

AIR QUALITY

July 2007 Issue 15

BULLETIN

RISK

Air kills more than traffic

More people are killed by air pollution than traffic accidents, it is claimed.

Urban policy on the environment is "too little, too late and too small", Royal Commission on Environmental Pollution chairman Sir John Lawton told last month's Waterfront conference on transport and air quality.

Lawton has recently completed a report for RCEP on the urban environment (*AQB April p1*). This report urged the Government to increase action on air quality in urban areas.

He told the conference: "There are plenty of urban policies, and plenty of environmental policies, but no overarching policies covering the urban environment. Given that we are about to expand urban areas we have a good opportunity to get it right – or a good chance of spectacularly

screwing up."

"Pollution – in particular ozone and nitrogen dioxide – is now increasing in urban areas and this has a profound impact on health, especially of children. There is growing evidence that many child health problems are in part caused by poor air quality.

Lawton emphasised: "The number of people killed by air pollution is a whole order of magnitude more than those killed by road accidents – yet compare the resources put into each.

He added that the situation would get worse with growth in road traffic: "Despite the warm words of the transport minister (Gillian Merron MP opened the conference), urban traffic is set to grow by 40% which is faster than technology can clean up emissions. An asymmetry exists in Government policy – when

pollution is bad, rather than doing anything to cut traffic, we ask asthmatics to stay indoors. Imagine we substitute traffic pollution for pollution caused by a cement works – imagine what would happen if we asked asthmatics to stay indoors as a result of that cement works? It would be absurd.

"We should turn this round so that if pollution is bad then we should restrict transport. It will be hard, it will be difficult but it will have to be done."

Lawton proposed that local authorities are able to form an environmental 'contract' with central Government, business, lobby groups and the community. The contract would draw in local transport plans, air quality plans and others to form a consistent and joined up delivery mechanism with a

● continued on page 4

AVIATION

Agency wades into Heathrow growth debate

The Environment Agency has tabled its reservations about further expansion at Heathrow Airport.

In its response to consultation on alterations to the London Plan, it says: "We support the Aviation White paper's conclusion that any proposal for extra runway capacity at Heathrow should not progress unless the adverse impacts on air quality and noise are sufficiently mitigated and public transport access improved.

"We feel the alterations as presented in the London Plan

are not entirely consistent with the White Paper and Progress Statement of December 2006. The White Paper makes the assessment that 'there is a substantially better chance that the limits (ie specifically the currently exceeded limits for nitrogen dioxide) could be met in the 2015-2020 period'.

"The Plan Alterations state that on present evidence, Heathrow cannot adequately mitigate noise, air quality and climate change impacts, and oppose an additional runway at Heathrow on these grounds. On

current evidence we agree with the plan."

Concerning the excess emissions from the airport, the Agency says: "An environmentally robust surface access strategy would assist in reducing emissions. However, at present we feel there isn't much evidence to show that this and other measures can make a significant enough contribution to mitigation and to meeting the NO₂ standards within the 2015-2020 timescale required of expansion plans at Heathrow."

IN BRIEF

Bromley declares

The London Borough of Bromley has finally declared a large part of its borough. The AQMA encompasses Penge, Beckenham and part of Bromley.

Bromley – the last to declare in London – has long resisted a declaration but when faced with officers' recommendations to declare, councillors refused, demanding that it be given control of traffic lights before it made the decision (*AQB December 2006 p1*).

In March councillors accepted the two could not be linked and made the declaration.

Grant delayed

Defra has written to local authorities explaining that air quality grant is being delayed.

The hold up is due to Defra attempting to balance its books. Grants, which replace supplementary credit approvals and can be spent on air quality initiatives, are usually awarded early in the financial year.

Defra says that unlike the previous LAQM capital support programmes (Supplementary Credit Approvals (SCAs)), the grant does not have to be spent within the same financial year it is awarded.

Website review imminent

Over the next couple of months we will start reviewing the 500+ websites that cover air quality in the UK and beyond!

If your site is good, just to be sure we see it, please do tell us about it, especially if it is due to be down for maintenance or upgrading. Our much-anticipated review will appear in the September *Air Quality Bulletin*.

Don't let the usual suspects hog the limelight!

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Air consultancies ranked: AEA dominates

Consultants: The rankings

Number of air quality staff	Consultant
100	AEA Technology
62	Bureau Veritas
41	Entec UK
18	TRL
15	CERC
14	Faber Maunsell
14	Hyder Consulting
13	Atkins
12	ERG
12	BRE
12	NPL
11	Air Quality Consultants
11	Golder Associates
10	URS Corporation
9	SLR Consulting
9	Scott Wilson
8	Arup
7	Enviros Consulting
6	Peter Brett Associates
5	Mouchel Parkman
4	RPS
4	Capita Symonds
4	ERM
4	Jacobs Babtie
4	Mott Macdonald
4	RSK ENSR Group plc
4	Royal Haskoning

Air Quality Bulletin has contacted key consultants in the UK air quality market. We asked the question “how many consultants work on UK air quality” – the results are presented in the table (see left).

AEA, with over 100 consultants vastly outguns any other firm – the next largest is Bureau Veritas (better known in its former guise as Stanger/Casella). Below them are a number of surprises and we do hope everyone has been honest with us.

● **Editor’s note:** *We’ve confirmed all those with more than five consultants – with hindsight we’d have tried to pin down firms on how many were true consultants, and how many acted more as technicians or back-office boffins (eg those looking after monitoring equipment and not involved in consultancy). Had we done that, the picture would look different. We intend to repeat this survey in future years and will try to tease out these differences next time.*

For firms with four or less, we’ve taken an educated guess at staff numbers (those working on UK air quality) and if we’ve got it wrong please tell us and we’ll correct it (although in our defence some firms didn’t bother to respond to our email asking about staff numbers).

Size isn’t everything: the rest

Other firms involved in air quality that we estimate that have less than four air quality staff include: ADAS, ADM, AES, Alderley Environmental, BMT Cordah, Carl Bro, Egniol, Envirobods, Environ, Foster Wheeler, Gifford, Halcrow Group, JMP Consultants, McLellan, Met Office, Parsons Brinckerhoff, Qinetiq, Sadler Consultants, Temple, Terence O’Rourke, Transport and Travel Research, Wardell Armstrong, Waterman, Westlakes Scientific, WYG & WSP

IN BRIEF

New EPA AQ tool

AirCompare, a new US Environmental Protection Agency-developed air quality tool has been launched to provide householders with detailed air information.

AirCompare uses EPA’s Air Quality Index (AQI) to explain air quality from a health perspective. A person with asthma, for example, can use *AirCompare* to select up to 10 states across the country to find out how many days the air was unhealthy. Or someone planning a trip can find out the best time of year to visit a particular area, based on concerns about asthma, heart disease and outdoor activity.

AirCompare searches EPA air quality databases to pull information about pollutants and translates it into charts that show simply whether the previous year’s air quality was healthy or unhealthy

● www.epa.gov/aircompare

SHIPPING

Time to tackle shipping emissions in Europe

A study for the European Commission has explored the cost effectiveness of measures with different options to reduce air emissions from shipping.

The report demonstrates that the reduction of these emissions can be substantially lower than the costs of additional controls for land-based sources with the same effect on health and environment.

In 2000, SO₂ and NO_x emissions from international maritime shipping in Europe amounted to approximately 30% of the land-based emissions in the EU-25. Under business-as-usual assumptions, by 2020 emissions from maritime activities would come close to the projected baseline emission levels from land-based sources, and exceed the target levels set by Europe.

“This anticipated increase in ship emissions will counteract the envisaged benefits of the

costly efforts to control the remaining emissions from land-based sources in Europe.”

The study has identified a set of emission control measures that are technically available and that could – if fully applied – reduce by 2020 80% of SO₂ emissions from international shipping, and almost 90 percent of the NO_x emissions. Total costs of these measures are estimated at 5.5bn €/yr. For comparison, the costs of the measures proposed by the Thematic Strategy amount to 7.1bn €/yr.

Abatement options include seawater sulphur scrubbing, lower sulphur content in residual oil, humid air engines for new built ships, slide valves retrofitting in existing ship engines, as well as the use of selective catalytic reduction (SCR). Marginal costs of these measures are well below the costs of the measures for land-

based sources that have been proposed by the Thematic Strategy.

● <http://ec.europa.eu/environment/air/transport.htm>

Filthy dirty ships

Brussels based campaign group Transport and Environment (T&E) and a coalition of environmental groups are calling for cuts in shipping emissions.

They want the International Maritime Organisation to agree a reduction in NO_x emission of about 90% for both existing and new ships, no later than 2015; reductions in SO_x emissions of 70-90% by 2015 and substantial reductions in particular matter (PM), both through the side-effects of reducing NO_x and SO_x, but also by working on specific targets for PM in Marpol Annex VI (to be adopted no later than 2009).

REGULATION

Council indicators a ‘badge of honour’

The *Lifting the burdens* task force has studied Defra’s brief and identified initiatives to be scrapped – including indicators on air quality.

It picked on air quality and animal health as the two main areas where ‘streamlining’ can take place. The task force findings will feed into current Government efforts to reduce the number of indicators and targets in central and local government (*AQB May p3*) and the Rogers Review (*April p1*).

The task force is an independent practitioner body that has been set up to review the bureaucratic and performance management burdens that exist as a consequence of the current relationship between central and local government. “The task force will identify which requirements cause the most

difficulty on the ground and which add the least value and agree packages of burden reduction with Government.”

The report says: “A worryingly common reluctance in both central and local government staff to let go of performance indicators has been brought to our attention. Over the years performance indicators have assumed a badge of honour like symbolism to say this service is important and taken seriously and used to protect the service from any potential cuts or changes.

“In discussing performance indicators with local authorities, some tension has emerged between the rationale of removing performance indicators which do not meet the criteria and retaining the measure as a means of securing funding for an area of work

which would not be considered a local priority. The task force is unanimous in the view that the national indicator set should not exist to provide undue leverage to resource areas of work considered low priority at a local level.”

The task force recommends deletion of best value indicator BV217 (percentage of pollution control improvements to existing installations completed on time). “Although this is an area within the national enforcement priorities, there are perversities caused by the indicator.

“This indicator can only be checked by inspecting businesses to check all improvements no matter how trivial are completed on time. This is contrary to Hampton principles of risk based inspection.”

Turning to air quality procedures, the report says: “Local authorities say that annual reporting does not allow for sufficient trend analysis of air quality data which can be influenced by periodic factors eg extended unusual weather, major roadworks leading to unusual traffic queues etc. If reporting is to continue, reporting over a longer period would allow better trend analysis and more reliable data on which to base action.”

It recommends that the task force “engages with Defra’s air quality division to explore reviewing reporting requirements for air quality”.

● *The Lifting the burdens task force review of Defra can be viewed on www.lga.gov.uk/download.asp?path=/Document s/Publication/LBTF_DEFRA.pdf*

LOCAL TRANSPORT PLANS

LTP fails to prompt air quality success

A review of local transport plan policy suggests progress has been ‘weak’ on air quality.

Local authorities have been obliged to transfer air quality action planning (where prompted by road transport) into local transport plans as a means of reducing red tape (*AQB July p6*). Air quality action in such cases must normally be funded through local transport plan funding.

But a review of the LTP process by Atkins suggests that

while there have been successful outcomes such as road safety, highway condition and rural accessibility, other issues such as air quality, climate change or sustainable distribution have been “weak”. “Delivery of national targets has been less evident compared to local targets,” it adds.

Atkins adds: “There have been a number of unintended consequences not anticipated by policy makers. For example, the focus on detailed guidance and

assessment has led to significant resource burdens for DfT, Government Offices and local authorities, and high levels of compliance, rather than competence, from authorities aimed at maximising their score rather than pursuing genuinely locally relevant strategies or innovative new approaches.”

● *Long term process and impact evaluation of the local transport plan policy www.dft.gov.uk/pgr/regional/ltp/research/ltpoutcomes*

GLOBAL WARMING

Councils left out of climate change efforts

NSCA has responded robustly to the Climate Change Bill consultation. The Bill omits mention of local authority involvement.

It says: “It is disappointing that there is no role for local authorities set out in the Climate Change Bill. Local authorities can potentially play a major part in reducing emissions of greenhouse gases, both in exercising their own powers and also in the role as community leaders. In the latter case local action can be far

more powerful and cost effective than centralised programmes. To date many local authorities have had considerable success in reducing domestic emissions under initiatives related to the Home Energy Conservation Act and through Local Transport Plans.

“An obligation to reduce emissions of greenhouse gases would sit happily as a successor to the Home Energy Conservation Act, and could strongly integrate with the local

air quality management process, to the benefit of both. We would like to see local authorities issued with a statutory responsibility to assess carbon dioxide emissions from their districts, formulate long-term targets and shorter-term budgets, and produce action plans for emissions reductions. The review and assessment periods could be timed to fit in with existing air quality responsibilities.”

● NSCA Ed Dearnley email edearnley@nscs.org.uk

IN BRIEF

US animal emissions

The US EPA is to carry out its first nationwide study of air emissions from poultry, dairy and pig animal feeding operations.

With EPA oversight, researchers from eight universities will take part in the two-year, \$14.6 million study to measure levels of hydrogen sulphide, particulate matter, ammonia, NO_x, volatile organic compounds and other gases from livestock facilities.

There is a shortage of reliable air emissions data for livestock operations which makes it difficult to determine the compliance status of operators.

“There has never been an agricultural air emissions study this comprehensive or long term,” according to Dr Al Heber of Purdue University, the lead scientist for the study. “We don’t know enough about what is being emitted into the atmosphere. This study will give the EPA the data it needs to make science-based decisions.”

● More information about the study: www.epa.gov/agriculture/airmonitoringstudy.html

NEWS FROM LAST MONTH'S WATERFRONT CONFERENCE ON LOCAL TRANSPORT AND AIR QUALITY

• Traffic risk: from p1

small number of high level targets and fewer local requirements, allowing more local choice.

Lawton added his voice to the discussion on air pollution risk: "However you do the figures, it looks like urban air pollution is a bigger killer than road accidents. Against this, there is increasing evidence that environmental regulation is being unpicked in the desire to cut red tape – the failure to tackle particles is a national scandal."

Conference briefs

Nicky Woodfield, AQC

"Local development frameworks are being prepared and are failing to properly take into account air quality," planning expert Nicky Woodfield told the Waterfront conference.

Woodfield, of Air Quality Consultants, has been instrumental in producing air quality planning guidance for the NSCA. She told the conference: "We have been involved in appraisals of LDFs (Local Development Frameworks required to be produced by planning authorities) and there are huge disparities between them – some make a lot of references to air quality, some don't mention it even in their core strategies.

"If we are not getting air quality into LDFs and they are not being monitored to ensure inclusion, then we are missing great opportunities."

Sir John Lawton (in combative form)

Sir John Lawton, head of the RCEP, said: "I've heard that major bus operators are using cerium oxide as an additive in the fuel which then comes out of the exhaust in the form of fine particles.

"We have no idea of the environmental health impacts of these emissions despite the fiasco of lead additives in fuel. There is *no* regulation on what you can add to fuel and this is criminally irresponsible."

Pollution worse than Chernobyl

The impact of air pollution is worse than Chernobyl, CEH researcher Jim Smith told the Waterfront transport and air quality conference.

Smith based his claim on research he had carried out with the intention of reassuring Chernobyl victims of the level of health risk they faced. The comparison of various risks revealed that air pollution was more dangerous: "Last year was the 20th anniversary of Chernobyl. In fact the largest health legacy of the nuclear

accident is one of mental problems – stress and anxiety about the impacts of radiation.

"I set out to compare the risk from the accident to other public

health risks in a bid give locals an accurate picture of risk for those people. We wanted to impart the actual risk to them. Of the 500 working on the site, 134 received an acute dose and 40 have died. Across the wider population, the biggest impact has been on thyroid cancer – 4,000 cases – luckily this is treatable.

"20 years on, among the wider population, there has been no clear evidence of increases in leukemia, and the latency of leukemia is such that had there

been an effect, we would have seen it by now. In terms of other 'solid' cancers, we predicted that Chernobyl has caused 8,000 extra deaths locally and 30,000 deaths worldwide.

"Air pollution causes an eight months reduction in life expectancy and 24,000 premature deaths *per year*. Chernobyl is estimated to cut average life expectancy by three months and cause 30-60,000 deaths in *total*. "In some respects, one could conclude that air pollution is worse than Chernobyl."

He added caveats that there is a great deal of uncertainty in the risk estimates, and it is hard to compare environmental health risks objectively.

Increase in lifetime mortality risk...

Pollution (for those living in the London congestion charging zone)	2.8%
Increased risk from passive smoking	1.7%
Chernobyl – low 100mSV dose	0.4%
Higher 250mSV dose	1.0%

Non-London councils told to use LEZ powers

Laws used to introduce the London low emission zone could be used to introduce similar zones across the country, claims a planning lawyer.

Rahul Bijlani, of Bircham Dyson Bell, was involved in developing the London LEZ regulations. The LEZ will set a minimum Euro 3 standard for commercial vehicles to avoid payment of a £200 penalty charge (*AQB June p8*).

Urban areas outside of London are being encouraged to introduce congestion charging and low emission zones, but many are unsure of the legal basis for introducing such zones. Bijlani says the powers already exist to introduce schemes now: "It really is possible," he said.

Two powers are available – Traffic Regulation Orders (TROs) or Road User Charging regulations as contained in the Transport Act 2000. "Many have not appreciated the scope for using the latter, says Bijlani.

Bijlani said that the Environment Act 1995 introduced powers to allow traffic authorities to introduce orders for air quality purposes. Introducing a TRO involves statutory consultees, and faced with objections, the authority may be obliged to hold a public inquiry. "Also, a TRO can prohibit certain classes of

vehicles but does not allow powers to charge. Along with the possibility of a mandatory public inquiry, the power is not that flexible (although the current Local Transport Bill is set to remove the need for a mandatory public inquiry).

"Road user charging legislation is very broad; a scheme can be brought in for reasons other than congestion and can apply at different times and to different vehicles. The London scheme has been taken forward under this legislation.

He flagged up some constraints. So called 'soft law' – government policy – can conflict with the legislation. Until recently, Government has suggested that it would only support charging to deal with congestion and it has not explicitly endorsed charging for emissions. It needs to do so.

Any scheme must by law facilitate the policies contained within a local transport plan with allocation of any funds raised going towards LTP policies. "Thus the content of the LTP is very important." Other problems include where schemes cross boundaries: "Air pollution does not recognise boundaries, but where schemes cross boundaries there are issues about revenue sharing, joint procurement, joint working and political change."

Other risks include a judicial review of the scheme, perhaps from a group feeling it has been badly affected: "Judicial reviews can be mounted on the basis of irrationality, so a scheme has got to be fair and reasonable. Thus – for instance – while the scheme can specify the minimum Euro standard of a vehicle, there has to be a mechanism for dealing with special cases, for instance foreign vehicles, retrofitted vehicles and early adopters of new technology. Not recognising such special cases is classic judicial review material, you have to balance reasonableness with enforceability and expediency."

Can the experience of London be emulated? Bijlani said: "There is a widespread view that London is different, and I am not sure this is entirely true. It has strong leadership and such schemes are never uncontroversial. It has a special relationship between TfL and the Mayor, but so will other authorities under the Local Transport Bill, and London already has congestion charging. None of these things preclude introduction of a scheme outside of London – and Transport Innovation Fund cash is available for innovative schemes, and the political climate is very favourable."

REGULATION

EPP manual: first glimpse

Defra has launched a consultation on the shape of the manual that will support new Environmental Permitting Programme (EPP) regulation.

EPP regulations come into force in April 2008 and see Pollution Prevention and Control (PPC) merged with Waste Management Licensing into a common permitting and compliance system.

Defra says the transfer from PPC to EP shouldn't have major implications for the operation of these two local-authority regulated regimes, for instance all PPC permits issued by local authorities will automatically become EP permits.

Defra says: "The purpose of this consultation is not to invite comment on matters relating to the EPP which have been consulted on previously. The main purpose of this consultation therefore is to seek views on whether the structure, coverage and approach in the revised text will meet the needs of all users."

The structure of the manual has not been altered from the 2003 original. Most of the

chapter numbers are the same, with the addition of a few new ones.

It still contains four parts:

- Part A – 37 mainly short chapters, each describing a different element of the system. New chapters cover solvent emissions, paints, petrol vapour recovery and asbestos), the European Pollutant Release and Transfer Register, and the relationship between Defra and local authorities/industry;
- Part B – 21 detailed annexes;
- Part C – specimen forms;
- Part D – specimen notices and letters.

Main changes are:

- The transition between PPC and EP;
- New terminology, eg the relationship between 'installation' and 'regulated facility';
- Summarises the arrangements for one regulator per site;
- Sets out the timetable for LA-IPPC applications to comply with the Public Participation Directive, including a more flexible interpretation of the PPD compared with that given additional guidance note AQ14(05);

- Specifies that there is no longer a system of listed statutory consultees, although no significant change is envisaged in practice;
- Covers the interface with both the Freedom of Information Act and the Environmental Information Regulations;
- Explains that applications can be made electronically;
- Gives the latest position on the interface between PPC/EP and land use planning;
- Advises that imminence of risk is no longer a factor for suspension notices;
- Expands advice on operator competence;
- Expands advice on local authority good practice;
- Lists those convicted of PPC offences since 2001/2;
- Contains the advice in several additional guidance (AQ) notes issued since the 2003 edition.
- *Consultation on the Environmental Permitting Programme: draft revision of the General Guidance Manual* can be viewed on www.defra.gov.uk/corporate/consult/epp-guidance/index.htm

DEREGULATION

EIC costs Part B review

The Environmental Industries Commission has challenged the merits of plans to deregulate Part B local authority regulated processes.

EIC is concerned that Defra's review is primarily focused on deregulation and cost cutting and that proposals to remove up to 4,000 processes from LAPPC controls will jeopardise health.

EIC believe that the review of the LAPPC regime should focus on how to reduce the damage to

public health resulting from air pollution by improving enforcement: "It should look at ways of cutting red tape without undermining environmental protection," says EIC.

One of the options put forward is to move up to 4,000 processes from LAPPC controls to a statutory nuisance regime. "Controls based on nuisance (or visibility) would only suffice to detect particulate concentrations above 100µg/m³ (when it is

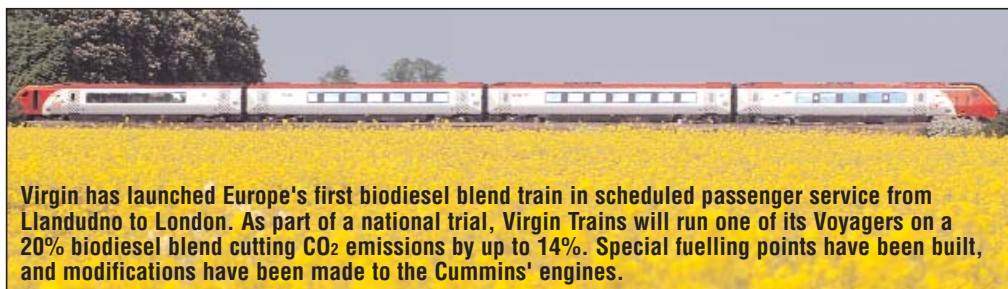
visible) which are much higher than the current 5µg/m³ from abated industrial processes.

EIC has produced a spreadsheet that estimates the impacts of deregulation. For instance non-BAT options show that the loss of technical requirements of process guidance notes could result in increase of PM₁₀ in UK of over 12% of the UK national emissions of PM₁₀.

- www.eic-uk.co.uk

ALTERNATIVE FUELS

Virgin trial biofuel for cross country train



Virgin has launched Europe's first biodiesel blend train in scheduled passenger service from Llandudno to London. As part of a national trial, Virgin Trains will run one of its Voyagers on a 20% biodiesel blend cutting CO₂ emissions by up to 14%. Special fuelling points have been built, and modifications have been made to the Cummins' engines.

IN BRIEF

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 – and 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;
- Information on both national air quality policy and the work of local authorities;
- Descriptions of what causes air pollution, how it is measured, and the relevant impacts.
- www.scottishairquality.co.uk

LAPC changes

Charges to cover the costs of local enforcing authorities in regulating petrol stations have changed.

Application fees for certain petrol vapour recovery applications – PVR2 – will be £91 and the subsistence fee for combined PVR I and PVR II will be £202.

Black smoke analysis

NPL has reported on its first year of operation of the UK black smoke network.

- *2006 annual report for the UK black smoke network* can be viewed on www.airquality.co.uk/archive/reports/list.php

Refinery emissions

Oil industry group Concawe has released a report detailing emissions of air pollutants, and how they are derived, to support preparation of data for the European pollution register (E-PRTR).

- *Air pollutant emission estimation methods for E-PRTR reporting by refineries* can be viewed on www.concawe.be/Content/Default.asp?PageID=11

IN BRIEF

Casella goes Swiss

Casella ETI has been appointed by Swiss firm Digitel as its UK and Ireland distributor.

Digitel, the Swiss specialist for automatic aerosol, gas and wet-only samplers, has been manufacturing for over 35 years and specialises in high volume samplers such as the DHA-80, a fully automatic gravimetric system to sample dust and aerosol particles for later assessment and analysis.

The DHA-80 sampler has a flow rate of between 6 and 60 m³/hr and can store up to 15 filters for programmable automatic timed change over.

Typically, the change over is programmed to happen daily so that the system only requires fortnightly maintenance. However, the change over can also be activated remotely as part of an emergency response situation, so that in an emergency particulate can be collected onto a new filter. (This approach is common for applications for background monitoring around nuclear installations).

A range of sample heads is available for the DHA-80 including the common size fractions of PM₁, PM_{2.5} & PM₁₀. An additional option available is to collect material onto large a (polyurethane foam) filters.

The instrument is suitable for PM₁₀ measurements according to the European Standard EN12341 and has commonly been used for many years throughout Europe as a gravimetric reference method for PM₁₀ sampling.

In the UK, a measurement network has been set up by Defra which purchased 25 Digitel instruments for measurements of PAH's (polynuclear aromatic hydrocarbons) and dioxins.

Traditionally, high volume samplers have been very noisy to operate with high maintenance costs. The Swiss build quality of the DHA-80 means that it is claimed to be quieter to run, and more reliable to operate.

● www.casellaeti.com

MONITORING

Mills to market the Magee

Air Quality Monitors' Jim Mills is to market the Magee black carbon aethalometer. The exclusive distributor deal with Magee Scientific follows Thermo's decision to directly sell Teoms itself rather than relying on solely on Mills.

The Magee Aethalometer measures 'black carbon' in aerosols and PM in real time. Black carbon (BC) has a close relationship to elemental carbon (EC) and is now required to be monitored by the new EU directives.

Mills is to visit key customers in the UK in the next few weeks to discuss the aethalometer monitors and the scientific merits of black carbon measurements in relation to current air quality standards and directives. The addition of the Magee range to Air Monitors portfolio "is a major step for our PM chemical speciation measurement abilities".

Mills told *AQB*: "The black carbon market size is much smaller than particulate right now but if black carbon or its associated chemicals are found to be a major player in health effects then that ratio could change. Fact is we still don't know which ingredient in the particulate stew is bad for us, so think of black carbon as a way to isolate one of those ingredients as a move toward that goal.

"There are currently mainly manual methods for measuring black carbon elemental carbon (soot). They are usually labour intensive and rely on burning the CO₂ and measuring the amount of CO₂ gas emitted.

"Despite there being a requirement to measure, there is no European standard for black carbon at the moment but there are a couple of US methods that most people either use or recognise. The Magee unit has

been shown to give a very close approximation of elemental carbon, is smaller and simpler in design making it highly reliable and ideal for real time monitoring in networks.

● www.airmonitors.co.uk



The Magee aethalometer

INDUSTRY

Environmental expenditure tops £3bn

Defra has released its 2005 environmental protection expenditure survey.

Compiled by consultant URS, the ninth survey in the series reveals many points including:

- Gross spending on environmental protection in 2005 by UK industry amounted to an estimated £3.4 billion;
- 40% of the total expenditure was spent on wastewater, with a further 28% spent on solid waste, 17% on air, 9% on other and the remaining 6% on

soil/groundwater and noise;

- Capital expenditure accounted for about 27% of the overall total environmental protection expenditure in 2005. The highest proportion of expenditure was on water, accounting for approximately 39% of the total (£356m), with a further 37% spent on air (£336m), and the remaining 24% (£215m) spent on solid waste, noise, nature protection and other areas;
- The continuing increase of

capital expenditure on water and air is likely to be driven by legislation, primarily IPPC regulations, which impose increasingly stringent environmental standards for emissions to air, and water and wastewater treatment, and have also extended the industry sectors that are subject to process-related regulation.

● *Environmental protection expenditure survey by industry 2005* can be viewed on www.defra.gov.uk

PUBLICITY

Industry awards to reward air quality

The inaugural Rushlight Awards have been launched to promote and celebrate the achievements of the leading UK and Irish environmental technology and innovation.

Award categories include air quality, renewable energy, clean fuels, waste and pollution management. Organisers say the awards will highlight the technology and innovation that is shaping the energy, transport, environment and industry sectors in the future.

They add say: "With corporate partners BT, Black & Veatch and Carron Energy, assistance from the environmental unit of DTI/DEFRA, Scottish Enterprise, Welsh Assembly, Action Renewables of Northern Ireland and over 20 trade associations, institutes and agencies, the awards are the leading awards in the environment, energy and waste field."

The air pollution technology category is designed to include

all types of air pollution mitigation technology, innovation and procedures and any form of air cleansing technology or instrumentation. Entrants can be, inter alia, manufacturers, industry, service and product providers to industry, research groups, management companies, facility owners or designers.

● To find out more and to enter the awards (closing date 31 October 2007) visit www.rushlightawards.co.uk

MONITORING

More intercomparison for FDMS

A minor modification to the Teom FDMS has prompted a new set of intercomparison trials being carried out at Teddington.

Bureau Veritas is testing the FDMS C against the FDMS B which was deemed to be 'approved' in an earlier batch of testing (*AQB July 2006 p1*).

Many other manufacturers are piggy backing on the trials in a bid to prove their equipment is equivalent. Teddington was chosen as there are considerable fractions of volatile ammonium nitrate in the south east of England. "If an instrument performs well under these conditions, it is most likely to perform well under other conditions."

In the earlier sets of trials, eight pieces of equipment were judged based on eight data sets based on two seasons and four sites. At least two data sets are needed to prove equivalence to the EU particle standard.

For these trials, tests started in early June and will finish in early August with reporting to Defra in autumn. David Harrison of Bureau Veritas told *AQB*: "Type C FDMSs differ from type B in that they have a parallel plate dryer as opposed to a dryer made of concentric tubes. This was considered to be a minor but significant change. It is no longer possible to buy Type B FDMSs. It was therefore decided that a single study should be performed to see that Type B and C instruments give the same results.

"PM_{2.5} Teoms and Partisols were included as there are a few in the national networks, but they were not included in the original trial. As these are effectively a sub set of previously tested instruments, it is hoped that there will be enough data from a single study to test for equivalence. The SEQ47/50 conforms to EN12341 as does the PM₁₀ KFG, though it is newer and can auto change the filters. This was included to check that both the PM₁₀ KFG and SEQ read the same.

Smart BAMs and Turnkeys were included at the request of ET/Turnkey respectively. It is a requirement of the guidance, that there are at least four datasets for any candidate



The last intercomparison trial signalled a move away from the Teom

instrument. This is to ensure that there is the same straight line relationship (possibly with a slope or intercept offset) irrespective of the sampling conditions and ambient aerosol make up. Defra currently has no plans to do any further field studies after this one. Should manufacturers or distributors wish to obtain equivalence for their instruments, then further datasets must be collected, and the data processed in line with the guidance.

"Currently, the Partisols in the national network contain quartz filters weighed to EN12341,

Partisols tested in the last set of trials contain Emfab filters weighed to EN14907.

"Current research suggests that quartz filters have a tendency to over-read as they hold on to water. As such, two extra Partisols were included on the study, one with quartz filters weighed to EN14907, and one with quartz filters weighed to EN12341.

"At the end of the study, a decision will be made as to whether to switch Partisols in the national network from quartz to Emfab filters," added Harrison.

PARTICLE MONITORS ON TRIAL

These are the monitors currently on site at Teddington:

- 2 x PM_{2.5} Leckel with Emfab filters weighed to EN14907 (EN14907 compliant standard used in last set of trials);
- 2 x PM₁₀ KFG with Emfab filters weighed to EN14907 (EN12341 compliant standard used in last set of trials);
- 2 x PM₁₀ SEQ47/50s with Emfab filters weighed to EN14907 (EN12341 compliant standard recently purchased by Defra);
- 2 x Type B PM_{2.5} FDMSs (tested in last set of trials);
- 2 x Type B PM₁₀ FDMSs (tested in last set of trials);
- 2 x Type C PM_{2.5} FDMSs;
- 2 x Type C PM₁₀ FDMSs;
- 2 x PM_{2.5} Teoms;
- 2 x PM_{2.5} Partisol 2025s with Emfab filters weighed to EN14907;
- 1 x PM_{2.5} Partisol 2025 with quartz filters weighed to EN14907;
- 1 x PM_{2.5} Partisol 2025 with quartz filters weighed to EN12341;
- 2 x PM₁₀ Met-one Smart BAM;
- 2 x PM_{2.5} Met-one smart BAM;
- 2 x PM₁₀, PM_{2.5} and PM₁ in single instrument Turnkey TOPAS instruments. the TOPAS is said to be the same as the OSIRIS differing only in that it is stand alone not lamp post mounted.

IN BRIEF

BAA backs Heathrow

BAA has joined *Future Heathrow*, the campaign for the sustainable growth of Heathrow Airport, saying that the expansion of the airport is vital to UK competitiveness.

BAA has held back from joining the group until now. The backing of Heathrow expansion (including a sixth terminal and third runway) signals that BAA now expects that expansion can take place within air quality and noise limits contained in the 2003 Air Transport White Paper.

Tony Douglas of BAA Heathrow says: "We are increasingly confident that the further growth of Heathrow is possible within the environmental limits set out by the Government – that means no more noise than in 2002, air quality pollution safely within EU limits, and public transport improvements to help manage congestion."

King carbon call

The King Review of low-carbon cars will end next month.

The review invites views from all interested parties on how best to achieve substantial reductions in road transport emissions over the next 25 years, as part of the Government's strategy to tackle climate change.

● www.hm-treasury.gov.uk/king

Best practice guide

A guide on traffic and air quality impacts has been produced for the West London Alliance (WLA) air quality cluster group.

Transport & Travel Research and Bureau Veritas produced the best practice guide which provides advice for transport planners on how air quality considerations should be integrated into mainstream transport policy. A workshop was recently held to discuss the guide.

● *The Guide to Traffic and Air Quality Impacts* is available to download from the 'Projects' page of the West London Air Quality Group website www.westlondonairquality.org.uk

IN BRIEF

London seminar

Following the success of ERG's London Air Quality Network seminar in January, it is planning to hold a further seminar on 9th July 2007.

The seminar will focus on air pollution measurement. It will be designed to support those local authorities that undertake their own site operation providing practical tips for site operators, highlighting the importance of equipment calibration and detailing the way that calibration results are used to produce validated air pollution measurements.

"The seminar will aim to de-mystify the processes involved in the production of a final measurement data set including ratification and UKAS accredited audits. This essential perspective will therefore be relevant to all end users of air quality measurements."

Other topics covered will include a new method to make Teom data equivalent to gravimetric measurements, the use of oxidative potential as a new measurement of PM₁₀ and the use of air pollution measurements in epidemiological studies.

● www.londonair.org.uk/london/reports/AgendaAQMeasurementSeminar9thJuly2007DraftAgenda.pdf

Physiotherapists again

A 'new' analysis of "highly toxic pollutants" has once again made national newspaper headlines.

The Chartered Society of Physiotherapy (CSP) frequently uses Netcen's air quality data website to pull off data to name and shame the most polluted monitoring sites.

CSP says: "Levels of PM₁₀ across the whole of the UK are of enormous concern to physiotherapists and all health professionals who work with patients with breathing problems. The technology exists to reduce PM₁₀ emissions from diesel engines – but is the political will there to enforce its use?"

"For the sake of our health and our children's health we cannot afford to go on ignoring this problem."

● www.csp.org.uk

MONITORING

Agency prosecutes for smoke

A firm has been fined following release of black smoke.

The Environment Agency said a cloud of black smoke from a Wollaston chemical manufacturer blew across the gardens of nearby houses leaving a sooty mess both inside and outside of homes. A tabby cat was turned black, Wellingborough Magistrates' Court was told, and did not return to its normal colour for two weeks.

Chemicals firm Scott Bader UK Ltd pleaded guilty to four charges relating to the incident in 2005, three of them breaching the Environmental Protection Act 1990 and one of breaching the Health and Safety at Work Act 1974 and was fined a total of £20,000 and ordered

to pay £15,289 Environment Agency costs.

Magistrates were told that the incident had happened because a member of staff had left open a valve allowing water to flow into a sealed tank system.

After seven hours, the tank had filled, forcing an abnormal quantity of waste chemicals into the site incinerator where they burned creating the plume of black carboniferous-based smoke which was emitted for about five to 15 minutes from the chimney stack.

Alarm systems proved to be inadequate as they went off in rooms which were not permanently staffed and there was no automatic shut-off on the water addition valve. These have now been remedied.

Two days after the incident Scott Bader sent an analytical report to the Environment Agency which stated that 'no obviously harmful components were identified' in the soot sample taken from a nearby resident's garden.

Magistrates were told the Agency found the report 'wholly unsatisfactory' and considered its conclusion to be misleading. They thought it should have been evident to professional chemists that soot produced from the incineration of chemicals would contain hydrocarbon residues.

The Agency commissioned its own report which showed that the soot contained raised levels of Polycyclic Aromatic Hydrocarbons (PAHs).

VEHICLE EMISSIONS

Non-tailpipe emissions studied by TRL

TRL has completed a set of reports into non tailpipe emission from vehicles.

As engine technology improves so particles from tyres, brake and road wear become proportionally more important, but to date have not been well understood in terms of emission rates for feeding into the National Atmospheric Emissions Inventory.

TRL's conclusions include:

- For normal driving conditions, it seems that an emission factor for tyres of 100mg/vkm is "about right", for heavy goods vehicles, it is an order of magnitude higher. It is thought that up to 30% of tyre dust is PM₁₀ or smaller;

- Total brake wear appears to be 10-20mg/vkm and around 50-80mg/vkm for heavy goods vehicles. Half the dust escapes from the vehicle, and more than 80% of it is PM₁₀, with a large proportion as small as PM_{2.5};
- Road surface wear factors are uncertain and vary from 4 mg/vkm to more than 400mg/vkm where there is a lot of bitumen.
- Resuspension of dust is the single largest vehicle non exhaust contributor to roadside PM₁₀ especially where there is winter gritting.

A number of options are discussed with varying success for reducing particle concentrations:

- Improved materials, such as hard wearing tyre, brake and road surface compounds;
- Particle collection and destruction methods, such as enclosed brakes and wheels, filtration and electrostatic precipitation;
- Improved vehicle design;
- Roadside vegetation barriers;
- Street cleaning and vehicle washing;
- Improved inspection and maintenance regimes;
- Other methods including dust suppressants and de icing fluids.
- The reports on road vehicle non-exhaust particulate matter can be viewed on www.airquality.co.uk/archive/reports/list.php

MONITORING

Heavy metal hotspots listed by AEA

A report has been released summarising levels of heavy metals in the UK.

AEA, which runs heavy metal testing for Defra, says the highest annual mean value for nickel has been found at site 49 (INCO Europe, Swansea). The highest annual mean values for cadmium and lead are found at site 69 (Brookside Metals, Walsall). The highest mean value for arsenic has been found at site 58 (Avesta Steel,

Sheffield). The highest annual mean value for total gaseous mercury has been found at site 59 (ICI Weston Point, Runcorn).

- Notable sites include:
- Nickel at Site 49 (INCO Europe, Swansea): 131% of the target value.
 - Cadmium at Site 69 (Brookside Metals, Walsall): 73% of the target value.
 - Total gaseous mercury at Site 59 (ICI Weston Point, Runcorn). The measured concentration

represents 62% of the target value of 50 ng/m³.

The total gaseous mercury to particulate phase mercury concentration ratio is in the range 4 to 11 for all sites, except Site 59 (ICI Weston Point, Runcorn) where the ratio is 21.

● *Annual report for 2006 on the UK heavy metals monitoring network* is available on www.airquality.co.uk/archive/reports/list.php

Dust done in Brussels

Dustconf: a rare chance for Europeans to talk about particles

DustConf 2007 brought 285 people from 23 countries together to discuss the more obscure side of dust and particles.

European experts spent two days in Maastricht discussing dust. The talks, part-organised and chaired by Lucy Sadler of Sadler Consultants, showed that other countries have similar problems to the UK – and there are lessons to be learned.

Dutch health expert Bert Brunekeef outlined the health effects of particles – and questioned the EU position on ‘man made’ particles. The EU allows member states to subtract ‘natural’ pollution events from national reporting on particles. He showed how apparently natural events such as dust storms may in fact be due to biomass burning or even vehicle usage in the Sahara desert: “Particles are associated with adverse health effects at levels well below current and proposed EU limit values, and the impact is large. Natural particulate subtraction is bad for public health.”

Albert Bleeke of the Dutch energy institute explained the special position in The Netherlands where livestock contributes significantly to PM emissions. Dutch agriculture is particularly intensive and typically comprises livestock houses that exceed IPPC threshold requirements and are significant local emitters. Projections for agriculture suggest particle emissions are set to rise rather than fall, and are far higher than previously thought – and worse than traffic.

Emissions from livestock houses have long proved problematic for air quality dispersion modellers due to the lack of reliable emission factors for animals – emissions can vary according to season as well as their life cycle.

He said: “Using scrubbers on these farms is an effective and integral abatement measure to reduce emission of PM₁₀ and at the same time the emission of ammonia (indirectly also secondary PM) and odour. By applying the measures, local problems with farms exceeding the European air quality target levels can be solved to a large degree and at the same time the overall

Christian Nagl of the Austrian Umweltbundesamt noted that a great deal of member states had particle problems, and focused on a few that had taken special measures to reduce impacts, including London, Graz in Austria and Bozen in Italy.

In Graz, which has well known particle problems, authorities have taken steps to implement new emission limits for domestic heating systems, closed down particularly old heating systems as well as provided incentives to install cleaner systems.

In the Italian town of Bozen, a new law has been introduced that will see a ban of wood burning if daily means of PM₁₀ are

above 50µg/m³ for five consecutive days and alternative heating systems are available.

Indeed the discussions on domestic wood combustion and emission effects were quite interesting given the rising cost of conventional fossil fuel devices and the enthusiasm for use of biomass in the UK. The UK Government has recently introduced a biomass policy, the GLA and some forward thinking councils have policies that require certain percentages of new developments to use renewable fuel sources and developers are proposing small and medium scale biomass plants.

If this situation continues, then the UK can expect similar problems to those found in Germany and learn from lessons learned there. Anja Behnke of the German environmental protection agency noted:

- The use of wood for domestic heating is promoted for climate protection reasons;
- Rising use of wood in small combustion installations causes problems for air quality, eg with fine particles and products of incomplete combustion (PAH and dioxins);
- In Germany there are about 14 million stoves and about 0.7 million solid fuel boilers for solid fuels;
- Dust emissions are significant; more than 90% of them consist of PM_{2.5};
- Between 2000 and 2004, emissions from transport dropped from 29.4 to 22.5ktonnes, but emissions from small wood combustion plants rose from 20.5 to 24kt.

French academic Gwénaëlle Trouvé outlined studies on some modern domestic log burning appliances. These enclosed and controlled burning systems can reduce emissions significantly leaving emissions in the nanoparticle (PM_{0.1}) range apart from during the light up stage when emissions are in the PM_{2.5} range.

Soot emissions from new boilers is hugely less than open burning or old boilers, and toxicity is a factor of five less than vehicle derived soot, but any large scale switch to wood burning would have significant consequences for UK emissions.

Christian Rakos of Austrian pellet maker Propellets said: “Improvements of combustion technologies during the last two decades have led to a dramatic reduction of emissions. CO emissions of state of the art wood boiler technology are three orders of magnitude lower than of conventional logwood stoves or boilers. Emissions of unburned hydrocarbons have been reduced by more than two orders of magnitude and are generally below the detection limits of measuring equipment. Dust emissions of modern wood boilers – particularly of pellet boilers offer a dust reduction of 92 – 98 % compared to conventional wood combustion.”

The dust is less toxic as well as there being less of it: “Dust emitted by advanced

wood boilers contains less than 1% soot.

Recent studies have tried to compare the toxicity of emission of fine dust from advanced wood combustion with the toxicity of other fine dust particles such as soot from diesel engines. The cell survival rate of cells exposed to wood dust was significantly higher than of cells exposed to diesel dust. The authors conclude that the toxicity of diesel dust can be considered to be at least five times higher than from wood dust.

There were calls for legislation to force use of clean emission boilers, given modern wood boilers achieve efficiencies of over 90% while conventional devices hardly exceed 50% efficiency. “By replacing conventional wood heating devices with best available wood combustion technology a massive reduction of fine dust emissions can be achieved without compromising the goals of climate protection, energy policies and the target of socioeconomic development of rural areas.”

Lucy Sadler of Sadler Consultants chaired the conference and listed some conclusions drawn about the need for European legislation that the EU should implement, with support from Member States – or where not possible through the EU by individual member states, or through bi-lateral initiatives:

- Emissions reduction regulation in addition to concentration limit values, with state-of-the-art emissions limit values;
- Biodiesel in combined heat and power plants to be required to have PM emissions as low as EURO5/6 heavy duty vehicles;
- Particulate-trading, with prices on emissions of PM (like carbon-trading);
- NEC-Directive for particles;
- Implementation, enforcement, extension and tightening of IPPC;
- Regulation of small and medium sized combustion plants in IPPC or elsewhere – including domestic boilers;
- Requiring BAT on all installations emitting particles and precursors;
- Ban of agricultural fires and talks with neighbouring states on agricultural fires;
- BREFs to include PM₁₀ and vertical BREF on measures per sector in addition to the horizontal BREF, which are too general;
- Emissions limits for inland ships and (wood) stoves; tighter standards for diesels;
- Member states to be able to define PM-reduction regulations;
- Reduction of sand erosion from the Sahara – eg cutting use of 4x4 vehicles;
- Marine fuel quality directive or (IMO) international agreement;
- (International) emissions standards for shipping;
- Energy efficiency Directive.

Papers can be downloaded from www.dustconf.org

SCIENCE SHORTS

Pollution affects DNA

Polluted air in the city of Prague has been found to affect DNA.

Traffic police officers who spent most of their time in the city streets were equipped with personal monitors to establish PM₁₀, PM_{2.5} and PAH exposure. Typical PM₁₀ exposure was 62 µg/m³ and PAH 25ng/m³.

Fluorescent in situ hybridisation (FISH) was used to assess chromosomal aberrations. Researchers concluded: "It detected a significant increase in all studied endpoints in the policemen compared to controls. We may conclude that FISH indicates that the city policemen in Prague represent a group of increased genotoxic risk. This is the first study that has reported a relationship between DNA adducts (biomarker of exposure) and chromosomal aberrations by FISH (biomarker of effect)."

Chromosomal aberrations in environmentally exposed population in relation to metabolic and DNA repair genes polymorphisms, RJ Sram et al, *Mutation Research* 2007 Jul 1; 620(1-2) pp22-33.

Benzene risk high

Greek researchers have estimated the health impacts of benzene pollution from a petrol filling station.

Three monitoring points were used as reference points, along with benzene concentrations taken at various distances from the petrol station perimeter. Modelling backed up the measurements that estimated increased concentrations of 3-6 µg/m³.

Researchers say: "It seems that petrol stations have a significant contribution to ambient benzene concentrations in their vicinity. Results show a remarkable increase in increased cancer risks in the vicinity, ranging from 3% to 21%."

Contribution to ambient benzene concentrations in the vicinity of petrol stations: estimation of the associated health risk, Spyros Karakitsios et al, *Atmospheric Environment* Vol. 41 (2007) pp1889-1902.

GESTATION

Pollution prompts prematurity

Pollution may increase the risk of premature babies, research in Korea suggests.

Over 52,000 singleton births between 2001 and 2002 were studied and air pollution exposure of mothers estimated using GIS techniques. Living in the highest quartile of air pollution exposure led to a 26% increased risk of pre term delivery for carbon monoxide 27% for PM₁₀, 24% for nitrogen dioxide and 21% for sulphur

dioxide (where the exposure was in the first trimester of pregnancy). A significant association was found for exposure in the third trimester too.

Researchers said: "In conclusion, our study showed that relatively low concentrations of air pollution under current air quality standards during pregnancy may contribute to an increased risk of pre term delivery.

Foetuses in the early and late stages of pregnancy are susceptible to air pollutants. A biologic mechanism through increased prostaglandin levels that are triggered by inflammatory mediators during exposure periods is discussed." **Exposures to air pollutants during pregnancy and pre-term delivery, Jong-Han Leem, *Environmental Health Perspectives* Volume 114, no 6 pp905-910.**

TRAFFIC EMISSIONS

Traffic pollution related to ear infections?

Canadian researchers think that there may be a link between traffic pollution and otitis media – inflammation of the inner ear – among preschool children.

The infection is known to be linked to tobacco smoke, but so far not traffic pollution. Two birth cohorts were studied, over 4,000 in total spread across Germany and the Netherlands. Pollution exposures based on

their place of residence was calculated and otitis media diagnosis recorded during the first two years of life.

An increase of 3µg/m³ in PM_{2.5}, 0.5µg/m³ elemental carbon and 10µg/m³ NO₂ was associated with a 13%/10%/14% respective increase in risk of having otitis media in Netherlands and 24%/10%/14% respectively in Germany.

Researchers conclude: "Given the ubiquitous nature of air pollution exposure and the importance of otitis media to children's health, these findings have significant public health implications."

Traffic related air pollution and otitis media, Michael Brauer et al, *Environmental Health Perspectives*, Vol. 114, no 9, pp 1414-1418.

URBAN POLLUTION

Regional particles to blame

Regional particulate is most to blame for exceedences at Marylebone Road, claim researchers.

Marylebone Road in London saw 185 exceedences of the 50µg/m³ PM₁₀ objective in 2002-2004, most taking place in early spring and autumn. Concentrations were disaggregated into regional, urban background and local

street concentrations.

41% were ascribed to regional events, and 37% to local emissions. Particulate nitrate was the largest part of the secondary aerosol, but as these are lost in the Teom inlet, they were not seen by the Teom instrument. "These findings suggest that international reduction of emissions responsible for the regional

secondary aerosol (SO₂, NO_x and VOCs) will be the most effective path to compliance with the European Directive."

What are the sources and conditions responsible for exceedences of the 24 hour PM₁₀ limit value (50µg/m³) at a heavily trafficked London site? Aurelie Charron et al, *Atmospheric Environment* Vol. 41 (2007) pp1960-1975.

LEARNING

School performance affected by PAH levels

Pre-natal air pollution exposure may affective child brain development and subsequent school performance say New York researchers.

In what is billed as the first study of the effect of prenatal exposure of airborne PAHs on child development, hundreds of pregnant mothers' exposure was assessed with personal monitors.

Researchers found that high personal exposures of mothers

to PAHs was not associated with motor development or behavioural problems, but was associated with a lower mental development index at the age of three. The children will be reassessed at the age of six.

"This study provides evidence that environmental PAHs at levels recently encountered in New York City may adversely affect cognitive development of children. They are of concern because

compromised mental performance in the pre school years is an important precursor of subsequent educational performance deficits."

Effects of prenatal exposure to airborne polycyclic aromatic hydrocarbons on neurodevelopment in the first three years of life among inner city children, Frederica Perera et al, *Environmental Health Perspectives* Vol. 114 No 8 pp1287-1292.

TRAFFIC EMISSIONS

Roadside heavy metals increase

Deposition of heavy metals in roadside soils has increased in recent years, German researchers suggest.

Heavy metals such as palladium, platinum and rhodium are contained in catalytic converters, tiny proportions are emitted in exhausts but it is feared these are building up to significant quantities at the roadside.

Soil samples were taken alongside major junctions of a busy German road and compared to similar samples taken along the same stretch of road ten years previously.

Concentrations of palladium

were found to be 15 times higher than 10 years ago, with rhodium and platinum 2 and 1.6 times higher respectively.

Researchers blame this on use in catalytic converters and concentrations are related to traffic density and speed.

They add: "The increases are not limited to the soil surface with increased platinum levels found 12cm down, palladium measured at even greater depths of 12-16cm suggesting greater solubility.

"Levels dropped off with increasing distance from the highway nonetheless palladium and platinum were detected in a

meadow as far as 50m from the highway, a much greater distance from the highway compared to that measured ten years ago. The observed increases in palladium concentrations are a cause for concern," concluded the researchers.

Changes in palladium, platinum and rhodium concentrations and their spatial distribution in soils along a major highway in Germany from 1994 to 2004, Fathi Zereini et al, *Environmental Science and Technology*, 2007, Vol. 41, pp451-456.

PARTICLES

Is nickel the culprit?

Nickel is being blamed as the likely culprit in the toxicity of particles.

New York and Taiwan researchers looked at various datasets in a bid to establish which was the component most to blame for cardiovascular (heart and circulation system) health effects.

They targeted nickel and vanadium as the most likely culprits – with Nickel more likely out of those two.

Mice were subjected to concentrated air particles of New York air in which there were average nickel concentrations of 43ng/m³. On

14 days over the six months study period there were peaks over 175ng/m³ of nickel and electrocardiac traces showed that on these particular days, mice showed acute changes in heart rate and variability.

Researchers said: "The chance occurrence of a series of days during out six month sub chronic mouse concentrated air pollution inhalation study, in which north west winds with low fine particle matter concentrations but with greatly elevated concentrations of nickel attributable to a nickel smelter gave us the opportunity to identify nickel as a fine

particle matter component of particular relevance to cardiac function."

"Known biological mechanisms cannot account for the significant associations between nickel with acute cardiac function changes in the mice of with cardiovascular mortality in people at low ambient air concentrations and further research is required."

Cardiovascular effects of nickel in ambient air, Morton Lippmann et al, *Environmental Health Perspectives* Volume 114, November 2006 pages 1662-1669.

PARTICLES

Toxic content of particles studied

Toxicity of various types of fine particle has been studied by New Mexico researchers.

Samples of PM_{2.5} were collected from four areas with differing sources of particle including local urban, regional sources, urban with predominant transport sources, urban with predominant industrial sources and a site influenced by maritime weather patterns.

Samples were also collected downwind from forest burning programmes. Samples were

instilled into rat lungs and assessed for general toxicity, acute cytotoxicity and inflammation.

Researchers concluded: "This study supports the concept that PM_{2.5} composition affects its toxicity. The most toxic samples were from the sites during seasons with the largest contributions of diesel and gasoline emissions, whereas wood burning was only weakly correlated with toxicity end points.

"Analysis also indicated that

sulphate, secondary organic aerosols, meat cooking and vegetative detritus were not correlated with biological responses."

Lung toxicity of ambient particulate matter from South Eastern United States sites with different contributing sources: Relationships between composition and effects, JeanClare Seagrave et al, *Environmental Health Perspectives*, Volume 114, number 9 pages 1387-1393.

SCIENCE SHORTS

Volatility studied

Volatility of particles near a motorway has been studied by US researchers.

Particle volatility near a predominantly diesel truck freeway was lower in all particle sizes than next to a purely petrol vehicle freeway.

Particle volatility in the vicinity of a freeway with heavy duty diesel traffic Subhasis Biswas et al, *Atmospheric Environment* Vol. 41 (2007) pp3479-3493.

Trailer collects PM

Australian researchers have used a trailer to collect particles.

Particle measurement and analysis is often seen as flawed as they change properties as they leave the tailpipe and any particle measurement method can itself change properties.

So researchers have tried collecting samples in a container mounted on a trailer with an inlet three metres behind the vehicle so natural dilution effects can be studied.

Novel method for on road emission factor measurements using a plume capture trailer, L Morawska et al, *Environmental Science and Technology*, 2007, Vol. 41, pp574-579.

Damage done to DNA

Environmental air pollution may alter the oxidative DNA damage levels in humans but the effect appears to be related to the country where the individuals reside.

Genetic polymorphisms of the genes involved in metabolism and detoxification and also differences in the DNA repair capacity and antioxidant status of the individuals could be possible explanations for the variation observed in the level of endogenous oxidative DNA damage for the different populations.

Effects of environmental air pollution on endogenous oxidative DNA damage in humans, Rajinder Singh et al, *Mutation Research* 620 (2007) 71-82.

It was a bit of a shock to hear a minister – albeit a transport minister – talking about air quality.

It's been a good few years since AQB can remember the last time anyone from the Government talking about air quality at a conference. Since the departure of Michael Meacher, ministers have appeared bored by the subject and left air quality well alone.

As it happens they rarely have anything interesting to say (eg boasting about giving local authorities 'new' powers to carry out roadside emission testing!), but at least transport minister Gillian Merron MP bothered to read out the speech and mingle with air quality folks at the recent Waterfront Conference.

AQB has always been sceptical at the supposed benefits of subsuming air quality action into local transport plans and there are comments confirming this in the latest Atkins report into LTPs.

But the evidence presented to back this up is a little worrying. Atkins says: "Significantly more AQMAs relating to high transport emissions on local roads were declared during LTP1 than were revoked." Hmmm, as LTP1 covered the period 2001-2006 – the period in which 85 air quality management areas were

declared and 15 revoked – it would be nothing short of miraculous if AQMA's were being dealt with as quickly as they could be found.

The Health and Safety Executive has released an interesting report on 'dread risks'. It sets economists on the thorny issue of valuing risk, which is not easy given that folk seem to place virtually no value on life when driving a car, but are perfectly happy to see millions or even billions spent to make railways and aviation disproportionately safe.

Of course people are happy to kill themselves but less happy at having other people kill them – surely making valuation of risk quite impossible.

By coincidence others were discussing risk at the recent Waterfront conference. At this, air pollution was deemed to be riskier than Chernobyl and road crashes.

As the risk from air pollution is invisible, and doing something about it might impact on our 'right' to drive, we suspect that human nature will blank out road risk. But as for new nuclear reactors.....

It was Jim Smith from the Centre for Ecology and Hydrology who talked of the Chernobyl risk. He recounted his

attempts to warn the press about simplistic headlines: "Whatever you do, please do not say that air pollution is more dangerous than Chernobyl. Naturally, the journalists went on to use just those headlines."

Well this gave AQB a bit of a problem as we see ourselves as 'responsible'. So we looked hard at our notes – very hard – and could see no way of avoiding what was said. Air pollution certainly does look more dangerous than Chernobyl. Hence our 'Pollution worse than Chernobyl' headline!

Back on journalists and risk.

Sometimes – well, perhaps most of the time – the press whip up the dangers of air pollution to unrecognisable levels.

Here's a particularly good example from a Surrey local newspaper about leafy Ewell: "Potentially dangerous levels of nitrogen dioxide have been found in picturesque Ewell Village. The grim discovery now means the High Street with its listed buildings must be branded an Air Quality Management Area. The High Street is busy with shoppers and pedestrians breathing in the tainted air."

Goodness, you'd think they were talking about cyanide gas rather than nitrogen dioxide!

AIR QUALITY EVENTS 2007

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

July 9th

AIR POLLUTION MEASUREMENT

London Air Quality Network seminar on air pollution measurement to be held in London website www.londonair.org.uk/london/reports/AgendaAQMeasurementSeminar9thJuly2007DraftAgenda.pdf

5th September

CLIMATE CHANGE AND AIR QUALITY

EMAQ seminar to be held in London www.emaq.aeat.com

5-6th September

CEM 2007

8th International Conference on Emissions Monitoring to be held in Zurich, website www.cem.uk.com

9-13 September

CLEAN AIR PARTNERSHIPS: COMING TOGETHER FOR THE

Future – Triennial IUAPPA World Clean Air and Environment Congress, Brisbane, Australia. Full programme and online registration www.iuappa2007.com/

12th September

CLIMATE CHANGE AND AIR QUALITY

EMAQ seminar to be held in Bradford www.emaq.aeat.com

19th September

CLIMATE CHANGE AND AIR QUALITY

EMAQ seminar to be held in Birmingham www.emaq.aeat.com

25th-26th September

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>

7th November

AIR QUALITY UPDATE SEMINAR

NSCA autumn spring update seminar to be held in Birmingham, Contact Lucy Salter NSCA, 01273 878770

13-14th December

THE IMPORTANCE OF INDOOR AIR

Society for Chemical Industry conference to be held in London website <http://rsc-aamg.org/Pages/Meetings.html>

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