on a busy road. The paint is claimed to reduce NO<sub>x</sub> into less harmful substances – Camden is also using and early results said it might have cut NO<sub>x</sub> by 20% (*AQB April p5*).

A continuous NO<sub>x</sub> analyser was located approximately 2.5 metres from the edge of the painted wall. Concentrations of NO<sub>x</sub> were monitored for six months before the application of

the paint and for eight months after. Paint from the wall was also analysed for the presence of nitrates – these showed that the paint was successfully converting NO<sub>x</sub> to nitrates. However, a corresponding decrease in monitored NO<sub>x</sub> concentrations at the air quality analyser was not detected by either analytical method.

Experts think this was likely to be due to the general mixing of the air around the building as the site is relatively open, unlike where it has been successful in Italian cities. Further trials are expected in more enclosed environments and the air will be



NO<sub>x</sub> eating paint: no effect found

analysed nearer to the painted façade.

● City of London, Ruth.Calderwood@cityoflondon.gov.uk

## Oxford miracle?

The Oxford transport strategy has had a direct impact on child health, claim researchers.

Oxford's wide ranging transport strategy involved closing roads and rerouting traffic to cut congestion and pollution. Researchers went into primary schools and monitored pupils before and after to see if there was any discernable effect.

Nearly 1400 children aged 6-10 years old from seven schools were visited for weekly periods to gather peak lung flows. Questionnaires were used to gather wheeze histories and postcodes used to establish pollution exposure at home.

A health improvement was found despite a minor traffic impact – mean traffic flows across 217 road segments dropped from 10,417vpd before the strategy to 10,147vpd afterwards although there was a wide range in individual segments (some rising by 10,000 vehicles and some falling by 17,424 vehicles).

Peak flow measurements improved by on average by 5L per minute for children after the traffic changes – and there was a 20% reduction in wheeze.

Researchers said: “The benefits were especially pertinent to those with pre-existing respiratory conditions and to those from less affluent backgrounds despite the relatively moderate traffic reductions. Improvements were seen across all samples, whether or not they were near to a rise or fall in traffic levels in nearby streets.”

The results prompted much discussion at the recent IEH meeting at Cranfield and are in stark contrast to many previous experiences where it has been difficult enough to identify an air quality improvement following cuts in traffic let alone a statistically significant health improvement.

● More from the IEH conference at Cranfield, see page 4-5

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## IN BRIEF

### Opal bid mounted

Air quality is a theme of a huge £12m bid for Lottery funding.

Universities and organisations including Imperial College London are seeking £250k start up funding for the larger bid that will launch OPAL (The Open Air Laboratory) that aims to encourage local environmental research in England.

### LTP2 reporting note

DfT has indicated there will be no local transport plan progress reports required from local authorities in 2007.

However DfT will ask authorities for an update on the 2006/07 position for those mandatory indicators which include the air quality indicator, LTP8.

LTP authorities who have integrated air quality action plans should also provide an update in 2007 on the implementation of local transport measures aimed at delivering cleaner air within the AQMAs. Details should be provided to Defra in accordance with the requirements of the tabular approach (Box 3.1) of Local Air Quality Management Progress Report Guidance LAQM.PRG(03).

Where an authority has declared new AQMAs, or has identified the need to declare new AQMAs in the future, the authority should provide in the 2007 air quality progress report a short description of the AQMA(s), and how the authority will be taking forward the air quality action plan, where applicable.

Where the LTP authority is the upper-tier authority then district authorities should be consulted on the implementation of local measures within their districts and the information from each district should be collated into a single LTP authority report against which progress of the air quality shared priority can be benchmarked.

- More details in a frequently asked question on the action plan helpdesk which can be found on [www.bv-actionplan.co.uk/faqs.asp](http://www.bv-actionplan.co.uk/faqs.asp)

## NEWS FROM THE NSCA SPRING WORKSHOP HELD IN DIDCOT LAST MONTH

# Highways Agency in DMRB revamp

The Highways Agency's Michelle Hackman told NSCA spring workshop delegates that that research was underway with a view to updating the commonly used DMRB air quality screening module.

Hackman, formerly of consultant Atkins, explained there was a need to speed up the DMRB calculations. Atkins has been appointed by the Agency to incorporate GIS into DMRB to provide more automation and make results less dependent on manual judgement.

Other changes include the incorporation of wind direction into the model – sites upwind of a motorway are likely to have lower concentrations than those downwind. The new DMRB will also have:

- Multi receptor capability;
- Met data from Birmingham;
- NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub>;

- Complex road geometry;
- Considers road width;
- Revised emission rates.

It is expected to be released by the end of the year. It is not yet clear when DMRB will incorporate new NO<sub>2</sub>/NO<sub>x</sub> ratios (see news, page one).

Transect monitoring is being carried out to validate wind effects looking at cuttings, embankments, elevated

sections, street canyon, roughness length, road width, noise barriers and tree shelterbelts.

Over 400 NO<sub>x</sub> tubes have been installed, including Ogawa tubes which read both NO<sub>x</sub> and NO<sub>2</sub>. Early results suggest that NO<sub>2</sub> concentrations caused by roads may be reduced by up to a half if in a cutting or on an embankment.

## Councils help agency with tube survey

50 local authorities have helped the Agency study the impact of its roads.

The councils had responded to an Agency request to put NO<sub>2</sub> tubes on houses near to its carriageways. Some ten months of data are available – provisional results suggest that the most common result is 35-40µg/m<sup>3</sup>, with some four sites

– for instance the M1 at Rotherham, the A282 at Dartford and the A5 at Dunstable – in the range 60-65µg/m<sup>3</sup>. Hackman said: "Three of these sites were next to a motorway, but the one next to the A5 in Dunstable wasn't a high flow rather was caused by congestion in a street canyon."

## MONITORING

# Dixon updates on Defra network revamp

Defra is now well into its expensive upgrade of its monitoring network to comply with EU directive requirements.

The upgrade will cost "big money" – £3m for the new equipment and £1.5 m a year for upkeep or else the UK will be in breach of directive requirements (*AQB Jan p1*).

The official network consists of Defra-owned and managed sites as well as local authority sites where councils are paid to

gather data provided they comply with AURN standards.

Dixon warns that there will be significant changes to the numbers of monitors needed – more will be needed in some areas, in other areas, local authorities will no longer be paid to gather data.

There will need to be 51 fewer carbon monoxide monitoring sites and 35 fewer sulphur dioxide sites. Some sites will have to be moved, and there will be around 25 new NO<sub>2</sub> sites.

- Increases include:
- Particulate: 57 additional (new/affiliate) monitors;
  - 12 PM<sub>10</sub> converted to PM<sub>2.5</sub>;
  - 27 new urban background PM<sub>2.5</sub>;
  - 6 co-located traffic PM<sub>2.5</sub> with existing PM<sub>10</sub>;
  - 15 new traffic PM<sub>10</sub> and PM<sub>2.5</sub> sites;
  - 9 new urban background PM<sub>10</sub> and PM<sub>2.5</sub> sites.

Dixon explained what this would mean for local authorities:

- a/ Currently affiliated sites staying in network:
- Business as usual, possibly more PM equipment, possibly

lose carbon monoxide and/or SO<sub>2</sub>;

b/ Currently affiliated sites not staying in the network:

- Defra will no longer fund data collection, QA-QC and data dissemination. Councils will be informed where de-affiliating whole or part of sites.
- c/ New affiliate sites:

- Defra will fund data collection, QA-QC and data dissemination;
- May be whole site, some pollutants or request to install Defra equipment.

New gas analysers in the network will need to be MCERTS approved. So far 75% are type approved, MCERTS is an Environment Agency-led scheme aimed at ensuring minimum standards for both laboratories and monitor operators (see news, page 7).

## Website warning

Don't let the usual suspects (eg South Yorks!) scoop the AQB website review honours! This summer we'll be trawling through all known air quality websites and ranking them. Time to get yours spruced up!



**Groundhog Daly:** Mark Daly of Sheffield, winner of the AQB 'most reported' person award presented at the NSCA workshop

NEWS FROM THE NSCA SPRING WORKSHOP HELD IN DIDCOT LAST MONTH

# Air quality target to be merged

The joint Defra-DfT public service agreement (PSA) on air quality is set to be replaced.

The PSA is one of the few joint interdepartmental PSA's and was set up to encourage joint working between the transport and environment departments following the splitting up of DETR.

There are currently nine Defra PSA's, including the joint Defra/DfT air quality one, and there is pressure to rationalise them. Current thinking is to scrap the air quality PSA along with the other eight and replace them with two PSAs, one on climate change, the other on the natural environment. Air quality would be one of five topics within the natural environment PSA and would compass Defra, DfT and other departments with an impact on the natural environment.

Defra's Sarah Dudgeon explained the thinking, emphasising that work was very much 'in progress' and that no conclusions had yet been

agreed: "There are currently 600 PSAs in Government and there is a move to reduce the number to 110. We want fewer PSA's and for them to have a higher priority. The PSA has been very useful to use, we are not abolishing it and we will still have air quality within a PSA which is good."

The proposals are being submitted to peer review and will be agreed in time for the comprehensive spending review

in autumn. They will then come into effect in March 2008.

Other issues raised by Dudgeon include a push to get air quality included within the streamlined set of local government indicators being drawn up the Government. Targets are vulnerable in the drive to cut plans, targets and red tape – failure to have air quality included as an indicator would have obvious funding implications.

## More delays for strategy

The revamped air quality strategy is being delayed yet further. It was due by the end of last year, but it looks like it may be much later this year – essentially a year late due to the complexity of the task.

Speaking at the NSCA air quality spring workshop held in Didcot last month, Defra air quality head Sarah Dudgeon said: "The revamped strategy will include much cost benefit

analysis which is used to justify further action." (*AQB May 2006*) Dudgeon added: "In previous years there has been very little about climate change, this strategy contains a little more."

Defra is also currently assessing this year's air quality grant awards. This year there is £2.4m available and the scheme is three times oversubscribed. Awards are due to be made this month.

### NGOs

## NSCA has vision – and seeks name change

Acting NSCA chief Phil Mulligan updated workshop delegates on progress for the organisation's revamp.

Mulligan has launched a widespread consultation on the society's future, including a series of roadshows in the regions. Decisions have been made on issues such as NSCA's vision "for a cleaner, quieter and healthier world" and mission statement: "We seek changes in policy and practice to minimise air, noise and land pollution, bringing together stakeholders to inform debates and influence decision-making. We educate and influence policy makers, environmental professionals, industry and the public by:

- Developing policy;
- Running campaigns and raising awareness;
- Providing training and resources;
- Promoting effective enforcement."

NSCA is to focus on air quality, noise and land quality – and will cease to work on waste and flooding, and phase out

work on light pollution. Climate change will be integrated into the air quality programme which will focus on particles, ozone and nitrogen dioxide.

A name change is planned. Mulligan said the current name "under-represents the full range of our interests and activities, is not known in wider circles, is cumbersome and requires further explanation and does not appeal to new supporters. We have four options:

- Descriptive name – unambiguous but may be cumbersome and could become outdated;
- Associative name – distinctive and value driven but it may be difficult to find something appropriate;
- Free standing name – aspirational, metaphorical or a new acronym, distinctive, strong identity but it may be difficult for people to associate it with our current name/work;
- We could leave the name unchanged.

**Editor's comment:**  
*The speed that Mulligan is*

*introducing changes is both welcome and scary. Welcome because NCSA has for the last year or two been unable to respond effectively to policy issues since the departure of Richard Mills and the 'two Tims', and more latterly uncertainty due to Mulligan's plans for change.*

*Scary because NSCA is a precious but fragile resource and while the NSCA's name is not ideal, it is not clear that the group is strong enough at the moment to endure the pain of a name change.*

*On a lighter note, Mulligan refused to speculate what names were up for grabs so we are left to suggest our own. All sound pretty daft: Cleaner Environment Society (CES); Environmentia; Grimebusters; LANS (Land, Air & Noise Society). Or ANAL (Air, Noise And Land). Or SPEW (Society for the Protection of Environmental Welfare).*

*Oh dear – if you think you can do better, please tell Mulligan: email PMulligan@nsca.org.uk*

### IN BRIEF

#### Tidmarsh marches

Defra local air quality number two Carole Tidmarsh has moved to the Government Office Partnership Unit.

Tidmarsh told AQB: "I will be so sad to leave local air quality management – it has been a really enjoyable time and the air quality community is great to work with."

● *Editor's comment:* Tidmarsh will be missed. She'd been in the job long enough to reliably supply a wise and helpful answer to air quality questions and we wish her well.

#### PM petitioned on air

A London residents' group is coordinating a petition demanding that the Government meet World Health Organisation air quality standards in London.

The Knightsbridge Association, which represents around 1,000 people and businesses in the area between Hyde Park Corner and Queen's Gate in Central London, has launched the *Campaign for Clean Air in London* which has enlisted support from MPs and business and community pressure groups.

● [www.bbc.co.uk/dna/action/network/G1956](http://www.bbc.co.uk/dna/action/network/G1956)  
The petition can be signed on <http://petitions.pm.gov.uk/LondonCleanAir/>

#### Last but not least...

Scotland has finally got its own dedicated government sponsored air quality website.

England, Wales and Northern Ireland have had their own websites for some time – all run by AEA. AEA is running Scotland's version, launched early last month.

Funded by the Scottish Executive, the site has been developed following a pilot study and consultation with stakeholders and contains latest up-to-date concentrations across Scotland, reports and analysis of trends and historical data, national and local policy information and background to air quality and its impacts.

● The site can be found at [www.scottishairquality.co.uk](http://www.scottishairquality.co.uk)

## NEWS FROM TENTH INSTITUTE OF ENVIRONMENT AND HEALTH MEETING AT CRANFIELD

### PM worse than cigs

Particle pollution has a far more important health impact on individuals than second hand tobacco smoke or traffic accidents, Edinburgh researchers suggest.

Air quality practitioners often struggle to spell out the risk from air pollution. Even those among expert committees struggle and use terms such as loss of life expectancy or QALYs which can be difficult for the public to properly comprehend. Brian Miller said: "It's difficult to put these figures into context, risk communication for air pollution is very difficult and we've done a lot of work on it."

Miller, from the Institute of Occupational Medicine in Edinburgh, has developed a spreadsheet programme based on 'life tables'. These are statistics used by actuaries and insurance companies to accurately predict people's life expectancy. Using these tables and the relative risks of PM<sub>2.5</sub> pollution, the researchers were able to show that a 10µg/m<sup>3</sup> reduction in PM<sub>2.5</sub> led to a gain of over 200 days in life expectancy. Eliminating road traffic accidents led to a life gain of 81 life days for men (and 30 for women), eliminating second hand tobacco smoke gained 70 days.

Miller concluded: "While these estimates are subject to uncertainty, they show the effect of ambient air pollution on mortality is a public health issue of substantial importance."

The techniques were used by Defra in testing various air quality strategy options for action.

### R&P works closed

R&P's factory near New York is to be closed, Thermo has announced.

R&P was taken over by Thermo last year, a number of key researchers have since left and product lines withdrawn (AQB April p2). R&P developed the Teom and the updated FDMS before Thermo took them over.

## Seaton: heart drugs protective?

Aberdeen researchers came up with a 'completely unexpected result' when extending a study into air pollution and heart problems.

A previous study looked at cardiac effects of air pollution in Belfast and Edinburgh, this time Aberdeen was studied. 112 subjects aged 60 or more were recruited and various blood measures taken and compared to measured personal NO<sub>2</sub> and personal PM<sub>2.5</sub> mass and number count monitors.

The researchers found no effect which was most unexpected – including changes in temperatures.

Seaton told the conference:

"We found nothing, it's a negative result, but a very interesting negative result. The age of this study group and pollution levels did not differ significantly from those during the earlier Belfast and Edinburgh study, the only obvious difference between the two was the drug therapy among the subjects.

"Modern cardiac therapy, such as statins, probably prevents short term adverse effects of pollution and perhaps protects against temperature effects." Seaton added that the lesson for researchers was that widespread use of heart medicines would mask any

impact of air pollution. But for the wider medical world, it may be true that drugs taken by those with weak hearts may protect (ie act as a prophylactic) against the effects of air pollution and health. "Modern cardiac therapy removes risk from a significant proportion of people, and this is reassuring."

Those with diagnosed heart problems and on medication may be better able to withstand excess heat or pollution than those with undiagnosed heart problems and not on medication. Seaton said it was not exactly clear which medication was helpful, although it may be statins.

## Black smoke effects explored by APHEA2

Results from the pan European APHEA2 project have thrown up some 'unexpected' results says Athens' Klea Katsouyani.

APHEA2 is a project following on from the previous APHEA project. It uses a common methodology to compare health effects across

dozens of European cities.

She said: "An unexpected result is that there are different effects according to the source of particles that leave a split between western European cities and central Europe. Warmer cities see a higher particle effect on health. Drier

cities have a higher effect, cities with high NO<sub>2</sub> concentrations have a higher effect as do cities with a more elderly population."

Higher impacts in warmer cities could well be because the population is more likely to be outside and have windows open, she said.

## SO<sub>2</sub> to blame for heatwave deaths?

Analysis of the 2006 early-summer heatwave suggests that SO<sub>2</sub> may be to blame for increased deaths.

Andrew Kent from AEA analysed the 2006 heatwave using similar methodology to an analysis of the larger and more widespread 2003 heatwave. The 2003 heatwave was blamed for causing thousands of extra deaths in the UK and Europe.

"For our previous study we only looked at PM<sub>10</sub> and ozone, now we have included sulphur dioxide. Rather unexpectedly, there appeared to be no impact from PM<sub>10</sub> and ozone, but was when linked to SO<sub>2</sub>."

He suggested that the 2006 event might be rather unique as Thames Estuary power stations were working harder than usual because of shut downs of other

power stations. The increased burning raised sulphur dioxide levels in South Eastern England.

An analysis of the impact of elevated SO<sub>2</sub> concentrations has been carried out for Greater London and the estimated health impact of SO<sub>2</sub> was found to be of the same order of magnitude as the impact of PM<sub>10</sub> on the same days."

## POLICY

### Epaqs and Comeap to be merged

Two air quality expert groups are to be merged, Defra and the Department of Health have announced.

Comeap (the Committee on the Medical Effects of Air Pollution) is to absorb Epaqs (the Expert Panel on Air Quality Standards). The work of Epaqs has dwindled in recent years as focus of air quality strategies has switched from standards to concepts such as action and

exposure reduction, as well as a greater policy lead from Europe.

The merger follows an independent review of the committees. A few Epaqs members will be transferred to Comeap, in addition, they will form the core of a separate panel, chaired by Professor Stephen Holgate, current chair of Epaqs. This will be available to provide independent scientific advice on specifying,

interpreting and using air quality standards to Defra and other government departments.

The enlarged body will retain the Comeap name, structure and work programme. Sponsorship of Comeap will remain with the Department of Health, with day to day support from the Health Protection Agency.

● Independent report:  
www.defra.gov.uk/environment/airquality/panels/aqs/index.htm

**NEWS FROM TENTH INSTITUTE OF ENVIRONMENT AND HEALTH MEETING HELD AT CRANFIELD**

# Stone: PM not all the same

Napier University's Vicki Stone told the audience that not all small particles are the same, and that nanoparticles and ultrafines should not be confused.

"We have a situation where two worlds have collided – industrial chemists talk about nanoparticles and those in air pollution talk about ultrafine particles but they are not the same. Nanoparticles have lots of shapes but one dimension must be less than 100nm. All dimensions of an ultrafine particle are less than 100nm so it follows that all ultrafine particles are nanoparticles, but not necessarily vice versa."

Stone outlined the growing concerns about the spread of engineered nanoparticles. Such

nanotechnology is used in substances such as sun tan creams, paints, and even soil remediation.

There are implications. For instance gold nanoparticles become catalytic rather than inert at that size. Quantum dots are used as tracers for injection into the body – there are obvious health implications from such particles in the ambient air: "Lots of money is being invested into nanotechnology but very little into the health effects.

Stone continued: "Some human exposure is intentional, some is unintentional. For instance iron oxide nanoparticles have been engineered to remediate land.

The consequences of ploughing these particles into the ground is not known (and could give rise to ambient exposure)."

"In the past toxicologists have focussed on particle exposure through the lung – now there are many other pathways, and many other organs (such as the brain, liver, kidney and foetus) where nanoparticles can accumulate."

She added that the engineered nanoparticles may come in new shapes, such as tubes or spirals, the shape of which will depend on whether or not they will be absorbed by lung macrophages. "There is a long list of different factors of these nanoparticles that can interact with biological systems and we need to watch this area."

## Black smoke affects birthweight?

A study by Newcastle University suggests that black smoke might affect birthweight.

The researchers set up a historical cohort study comparing birth weights with local black smoke exposure estimated from black smoke measurements and chimney

density mapping.

Results were heavily qualified as being interim but did show an significant impact (a 13g decrease for lower levels of black smoke, rising to a 46g increase for black smoke levels above 94µg/m<sup>3</sup>). However there were suggestions from the

audience that during the term of the study, there had been a dramatic drop in smoke levels during the period, and the character of the smoke would have change during that period from being predominantly industrial and residential to traffic related.

## Arsenic: what to do with high concentrations

Jo Barnes of the Cornwall Air Quality Forum, speaking to the Institute of Environment and Health meeting at Cranfield last month, said that there was over 720 sq m of land contaminated with arsenic in the south west of England, more than half in West Cornwall. The arsenic arose from heavy mining activity in the past both as a waste product and having been mined in its own right.

Barnes said: "Due to the toxicity of the deposited material, vegetation on arsenic contaminated land is sparse and the potential for resuspended dusts is therefore high. Concern has been expressed by residents in the vicinity of mining wastes regarding the health effects of dust generating activities such as landfill, redevelopment and bike scrambling but there is little data on ambient concentrations."

Monitors were installed near

some of the contaminated sites and all were found to be below the recommended air quality standard level of 6 ng per sq m. Levels were found to be highest near former mine refinery process facilities.

It is recommended that the issue is taken into account before any development activity

takes place that might disturb dust near contaminated sites.

Also further monitoring is required to look at broader areas (for instance Devon) and indoor concentrations. Indoor pollutants tend to consist of finer particles and the impact on bioavailability of indoor arsenic particles is unknown.



**Parts of Cornwall are contaminated with arsenic from old mines**

### Big shift

Defra's Tim Williamson told the conference that the move towards exposure reduction "is the biggest shift in policy since the Clean Air Act".

Exposure reduction is the term given to the move away from strict reliance on limit values (protecting hotspots) to more general attempts to cut background pollution. Williamson said: "The move brings policy closer to health impacts assessment. We have assured ourselves that there will be no impacts on equity from the shift to exposure reduction.

Other changes noted by Williamson include the revamped air quality strategy, The National Emission Ceiling Directive and the Gothenburg Protocol. The latter currently covers NO<sub>x</sub>, SO<sub>2</sub>, VOC's and ammonia, but could be extended to cover particulates.

On the draft air quality strategy he said: "Cost benefit analysis is one of great strengths of this strategy but conversely can cause us problems elsewhere. For instance NO<sub>x</sub> abatement being considered for Euro 6 vehicle emission standards currently appears as all cost and no benefit – on this point we are being constrained by our own evidence base."

### No infant mortality?

A large study of infant deaths suggests that air pollution is not to blame.

Ben Armstrong of the London School of Hygiene and Tropical Medicine explained the study was set up to see whether findings from elsewhere on infant mortality were valid in the UK.

Researchers looked at ten cities across the UK, effectively including half the population. Across an eleven year period, there were 22,288 relevant deaths.

"There was no evidence of dependence on infant mortality on PM<sub>10</sub>, ozone, NO, NO<sub>2</sub> or carbon monoxide.

However there was some evidence of a small but significant effect caused by sulphur dioxide – and a large (15% increase in risk) caused by cold weather.

## IN BRIEF

### Oops, sorry we're late

Defra has apologised to local authorities and operators for forgetting to point out that operators of Part 2 processes must start gathering data for the European pollutant register.

In a new air quality note, it says the change this year from the European Pollutant Emission Register (EPER) to the E-PRTR means that operators, rather than itself, will need to compile the data: "All A2 (LA-IPPC) operators should know that they will have to collect relevant data for the calendar year 2007. Defra/WAG will be launching a consultation on the precise mechanisms we propose for collecting the information in the next couple of months.

"Relevant local authority and industry representative organisations will be invited to comment. But it is important that local authorities and operators know that the first period for which information will be required is the calendar year 2007. We apologise for the unfortunate delay in communicating this."

● [www.defra.gov.uk/environment/ppc/index.htm](http://www.defra.gov.uk/environment/ppc/index.htm)

### Good weather, bad air

Kings College ERG reported widespread moderate PM<sub>10</sub> particulate was measured throughout London and south east England between the Sunday 25th March and Wednesday 28th March.

In some locations, high PM<sub>10</sub> particulate has been measured. The episode results from influx of pollution from mainland Europe by easterly winds combined with local emissions and poor dispersal.

On the afternoon of Tuesday 27th March, several roadside and some sites close to waste transfer stations measured high PM<sub>10</sub> particulate whilst moderate levels were measured at most background sites.

Defra released its first smog warning of the year on 27th April due to continued hot and sunny conditions in south east England and the Midlands.

● [www.londonair.org.uk](http://www.londonair.org.uk)

## MONITORING

# Good and bad news for FDMS

New-style FDMS Teams particle monitors are being rolled out into the Welsh air quality network – but their performance has been patchy.

The Welsh Air Quality Forum says that FDMS kits have been installed at the Cardiff and Port Talbot monitoring sites. These upgrades are in addition to the four units already operating in Swansea, and there are plans to install further units at Port Talbot and another remote rural station near Swansea within the coming months.

The Forum says: "The bad

news is that there are still some issues with the monitoring data: Firstly, since the UK air pollution index for PM<sub>10</sub> is based on health effects studies of old Team data, the FDMS results cannot currently be reported in real-time as they are not directly comparable.

"Until the Comeap expert group sits to consider the index, we will see the FDMS sites have dropped out of the hourly bulletins on the web site, which report results as low, moderate and high.

"Secondly, the two units

(especially the PM<sub>10</sub>) at the Swansea Roadside AURN site continue to exhibit instability despite the best efforts of everyone to resolve the problem. There is a difference between PM<sub>10</sub> measured by the stable unit at Morrision Roadside, and that measured by the problematical system at the Swansea AURN site.

It is likely that all the data since October at the AURN site will be rejected during the final ratification process."

● Welsh Air Quality Forum: [www.welshairquality.co.uk](http://www.welshairquality.co.uk)

## HEALTH WARNINGS

# Sussex and London extend text alerting

Sussex authorities' Airlert text service has restarted again for the summer.

The free service has been extended from asthma sufferers to include some selected schools (Ecoschools) across the region as well, with a view to extending the scheme to

primary and secondary schools.

Nigel Jenkins told *AQB*: "In addition we are to provide SouthernFM with Airlerts for their evening bulletins integrating the weather forecasts with air alerts this summer.

● [www.sussex-air.net](http://www.sussex-air.net)

Ealing, Hammersmith & Fulham, Hackney, Harrow, Hillingdon, Hounslow, Islington, Lewisham, Merton, Newham, Richmond upon Thames, Southwark, Sutton, Wandsworth, Slough Borough Council and Westminster City Council.

Each London Borough gets its own forecast allowing users just to get alerts for certain parts of London – maybe where they live and work.

They can also choose when they want to get an alert – the evening before or the morning of a predicted high air pollution day.

● [www.airtext.info](http://www.airtext.info)



## London text extended

Croydon's Airtext service, based on Cerc modelling, is being extended across much of London.

New authorities are City of London Corporation, Royal Borough of Kensington and Chelsea, London Borough of Brent, Camden, Croydon,

## ANGLO FRENCH STUDY

# UK weather prompts ozone damage to crops

Sussex crops and vegetation are at risk from ozone, delegates were told at a recent conference.

The Anglo/French 'Air Rives Manche – Ozone (ARMO)' project has found that in 2003 and 2006, both record years for high ozone concentrations, all vegetation in Sussex was exposed to levels above United Nations Economic Commission for Europe (UNECE) guideline values. Even in 2002, 2004 and 2005, large areas were at risk.

The project found that some of the ozone in Sussex may have come from France and some may occur because of emissions from ships in the English Channel.

"These high concentrations

have to be of concern to farmers, foresters, horticulturalists and all those involved in growing or managing vegetation. Global warming will probably cause ozone levels to rise in the future too, so making the problem worse," said Philip Mulligan of the NSCA.

Primary and junior school children at 10 schools in Sussex saw the type of damage that can be caused, during the summer of 2006. They grew a special type of ozone-sensitive plant and were able to see and measure the brown spots that appeared on the leaves when ozone levels were high.

The conference also heard

how hospital admissions appeared to be related to distance from roads.

It was found that the greatest number of people admitted to hospital for respiratory illnesses live between 50 and 500m from a road. Most people live near roads and experience pollution from the traffic so it would be expected that the greatest proportion of hospital admissions come from those individuals.

However, those living very close seem to be less affected. It could be that residents almost adjacent to roads experience lower ozone concentrations because NO<sub>x</sub> from traffic absorbs ozone.

# Monitoring on show

Jack Pease visited the popular MCERTS exhibition and conference held at Bretby last month

Complaints have led to spot checks on firms operating under the MCERTS monitoring equipment certification scheme.

Speaking at the recent MCERTS monitoring exhibition and conference held at Bretby, Environment Agency's MCERTS manager John Tipping said that the first five years of the scheme had been broadly a success with over 400 individuals and 32 labs accredited under the scheme.

"Quality of monitoring work has generally improved," said Tipping, "but we have recently concluded a major review of both the personnel and laboratory areas of the scheme. We've had some feedback from customers concerned at the policing of the scheme – the current system is not doing the job that we would like. The system relies on trust and based on the feedback we have

carried out some unannounced audits. By and large it's a good story, but there's been some cases where monitoring has failed to meet standards.

"This is a long term activity and it is important that the scheme is credible at the end of the day."

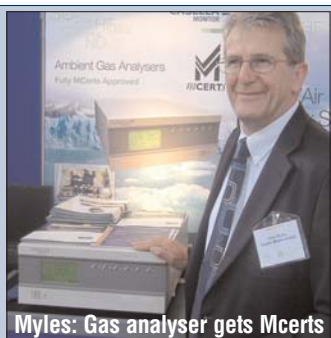
The review has led to a new clause being agreed that will "strengthen our ability to investigate complaints and interview members at any time". Tipping also said he would like to be able to get plant operators to inform the Agency when monitoring was taking place so that spot checks could be carried out.

"I would encourage people to complain to UKAS, as its only by people letting us know that things aren't right that we can try to fix them."

## Gas analyser wins MCERTS approval

Casella Measurement, which includes Casella ETI has recently been successful in attaining MCERTS approval for its four ME 9800 range of air quality analysers.

Tony Myles told AQB: "As an instrument manufacturer, the certification is important to us as the MCERTS tests are based upon the European CEN standard. Hence both our UK and European customers will benefit from the approval and have renewed confidence in the performance of the instruments."



Myles: Gas analyser gets Mcerts

## Casella: new gravimetric device

Casella also had the DHA 80 on its stand.

Casella's Cameron Stathers explained: "It is a fully automatic high volume gravimetric sampling system. The sampler has a flow rate of between 6 and 60 m<sup>3</sup>/h and can store up to 15 filters for programmable automatic timed change over. The change over can also be activated remotely as part of an emergency response situation. So in an emergency, particulate can be collected on to a new filter if required. (This approach is common for applications for background monitoring around nuclear installations).

"A range of sample heads are available for the DHA-80 including the common size fractions of PM<sub>1</sub>, PM<sub>2.5</sub> & PM<sub>10</sub>. An option is also available to collect material on to large PUF filters as well.

"The instrument has commonly used throughout Europe for many years as a gravimetric reference method for PM<sub>10</sub> sampling. In France, one instrument is to be installed for every four Teom's to provide a gravimetric reference



Cameron Stathers (left) & Heath Robinson

measurement for filter correction. In the UK Defra has purchased over 25 instruments for measurements of PAH's and dioxins for measurement network.

"Traditionally Hi Vol Samplers have been very noisy to operate with high maintenance costs. The extremely high Swiss build quality of the DHA-80 means that is very quite to run, and very reliable to operate," claimed Stathers.

## Opsis monitors MCERTS car park



Steve Hoskins in front of the Opsis monitor

ETI was demonstrating its Opsis equipment which has MCERTS approval.

Typical applications include busy junctions and street canyons. The rotating 'gun' fires light at preset mirrors hundreds of metres away, the equipment can be used to simultaneously measure multiple transects.

At the Bretby site, despite being set back a few hundred metres from the public highway, monitoring clearly showed a morning peak for NO<sub>2</sub>. Stephen Hoskins told AQB: "Although at some £30,000 the up front cost of this equipment is higher than others, it requires no complicated maintenance – in fact little more than cleaning of the mirrors – so running costs are far less. Whole life costs are therefore quite competitive."

## Many pollutants for Airpointer



Jamie McNee demonstrates Airpointer

Air Monitors is continuing to make progress with its Airpointer multiple pollutant monitor.

The firm says Airpointer is small enough to fit in many roadside applications where larger size equipment will not fit. It has equipment installed with the Cornwall Air Quality Forum and will shortly install equipment at Slough.

In Camden, it has mounted the box on a pulley system so it can be raised and lowered for routine maintenance. Airpointer is made by Recordum and can house up to seven analysers for gases and particles.

# Bad air v climate change

**AQEG has completed its huge and intricate report into air quality and climate change**

It was nearly 18 months ago that the Air Quality Expert Group set out its draft ideas for its report on climate change and air quality.

At 300 pages long, it was no easy read, but then climate change is not an easy subject by itself let alone when looking at how it impacts air quality and vice versa.

The content of the final report differs little from the draft beyond some further technical analysis of what one pollutant does to another. It will take a dedicated reader to get on top of these inside sections but if you venture there you'll find out which air quality pollutants warm the planet, which ones cool it, and whether global warming will worsen or improve the concentrations and health impacts of ground level pollutants.

For the busy air quality practitioner, of more immediate importance is what they will have to do differently. The report stops short of such direct policy direction for those on the ground, but will allow most to spot potential pitfalls in their air quality policies that might store up trouble if and when they are bequeathed with climate change responsibilities.

For many, that is the six million dollar question. Agenda 21 came and went and was adopted with enthusiasm by some authorities and studiously ignored by most. Public and political understanding of climate change has moved on hugely since then – and there is now a clear appetite for change – but little has changed in terms of funding or legislation that will force those on the ground to do anything.

Air quality was kickstarted by the Environmental Protection Act which gave local authorities very particular responsibilities. Air quality work had to be done – and funded – even if old folks' homes were being closed and there were particular strains on the budget.

Climate change work has not been similarly encouraged – and it will be a brave local authority that starts spending on climate change while its schools and care homes fall to bits. Those looking for succour from last month's Climate Change Bill will come away empty handed as there is no mention of what local authorities can or must do – it is all the headline stuff to be carried out by national and international governments – no

change there then!

So air quality professionals will do well to settle on trying to 'future proof' their air quality policies lest they are lumbered with climate change responsibilities in the future. Here AQEG report will be very helpful. (Defra is already thinking about targets it can set for local authorities on climate change through a research contract let to AEA and described briefly to delegates at the NSCA's recent air quality spring workshop).

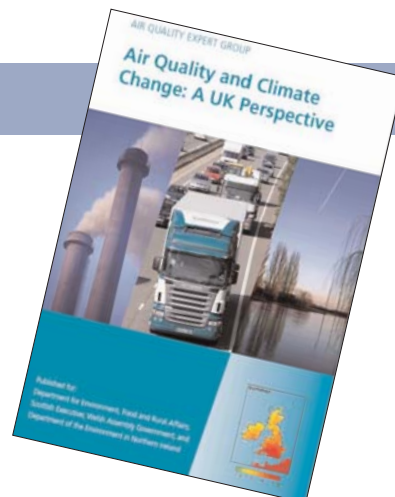
Perhaps the most useful and readily understandable section within AQEG report is the tables on 'win-win, win-lose and lose-lose' measures that describe the various tensions between air quality and climate change (see right).

AQEG's Mike Pilling spoke to *AQB* and wanted to stress:

- The need to look for win-wins. In win lose situations, CO<sub>2</sub> / other permanent greenhouse gas emissions will almost certainly be the primary consideration;
- The need for thorough assessments of air quality and climate change pollutants in fuel or life cycles;
- The importance of local authorities and the need for them to bring together climate change and air quality issues. This is discussed in the summary, including the need for support for local authorities;
- The importance of behaviour change.

He added: "The publication of first the Stern report and then the IPCC reports has raised the profile of climate change, demonstrated the technical achievability of mitigation, and emphasised the need for political will and behaviour change. Local authorities have an important role to play in this, and they have demonstrated their technical capabilities through their implementation of the air quality strategy. The integration of climate change and air quality strategies by local authorities, using and enhancing the skills base they have developed, is essential."

● *Air Quality Expert Group report – Air quality and climate change: a UK perspective, the third report of the Air Quality Expert Group (AQEG)* (its next report on direct NO<sub>2</sub> is due shortly). Weblink [www.defra.gov.uk/environment/airquality/publications/airqual-climatechange/index.htm](http://www.defra.gov.uk/environment/airquality/publications/airqual-climatechange/index.htm)



## AQEG'S RECOMMENDATIONS

- 1** Impact analysis of policies or specific developments, whether for industry, transport, housing etc, should take account of the interlinkages of emissions of air quality and climate change pollutants. In particular, measures at the national level designed to improve local air quality or to abate greenhouse warming should not be implemented without prior consideration of all types of impact on the atmosphere and other environmental media.
- 2** Detailed consideration should be given to appropriate policy drivers and legislation that could be introduced to ensure that the reduction of greenhouse gas emissions is properly incorporated into regional and local government planning decisions.
- 3** Detailed consideration should be given to developing better means of expressing the influence of air quality pollutants on climate, and for inter-comparing the benefits of abatement strategies in respect of air quality and of climate change.
- 4** The relationship between local radiative forcing and local temperature response has not been sufficiently investigated. This may be particularly important for spatially inhomogeneous radiative forcing agents such as aerosol (direct and indirect effects) and tropospheric ozone and needs further research.
- 5** Research is needed on the extent to which policies for large-scale tree planting within the United Kingdom and elsewhere within Europe would influence air quality in high temperature summer pollution episodes. Wider impacts of land use change upon both air quality and global pollutants also need to be considered.
- 6** Consideration should be given to promoting measures which result in benefits both for air quality and climate. These might include incentives for domestic energy conservation, improved industrial process efficiency and measures designed to modify the behaviour of individuals so as to reduce the impact of their activities on the atmosphere. Given the significant influence of transport emissions, measures which reduced the use of road vehicles, shipping and aircraft would be highly beneficial.
- 7** A comprehensive life cycle analysis should be conducted comparing the environmental implications of electric and hybrid vehicles with each other and with conventionally-fuelled vehicles, to inform policy on incentivising their use. A detailed fuel cycle analysis is needed to consider the air quality and greenhouse gas implications for the production, supply and consumption of biofuels for transport.
- 8** The full fuel cycle environmental implications of non-fossil fuel electricity generation (i.e. wind, tidal, nuclear, etc.) should be evaluated, as part of the development of future energy supply policies. This should include the implications of large-scale biofuel and bioenergy production for land-surface exchange of both air pollutants and greenhouse gases.



**WINNING AND LOSING AIR QUALITY AND CLIMATE CHANGE MEASURES**
**Win-win measures**
**that can lead to reductions in emissions of both air quality and climate active pollutants**

Measure	Effect
Switching from coal to natural gas for power generation.	Reduces carbon dioxide emissions for each kiloWatt generated. Emissions of sulphur dioxide and nitrogen oxides are also reduced.
Use of new technologies in road transport, e.g. (i) hybrid vehicles (ii) hydrogen from natural gas or from renewables (iii) lean burn petrol vehicles fitted with nitrogen oxide traps.	Reduces carbon dioxide emissions for each kilometre travelled and also emissions of nitrogen oxides and particulate matter. Essential that the whole fuel/ vehicle cycle is analysed (e.g. the emissions associated with hydrogen generation).
Efficiency improvements in domestic appliances and industrial processes, e.g. through technical developments.	Reduces emissions of both types of pollutant, but efficiency measures sometimes result in increased demand, which must be avoided.
Energy conservation, e.g. better insulation of houses.	Reduces emissions of both types of pollutant.
Demand management/behavioural change: improved public transport coupled with disincentives for private car usage.	Reduces emissions of both types of pollutant.

**Win-lose measures**
**that reduce emissions of climate active pollutants but could increase emissions of AQ pollutants**

Measure	Effect
Increased use of diesel in vehicles in place of petrol.	Reduces carbon dioxide emissions but increases emissions of particulate matter and nitrogen oxides. Diesel soot emissions lead to warming of the atmosphere, but soot has only a short atmospheric lifetime.
Use of biofuels for transport and domestic use.	Reduces carbon dioxide emissions but may lead to increased emissions of ammonia, nitrous oxide and volatile organic compounds, depending on species and management regime.
Waste incineration rather than landfill, especially if used for combined heat and power generation.	Reduces methane emissions, and emissions of carbon dioxide with combined heat and power generation, but increases emissions of some air quality pollutants.

**Lose-win measures**
**that reduce emissions of air quality pollutants but could increase emissions of climate pollutants**

Measure	Effect
Use of flue gas desulphurisation in power stations.	Reduces SO <sub>2</sub> emissions, but reduces efficiency and therefore leads to increased carbon dioxide emissions per KW generated.
Fitting some nitrogen oxide reduction traps to diesel vehicles (e.g. through the use of selective catalytic reduction).	Reduces nitrogen oxides but may lead to increased emissions of nitrous oxide.
Fitting particulate traps on diesel vehicles.	Reduces particulate matter emissions, but may introduce a fuel penalty and an increase in carbon dioxide emissions.
Fitting three way catalysts to petrol cars.	Reduces the emissions of NO <sub>x</sub> , CO and volatile organic compounds but leads to small increases in fuel consumption and hence in emissions of CO <sub>2</sub> .
Reducing sulphur in fuel.	Increases refinery CO <sub>2</sub> emissions, but reduces SO <sub>2</sub> emissions.

**Lose-lose measures**
**that could lead to increases in emissions of both air quality and climate active pollutants**

Measure	Effect
Shifts from train to short haul flights.	Increases emissions of carbon dioxide, nitrogen oxides and particulate matter.
Increased use of coal in power stations, rather than natural gas, renewables or nuclear.	Increases emissions of carbon dioxide, nitrogen oxides and particulate matter.
Increased demand for products and services.	Increased fuel efficiency in aircraft, for example, has been more than offset by increased demand

## SCIENCE SHORTS

### Pig farm raises levels

Levels of antibiotic-resistant bacteria were found to be raised up to 150m downwind of a Texas pig farm.

"This could pose a human health effect for those who work within or live in close proximity to these facilities," say researchers.

**Isolation of antibiotic-resistant bacteria from the air plume downwind of a swine confined or concentrated animal feeding operation, Shawn Gibbs et al, *Environmental Health Perspectives*, Vol. 114, pp1032-1037.**

### Quartz filters criticised

Other materials may be better than the quartz filters specified by official standards, NPL researchers have found.

They found that higher accuracies are possible for measuring particle mass when using glass fibre filters – or even better – PTFE bonded glass fibre filters.

**Studies of the effect of humidity and other factors on some different filter materials used for gravimetric measurements of ambient particulate matter, Andrew Brown et al, *Atmospheric Environment* Vol. 40 (2006) pp4670-4678.**

### Stop start traffic & CO

A study of stop-start traffic in a canyon suggests current models underestimate carbon monoxide emissions.

**Estimation of the emission factors of particle number and mass fractions from traffic at a site where mean vehicle speeds vary over short distances, Alan Jones et al, *Atmospheric Environment* Vol. 40 (2006) pp7125-7137.**

### French heat impacts

French researchers have tried to assess the risk from the heat and ozone associated with the 2003 heatwave.

They suggest the increased risk of death from the heightened levels of ozone and heat varied from 10% in Le Havre to 175% in Paris.

**The relation between temperature, ozone, mortality in nine French cities during the heatwave of 2003, Laurent Filleul et al, *EHP*, Vol.114, pp1344-1347.**

## HAZARDOUS POLLUTANTS

# Autism blamed on toxics

US researchers suggest that incidence of autism may be influenced by hazardous air pollutants at the time of birth.

284 children with autism were compared to 657 children without the disorder and their exposure to 19 chemical pollutants. Incidence of autism was raised by 50% for chlorinated solvents and heavy

metals but not for aromatic solvents. Mercury, cadmium, nickel, trichloroethylene and vinyl chloride were found most to blame.

Researchers concluded: "Living in areas with higher ambient levels of hazardous air pollutants, particularly metals and chlorinated solvents during pregnancy or early childhood

may be associated with a moderately increased risk of autism."

**Autism spectrum disorders in relation to distribution of hazardous air pollutants in the San Francisco Bay Area, Gayle Windham et al, *Environmental Health Perspectives*, Vol. 114 pp1438-1444.**

## ASTHMA

# Asthma incidence increases

A Swedish study suggests that pollution may increase asthma incidence.

Over 203 adult asthma sufferers and the same number of controls were recruited and their exposure estimated by using measured levels of NO<sub>2</sub> and traffic flows near their home.

There was an association between asthma incidence and

living near a busy road, but the difference was not statistically significant. A skin prick test (a more sensitive test of incident asthma) did however show a small but significant association showing a correlation between traffic flow and reaction. Meanwhile the correlation between outdoor NO<sub>2</sub> and traffic flows was low.

Researchers added: "The

results suggest that living close to high traffic flows might increase the asthma incidence in adults, while the tendency for nitrogen dioxide was only seen among atopics."

**Vehicle exhaust exposure in an incident cast control study of adult asthma, L Modig et al, *European Respiratory Journal*, 2006, Vol. 28, pp75-81.**

## ALLERGY

# Dog ownership worsens pollution impact

Owning a dog may worsen air pollution impacts on children, US researchers suggest.

475 children with asthma were drawn from participants in the US Children's Health Study across 12 different communities. Their exposure to air pollution was estimated based on local monitoring station data, and prevalence of chronic cough, phlegm production or bronchitis

was related to dog ownership.

Researchers say: "Among children owning a dog, there were strong associations between bronchitic symptoms and all pollutants examined. Increased risk ranged from 30% for a 4.2µg/m<sup>3</sup> rise in PM<sub>coarse</sub> to 91% risk increase for a 1.2µg/m<sup>3</sup> rise in organic carbon. Effects were larger for those that owned a dog and a cat, and no

effect was seen for those that only owned a cat.

Researchers suggest the dogs are a source of endotoxin that worsens the impact of air pollution.

**Dog ownership enhances symptomatic responses to air pollution in children with asthma, Rob McConnell et al, *Environmental Health Perspectives*, Vol. 114, pp1910-1915.**

## CHILD EXPOSURE

# Leicester study targets local particles

A study by Leicester University researchers suggests that there is an association between locally derived primary particles and respiratory effects.

Some 4,400 randomly selected children aged 1-5 were studied first in 1998 and again in 2001. Annual exposure to primary PM<sub>10</sub> (as opposed to regional secondary PM<sub>10</sub>) was then calculated for the home address using the Airviro model and increased risks calculated for each µg/m<sup>3</sup> rise in PM.

A 1µg/m<sup>3</sup> increase in locally generated PM was found to increase cough without cold by 21-56% and current wheeze by up to 28%. The strength of the association did not appear to be influenced by proximity to school or nursery.

Researchers said: "In our cohort of young children we found consistent association between exposure to locally emitted primary PM<sub>10</sub> and the prevalence and incidence of cough without a cold and night

time cough, and incidence of wheeze. We conclude that a reduction in locally generated primary PM<sub>10</sub> may have significant health benefits in young children, and that linking paediatric cohort data to pollution dispersion models may help in planning local air quality initiatives."

**Locally generated particulate pollution and respiratory symptoms in young children, N Pierse et al, *Thorax*, 2006, Vol. 61, pp216-220.**

FUELS

# Switch to diesel costs lives

Canadian researchers have studied UK taxation policies that have encouraged a switch to diesel to reduce CO<sub>2</sub> impacts.

Since 2001 the UK has had a graduated vehicle tax charge based on CO<sub>2</sub> emissions, and this has had the impact of nearly doubling the percentage of new diesel vehicle sales.

Researchers say: "We estimate that consumers switching from petrol to diesel cars over the period 2001-2020 will reduce CO<sub>2</sub> by 7Mt and save 20m barrels of oil. However ancillary air quality

effects hinge upon the fuel properties and conversion technology, not just the quantity of fuel consumed, and adverse air quality is estimated to result in 90 additional deaths a year." This calculation was based on 570, 460 and 0 additional deaths per Mt of CO<sub>2</sub> abated for Euro 3, 4 and post Euro 4 technologies respectively (ie the cleaner the Euro standard, the fewer extra deaths caused by swapping to diesel).

"To the extent that CO<sub>2</sub> policies contributed to diesel growth, coordinating CO<sub>2</sub>

controls with tightening of emission standards would save lives. As the rest of the EU and other developed countries prepare to integrate transport into climate mitigation programmes, the lessons learned from the UK experience can help inform a better balance near term health effects with long term climate mitigation." **Air quality impacts of climate mitigation: UK policy and passenger vehicle choice, Eric Mazzi et al, *Environmental Science and Technology*, 2007, Vol. 41 pp387-392.**

ABATEMENT TECHNOLOGY

# Particle filter benefits diluted

The benefits of particle filters may be less than may be apparent, Californian researchers say.

They looked at the 'redox' activity of particles from engine exhausts – reduction effects in cells can damage the lung. Researchers said: "While the PM mass emission rate from the diesel particle filter equipped

vehicle was on average 25 times lower than that of the conventional diesel, the redox potential was only eight times lower, which makes the per-mass particle redox potential of the filter equipped vehicle about three times higher.

"Thus a strategy aimed at protecting public health and welfare by reducing total mass

and number emissions may not fully achieve the desired goal of preventing the health consequences of PM exposure." **Physiochemical and redox characteristics of particulate matter emitted from gasoline and diesel passenger cars, Michael Geller et al, *Atmospheric Environment* Vol. 40 (2006) pp6988-7004.**

TRAFFIC POLLUTION

# Ambient air causes problems for babies

Current levels of air pollution in Canada are causing problems for babies.

Researchers compared daily respiratory hospitalisations of babies up to a month old and levels of ozone, carbon monoxide, sulphur dioxide and nitrogen dioxide in eleven Canadian cities.

An interquartile rise in ozone led to a 3.35% increase in hospitalisations, 3.85% for NO<sub>2</sub>, 1.66% for SO<sub>2</sub> and 1.75% for carbon monoxide.

They conclude: "Our results suggest that neonates (babies) are experiencing adverse effects of air pollution at current levels in Canada, and that accounts for

a significant proportion of hospitalisations in this subgroup." **Gaseous air pollutants and hospitalisation for respiratory disease in the neonatal period, Robert Dales et al, *Environmental Health Perspectives* Vol. 114, No.11, pp1751-1754.**

POWER GENERATION

# Back up generators may be cost effective

Use of back-up generators to boost peak time electricity capacity may be feasible, Pennsylvania researchers suggest.

There are fears that diesel generators used for stand by power supplies may become a significant air pollution source if used regularly to boost peak time supplies. US and the UK are short of spare generating capacity. Researchers compared generators running on diesel, diesel with filter and natural gas

against the building of a large power plant.

They conclude: "While uncontrolled diesel internal combustion engines would harm air quality and health, a generator with a diesel particle filter has a social cost, comparable to natural gas options. We conclude that on a full cost basis, back up generators, including controlled diesels, are a cost effective method of meeting peak demand.

"Regulatory authorities

should reconsider their ban on using diesels taking care that individual units maintain appropriate emission standards and be properly sited so as not to cause a nuisance in the immediate area."

**The costs, air quality and human health effects of meeting peak electricity demand with installed back up generators, Elisabeth Gilmore et al, *Environmental Science and Technology*, Vol. 40 no 22 PP6687-6892.**

SCIENCE SHORTS

**Cow emissions logged**  
Researchers have monitored ammonia emissions from cattle in concrete farm yards

Emission rates per animal were derived and used to estimate that cattle are responsible for 10% of UK emissions. Cutting the amount of yard space available to cows, pressure washing and urea inhibitors are ways of reducing emissions.

**Ammonia emissions from outdoor concrete yards used by livestock – quantification and mitigation, T Misselbrook et al, *Atmospheric Environment* Vol. 40 (2006) pp6752-6763.**

**Taxi-ing causes odour**

Taxi-ing aircraft cause 98% of odour at airports, Danish researchers suggest. Most odour is produced when engines are at low thrust as when taxi-ing, queuing and landing, whereas shares for take off and climb out phases are 2% and APU usage 0.5%. An odour factor of 57OU/mg HC was derived.

**Calculation of odour emissions from aircraft engines at Copenhagen Airport, *Science of the Total Environment*, Vol. 366 (2006), pp218-232.**

**Noise a good proxy**

Measurement of vehicle acceleration noise can be used to predict emissions. The technique improves on current models that 'grossly underestimate' emissions of congested traffic through reliance on average speeds.

**Estimating the effects of traffic congestion on fuel consumption and vehicle emissions based on acceleration noise, I Greenwood et al, *Journal of Transportation Engineering*, February 2007 pp96-104.**

**PM alters heat impact**

Particle levels can affect the impact that heatwaves can have on hospital admissions for heart problems, Australian researchers suggest.

**Does particle matter modify the association between temperature and cardio respiratory diseases, Cizao Ren et al, *Environmental Health Perspectives* Vol. 114 pp1690-1696.**

The Air Quality Expert Group is no stranger to this column – the AQEG team has produced some rather good reports but they do tend to be rather long.

But at least they recognise their foibles. Aqeg member David Carslaw told NSCA workshop delegates: "Defra phrased six short questions for us on air quality and climate change in the mistaken belief that we would provide short answers. Mad fools. They should know that we're quite incapable of being brief – we ended up with 300 pages."

Maybe they're paid by the page.

Sensitive readers turn away! The F-word has drawn us into controversy before (we were musing about which air quality lads and lasses had the F-Factor). Perhaps we will get ourselves into trouble again.

The University of Gloucester's John Hunt, speaking to the NSCA spring workshop on the heated debate about climate change, recounted the response of a well known climate doubter to a climate change scientist. The doubter said: "Fuck off you daft cock," – Hunt recounted to the NSCA audience. In full.

Now AQB agonised about whether this F-word should be spelt out or blanked

out. Spelling it out accurately portrays Hunt's point about the heat in the debate. Blanking it out recognises sensitivities but also misses the shock value of the first F-word we've heard from the podium at an air quality conference.

AQB tries to keep to a rigid house style that cuts out random capital letters and silly stylisations, we use the same rules as the *Financial Times* newspaper. And that august journal has been increasingly using the uncensored F-word in its columns – even on the front page – reflecting the fruity language of fed-up civil servants. If its good enough for the *FT*, then we reckon it's good enough for AQB (but we won't make a regular habit of it).

NSCA is contemplating moving its two day workshops from their traditional home near Didcot. Now *that* is really shocking.

Word is that NSCA's green and sustainable boss Phil Mulligan is worried about the difficulty in getting to the traditional Didcot venue by public transport – the venue is slap bang in the middle of nowhere surrounded by

parkland and tranquillity.

It is thinking of going to a 'sustainable' inner city venue. Oh dear. We understand most organisations strive to continuously improve and we think even the new style touchy-feely NSCA might struggle to match the current Didcot venue which boasts nice views of green fields, tranquil courtyards, great food, extended drinking hours, giant Jenga & Connect4, Jacuzzi and swimming pool.

It may not be a sustainable destination, but NSCA could always reinstate its minibus service to the venue. Tinkering with the workshop is a dangerous thing. Much bonding takes place at the events (with even a whisper of intrigue at a recent one!) and the air quality workshop was no exception.

Hounslow troublemaker Rob Gibson brought his guitar to cheer up delegates once the bar closed at 2am. Aply supported by GLA songbirds Sarah Legge and Lucy Parkin, Gibson filled in the gaps left by the empty glasses.

Belfast's Graeme Swindles then plucked some complicated blues tunes – but UWE Tim Chatterton's probable guitar talent was frustrated by the late hour and an attack of beer-finger.

## AIR QUALITY EVENTS 2007

### May 17th

#### ACTION PLANNING – EXAMPLES

EMAQ conference to be held in Birmingham. Contact Sue Powditch on 0870 190 6551 or [sue.powditch@aeat.co.uk](mailto:sue.powditch@aeat.co.uk)

### May 23rd

#### ACTION PLANNING – EXAMPLES

EMAQ conference to be held in London. Contact Sue Powditch on 0870 190 6551 or [sue.powditch@aeat.co.uk](mailto:sue.powditch@aeat.co.uk)

### June 5th

#### IAPSC

Investigation of Air Pollution Standing Conference to be held in Sheffield, contact Alison Loader, AEAEA 0870 190 6518

### June 14th

#### MONITORING PROBLEM PARTICULATES

EMAQ conference to be held in Bradford. Contact Sue Powditch on 0870 190 6551 or [sue.powditch@aeat.co.uk](mailto:sue.powditch@aeat.co.uk)

### June 20th

#### MONITORING PROBLEM PARTICULATES

EMAQ conference to be held in London. Contact Sue Powditch on 0870 190 6551 or [sue.powditch@aeat.co.uk](mailto:sue.powditch@aeat.co.uk)

### June 26th

#### MONITORING PROBLEM PARTICULATES

EMAQ conference to be held in Bristol. Contact Sue Powditch on 0870 190 6551 or [sue.powditch@aeat.co.uk](mailto:sue.powditch@aeat.co.uk)

### June 17th-20th

#### COMBUSTION BY-PRODUCTS AND THEIR HEALTH EFFECTS

10th International Congress to be held in 17th-20th Jun, 2007 Ischia, Italy website [www.calendar.ifrf.net/event.html?id=231](http://www.calendar.ifrf.net/event.html?id=231)

### July 2nd-5th

#### 11TH INTERNATIONAL CONFERENCE ON HARMONISATION

within Atmospheric Dispersion Modelling for Regulatory Purposes conference to be held at Queen's College Cambridge, website [www.cerc.co.uk/HARMO11/index.htm](http://www.cerc.co.uk/HARMO11/index.htm)

### September 25th-26th

#### PARTICLES AND PHOTO-OXIDANTS IN EUROPE

RSC Automation and Analytical Management Group meeting to be held in Prague website <http://rsc-aamg.org/Pages/Prague.html>

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# AIR QUALITY

BULLETIN

## TRY OUR OTHER TITLES



Why not try our other newsletters on noise and contaminated land?

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*Jack Pease*

# Overmatter

## ERG lose Kent to AEA

AEA has won a three-year contract for the management of the Kent & Medway Air Quality Monitoring Network previously managed by Kings College ERG.

The network consists of five (currently) network owned sites, as well as a further 22 affiliated sites operated by the local authorities in Kent. The contract involves the collection, validation and reporting of data from all the monitoring sites across Kent, as well as

Atkins looks again at PPC costs  
Consultant Atkins has taken another look at the costs and benefits of pollution prevention and control regulations. Defra commissioned the review, following on from a previous study, in a bid to justify the regulation to industry, national government and Europe. A survey of installations was undertaken and other information was analysed,

## Filthy dirty ships

Brussels based campaign group T&E and a coalition of environmental groups are calling on the International Maritime Organisation to agree a reduction in NOx emission of about 90% for both existing and new ships, no later than 2015; reductions in SOx emissions of 70-90% by 2015 and substantial reductions in particular matter (PM), both through the side-effects of reducing NOx and SOx, but also by working on specific targets for PM in Marpol Annex VI (to be adopted no later than 2009).

## Responses outlined

Defra and the DCLG has outlined the responses received to its consultation 'Options for improving the way planning and pollution control regimes work together in delivering new development'. Summary of responses to the planning and pollution control interface consultation [www.communities.gov.uk/index.asp?id=1509556](http://www.communities.gov.uk/index.asp?id=1509556)

providing QA/QC audits, certified calibration gases and service and maintenance for the network owned sites. Additional network sites are planned in the near future.

As part of the contract AEA launched a revised version of the well respected monitoring network web site on April 1st. Latest data can be viewed through on-line maps and graphing tools, together with information on each of the monitoring site locations. All the historical data from the

including regulators' Pollution Inventories. Assessing costs and especially benefits was difficult as it is not known what would have happened in the absence of PPC. Costs were however estimated to be £770 million over the period 2001 to 2005, however the great majority of this expenditure is incurred by a small number of sites. Defra says: "This report will

## IPPC costs and benefits

An early analysis of the costs and benefits of the implementation of the IPPC Directive in the UK was commissioned by Defra and the devolved administrations. The report's conclusions provide an initial snap shot of some of the successes and challenges of implementing the IPPC Directive in the period 2000 to 2005. A further, more comprehensive assessment of the implementation of the IPPC Directive within the UK is intended in 2009, which will enable the collection of data on the first full year of the Directive's implementation. Mid-term review of the UK's implementation of the Pollution Prevention and Control Regulations [www.defra.gov.uk/environment/ppc/background/pdf/ppcregs-](http://www.defra.gov.uk/environment/ppc/background/pdf/ppcregs-)

## PPC responses posted

Responses to the recent consultation on merging waste planning and pollution regulatory regimes has been posted. [www.communities.gov.uk/embedded\\_object.asp?id=1509793](http://www.communities.gov.uk/embedded_object.asp?id=1509793)

past ten years of network operation have been loaded into the new on-line archive. There are further statistics and graphing tools provided on the site to assist in data analysis. The network members' diffusion tube data will shortly be added to the National NO2 diffusion tube database, also accessible through the website. Current and past reports are also available to download. The site can still be found at [www.kentair.org.uk](http://www.kentair.org.uk).

form part of a wider UK review which will, in addition include comments following a future public consultation exercise with industry, selected industry associations and non-governmental organisations. It is anticipated results from this wider review will then form part of the evidence base that will be used to contribute to and influence the European Commission's review of the

## Euro 6 to count

Euro 6 emission limits are set to include a particle number limit as well as a particle mass limit. Such a number limit would reduce the number of ultrafine particles though to have most damaging health effects and would make it harder for engine manufacturers to reduce particle mass at the expense of other metrics without the use of particle filters. The proposed number emission limit of  $5 \times 10^{11}$  particles per km would be applicable to all categories of light-duty diesel vehicles and would essential force manufacturers to use filters.

## Indicator finalised

The Government's air quality indicator, used in its sustainability tables, has been finalised. 2006 figures showed a significant worsening on the previous year when launched in draft form (AQB February p1). The draft urban figures have been conformed at 41 bad air days in 2006, the rural indicator was conformed at 56 days rather than the 57 in draft

## New PPC Certificate

A new training course has been established in Pollution Prevention and Control intended to provide the knowledge that underpins IPPC/PPC.

The course was developed following evidence that some local authorities were using staff that did not have the necessary knowledge of PPC. NSCA, Lacors and the CIEH are behind the courses. [www.nasca.org.uk](http://www.nasca.org.uk)

## Tube database update

A number of changes have taken place to the Diffusion Tube Database since the last release in February 2007. New version download [www.uwe.ac.uk/aqm/review/diffusiontube300307.xls](http://www.uwe.ac.uk/aqm/review/diffusiontube300307.xls)

## EU asks on IPPC

The European Commission is carrying out an internet consultation on the future of industrial IPPC regulation. "In the context of the process to evaluate and review the IPPC Directive. This questionnaire seeks your views on actions which could be taken at EU level to ensure a high level of environmental protection through the prevention and control of industrial emissions. The replies will be used as input to the process of reviewing the legislation during 2007." <http://ec.europa.eu/yourvoice/ipm/forms/dispatch?form=ippc>