

AVIATION

Heathrow: meet or cheat?

The all important Heathrow air quality panels have completed their work – the way is now clear to decide whether a third runway or mixed mode operations are possible without breaching EU air quality objectives. Or whether to apply for a five year derogation to avoid having to meet 2010 limits.

The Aviation White paper said that a third runway at Heathrow would go ahead only if EU air quality objectives could be met. As that decision is based on a myriad of monitoring and modelling, three technical panels were set within the Project for the Sustainable Development of Heathrow (PSDH) to agree a methodology headed by key figures such as Mike Pilling, Duncan Laxen and Roy Colville (*AQB May p1*).

Those panels have now released their technical reports – agreeing that air quality currently breaches objectives and that further action is needed to make improvements. They also agreed on a preferred dispersion model – ADMS Airports developed by Cerc.

In more detail, the report noted: “Overall, the panels

found that the key pollutants were NO₂, NO_x, and PM₁₀. Ozone was also included as it influences the formation of NO₂. Panels found that the annual mean NO₂ objective was currently being exceeded at some locations around Heathrow.

“Over 12 years there has been a significant reduction in NO_x concentrations, but the reduction in NO₂ over this period has been very small and breaches are set to continue.”

DfT added: “This is a specialist report which helps to ensure that we are best-placed to carry out an effective assessment of the likely position as regards air quality around Heathrow in the years ahead, taking into account expected growth in air and road traffic. It does not reach any conclusions about the viability of a third runway or the introduction of mixed mode operations, which is a matter for the next stage of the work.

“We will now proceed to model future scenarios at Heathrow and test them for air quality impacts. It will also look at action that might be taken to reduce emissions over time. The

outcome will inform policy conclusions on the prospects for proceeding with mixed mode or a third runway without breaching our national or European air quality obligations. We expect to go out to public consultation with our findings later this year. Policy decisions are not expected before 2007.”

Mixed mode is when both runways are used in both directions to maximise capacity – at the moment they are used in one direction only, with daily alternation, to give locals a period of predictable respite from noise.

At the time of the White Paper the 2010 EU NO₂ objective was mandatory – that is now changing. Observers feel there is some significance in the report spelling out that there “may be limited room for securing compliance up to 2015 in certain circumstances where abatement programmes are in place to demonstrate that conformity will be achieved before the new deadline”.

Applying for a derogation would buy time to allow cleaner planes and vehicles to come into service.

● More details, see page 6

IN BRIEF

Air people move on

A number of key air quality people are changing.

Defra air quality front man **Davide Minotti** left two months ago and has now been replaced by **Sarah Dudgeon**. Dudgeon is a Cambridge University geography graduate who worked as a strategy consultant before joining the civil service.

She has worked on environmental issues in the aviation industry at the DfT, most recently she was with the Foreign Office. Dudgeon is “now greatly looking forward to turning her attention to the important area of air quality policy development”.

Meanwhile NSCA policy man **Rob Pilling** is leaving but has no concrete plans. NSCA is now seeking a replacement. Pilling told *AQB*: “The work is brilliant and there are some great opportunities approaching for NSCA.” Two months ago NSCA chief **Martin Joseph** left – he is not being directly replaced but the NSCA has now announced **Phil Mulligan** will take senior policy role along with responsibilities for the wider management of the NSCA.

VEHICLE EMISSIONS

Sadler leads European probe to compare clean up options

Sadler Consultants is leading a consortium conducting a research project for the European Commission on how the EU can support the greater use of technical measures, such as after-treatments, fuels, oils and tyres, that can help reduce the emissions from existing heavy duty fleets.

The consortium consists of Sadler Consultants (set up by ex GLA air chief Lucy Sadler) together with other members of Sustainable Transport Solutions – Steve Bell, Jonathan Murray and Guy Hitchcock, Wolfram Knörr from the German Institute for Energy & Environment

Research, IFEU, and David Lemon.

Whilst newer vehicles are cleaner due to EU legislation, it takes a long time for new vehicles to penetrate into the fleet, and older vehicles would still contribute to a large share of pollutant emissions in the medium term. The new research focuses on how to help support the action around Europe, and will be particularly relevant for cities such as London or Berlin with measures such as their planned low emission zones.

This project focuses on technical interventions that lead to lower pollutant emissions, for

instance retro-fitting of after-treatment equipment, the use of alternative fuels or additives, low viscosity oil and low rolling resistance tyres, and other technical measures.

The project will identify what technical measures are available, assess their cost effectiveness at reducing pollution, identify barriers to their up-take and make concrete policy recommendations to the EU to encourage greater use of these measures.

Information from stakeholders, collected through questionnaires, will be presented at a workshop in

September 2006, pulling experts together from across the EU.

Sadler said: “If you are involved with implementing air quality measures or are a fleet operator, and there are things that the EU could do to help cut emissions and we need your comments.”

She added: “All companies supplying equipment, fuel, oil or other products that reduce pollution from heavy duty vehicles should contribute to this important policy development.”

● Lucy Sadler, Sadler Consultants, website www.airqualitypolicy.co.uk.

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IN BRIEF

NI gets new website

Northern Ireland now has its own dedicated air quality website, joining England and Wales – but leaving Scotland as the odd UK region out in terms of not having a website.

NI environment minister David Cairns said the site will provide a new medium for access to information on air quality: “The website and archive will be a primary source of air pollution information in Northern Ireland for district councils, government departments, consultants, academics and the general public. The website will benefit the public by giving everyone the widest possible access to reliable up-to-date information on the quality of the air in Northern Ireland.”

Netcen prepared the site and it follows much the same style as sites developed for Wales and Gibraltar.

● www.airqualityni.gov.uk

New site for Bristol

Bristol City Council has launched a new website with detailed air quality monitoring available to the public. It was launched alongside a new monitoring site.

● Website can be viewed at www.bristol.airqualitydata.com

Dry cleaning reminder

Defra is reminding all dry cleaners who don't yet have a permit to operate that there are less than four months to go to the 31 October deadline when applications must reach local councils. If they miss the boat they may have to pay more for their application and could be prosecuted.

The fee for applying for a permit is £134. Defra has now announced proposals to increase this to £200 for any dry cleaner not putting in a complete application by 31 October 2006.

The Solvent Emissions Directive aims to reduce emissions of volatile organic compounds which subsequently form ozone.

● Defra guidance on dry cleaning can be downloaded at www.defra.gov.uk/environment/ppc

POLLUTION EVENTS

ERG plots course of heatwave

Warnings from King's College ERG summarised the effect of the heatwave in July – the hottest since records began.

Unlike Defra's automatic network, ERG's south eastern local authority based network provides 'value added' commentary on readings from monitoring sites.

On **16th July** high ozone was measured north of Chichester and widespread moderate ozone was measured across all of London and south east England with the exception of roadside sites in London.

Over the weekend elevated sulphur dioxide was also measured across parts of south London and west Kent. Two notable fires in London (Hendon and Bow) also caused elevated PM₁₀ but no limit value breaches.

On the **17th July**, widespread moderate ozone affected all areas of south east England and moderate sulphur dioxide also affected parts of London. There was a strong east-west ozone gradient over south east England. No sites in Kent measured high ozone while sites in West Sussex and Surrey were breaching the 100ppb barrier.

18th July saw the third consecutive day of high ozone, the highest north of Chichester (125 ppb) – the nearby AURN site in Portsmouth measured 118 ppb. “These concentrations approached the maximum concentration of 131 ppb measured during the August 2003 heatwave and are amongst the greatest concentrations measured in the UK since 1990,” commented ERG.

High ozone was also measured in and immediately around London – this may be linked to emissions of ozone precursors from within London itself. Around London plume grounding incidents were measured during the morning and late evening.

19th July was the fourth consecutive day of high ozone with the hourly mean ozone concentrations at Enfield reaching 130 ppb, 1 ppb short of its 2003 record, and there were more widespread ozone highs. On the 19th, 29 monitoring sites in the KCL networks measured high ozone, compared to 21 sites on the 18th, nine sites on the 17th and one site on 16th.

Moderate PM₁₀ was measured alongside several roads in London. Moderate and high PM₁₀ was measured at sites on residential streets close to waste transfer facilities. Around London, plume grounding incidents were measured during the morning and afternoon.

As this heatwave died down, high air pollution was not measured on the **20th July** although there were plenty of moderates. However very high, high and moderate PM₁₀ was measured at sites on residential streets close to waste transfer facilities.

Brent exceeded the very high threshold of 100µg/m³ Teom*1.0 by a very wide margin. The rolling 24 hour mean PM₁₀ at Horn Lane reached 190µg/m³ Teom*1.0 and that at Neasden Lane reached 313µg/m³ Teom*1.0.

High ozone returned on the **25th and 26th of July**. Widespread moderate ozone was measured across London and south east England. Moderate PM₁₀ was measured alongside several roads in London and at Dover. High and moderate PM₁₀ was measured at 'the usual suspect' sites on residential streets close to waste sites (eg Bexley).

● www.erg.kcl.ac.uk

Ozone tracker for Europe

The European Environment Agency (EEA) has launched Ozoneweb which offers users the opportunity to monitor and track ground level ozone incidents on a pan-European scale for the first time.

Data from more than 500 air quality monitoring stations is sent to the EEA in Copenhagen every hour and displayed in (near) real time on the new web site. Either by entering a place name or by clicking on a map of Europe, users will be able to follow air quality locally and on

a European scale.

“The EU has made it obligatory for countries to alert citizens on a national level when ozone levels reach particular levels. However, Ozone Web goes much further by allowing you to monitor ozone anytime, from anywhere. You can monitor ozone levels in a neighbouring country or at holiday destination, check recent trends and track the spread of ozone across Europe by the wind,” EEA said.

● <http://eea.europa.eu>

LETTER TO THE EDITOR

Dear Sir

I refer to your article on the Buncefield fire AQ response delayed by bad communication in the July issue of *Air Quality Bulletin*.

I would like to clarify the situation. The Environment Agency does support the need to co-ordinate the air quality response in the event of a future emergency and we are at an early stage in discussing how this might be taken forward with the Health Protection Agency, Defra, the Meteorological Office and other interested parties.

In setting up a system we will need to consider the scope of the system. Whilst it is unlikely that we would see a direct repeat of

Buncefield, any system would need to be able to cope with an incident on this scale. Future incidents could potentially involve a wide range of different sources giving rise to a need to monitor a variety of different pollutants. We also need to consider how the system is to be delivered, the necessary response time and scale of event which would trigger the response.

I would like to assure you the Agencies involved are taking this matter seriously.

Colin Powlesland

Air quality policy manager
Environment Agency

NEWS FROM THE NSCA BIOFUELS CONFERENCE HELD IN GREENWICH

'Commercial disaster' for Volvo

Don Potts of Volvo said that his firm's efforts with liquefied petroleum gas (LPG) had been a 'commercial disaster'.

Speaking at the biofuels conference held in Greenwich last month by NSCA, Potts explained that Volvo – despite its environmental credentials – had had mixed success with alternative fuels. It had tried LPG – at best producing 1,000 a year, and at worst 100 a year – a 'commercial disaster'.

Compressed natural gas (methane as used for domestic supplies) was worse – with just two CNG vehicles sold last year in the UK.

Volvo (now a subsidiary of

Ford) has recently announced a huge investment in hybrid vehicles, believing that hydrogen technology is still 15-20 years away.

Potts told the conference: "What went wrong in the UK was that initially there was no refuelling infrastructure, not helped by planning restrictions that prevented many garages from storing gas. We also spent two years trying to convince TfL that bi fuel vehicles (that run on gas or petrol) should qualify for congestion charge discounts that might have encouraged the technology. TfL argued that drivers might run on petrol within the zone, we

countered that why would drivers use petrol if gas was so much cheaper?"

In Sweden there is more success in pushing biogas with partnerships created at a city level between biogas producers and users – and a Government pledge that by 2020 it will be totally independent of fossil fuel imports. For Gothenburg, there are 20 methane refuelling stations and 80% of new car sales are biofuel enabled, encouraged by national and local government subsidies.

He said \$100 a barrel crude was likely to be a reality sooner rather than later, pushing the case for biogas.

USE OF ALTERNATIVE FUELS

Lessons learned for biogas in Europe

Peter Boison of the European Natural Gas Vehicle Association said that biogas from wastes and crops had the potential for a 50% reduction in fossil fuel CO₂ emissions. "It also has less harmful air quality emissions than any other fuel apart from hydrogen produced from renewables."

However while he painted a rosy future for biogas – he also

listed problems experienced to date. These include:

- Moisture or oil entering vehicle tanks sooner or later enters engines and causes serious mechanical damage;
- Light duty engine conversions can lead to engine wear unless valves are modified;
- Refuelling infrastructure must be supervised and available round the clock;

● Technical problems in bus fleets can be caused by unsuitable lubrication oils or poor maintenance.

Guy Hitchcock of Sustainable Transport Solutions said that in the UK biomethane had the total potential to replace 16% of road transport fuel – but only half of this was 'likely'. He added that methane vehicles commonly meet Euro V levels.

SUBSIDIES

Dual fuel trucks are viable with no grant

Gas vehicle converter Hardstaff says that gas trucks have now reached the point where they are viable without the need for a grant.

The claim is important as clean fuel grants from the Energy Savings Trust Transportation and Powershift programme have been axed (*AQB July p2*).

Speaking at the Greenwich biogas conference organised by the NSCA, Hardstaff Group MD Trevor Fletcher said: "The Powershift grants have been helpful and without them we wouldn't have got to the point with the technology where gas trucks are viable without grant." The firm converts trucks and engines

to run on gas at a cost of £30,000 a vehicle using patented dual fuel technology.

Pure gas engines meet Euro IV and expected Euro V emissions levels with low emissions – and low noise, says Hardstaff. Dual fuel engines that run on a gas diesel mixture are more versatile but less clean

than pure gas vehicles. But with running costs of 14p per mile, the payback period for a truck is one year despite the extra £30,000 conversion cost.

David Martin of Sustainable Transport Solutions countered that the market was not quite viable. "Biogas economics are not attractive as a transport fuel, and for it to compete, market incentives are needed."

He said that for vans, running costs for gas were 8.72p per km as opposed to 5.45p per km for diesel. For a heavy truck covering 95,000km a year, running costs for gas are 22.65p/km compared to 27.95p/km for diesel – making it competitive over a four year payback period.

IN BRIEF

Sussex gets the text

Sussex has followed Croydon by using texts to warn residents of high pollution levels.

Croydon is texting residents using Cerc and its Yourair forecasting system (*AQB July p5*). By contrast the Sussex Air Quality Steering Group is using Kings College ERG's forecasting system. Gary Fuller from ERG says: "Airlert is an tool to provide air quality information directly to susceptible people whose health is most affected during pollution episodes. In addition to providing this information we hope that Airlert will raise public awareness of the health effects of air pollution and the steps that can be taken to manage concentrations of it."

Bespoke software translates the forecast into separate text and voice text messages and sends these automatically to the Airlert users (about 70 so far) within about seven seconds.

The user response to the Airlert pilot will be evaluated with a view to creating a full service during 2007.

● website www.sussex-air.net.

Indicator 'improves'

Defra has released its annual 'traffic light' air quality indicator and once again claims air quality is improving.

The claim is based on comparisons between recent measurements and 1999. Improvements in latter years have been less marked – and in some cases air quality has worsened.

Compared with 1999, areas of improvement include:

- air pollution emissions;
 - waste recycling;
 - vehicle crime and burglary;
 - housing conditions;
 - local environmental quality;
- Areas showing deterioration since 1999 include:

- aviation emissions of greenhouse gases;
 - water lost through leaks;
 - household waste levels;
 - urban ozone pollution;
 - childhood obesity;
- Sustainable development indicators in your pocket* is available at www.sustainable-development.gov.uk.

Website review imminent

We're about to start reviewing the 500+ websites that cover air quality in the UK and beyond!

If your site is due to be down for maintenance or upgrading, it may be best to tell us so we don't skip it. Our review will appear in the September *Air Quality Bulletin*.

Many web managers have already tipped us off about their sites – make sure your's isn't ignored!

IN BRIEF

Buncefield update

The Health Protection Agency has released a glossy report focusing on the public health impact of the Buncefield fire.

The air quality impacts were well covered in a Defra/Netcen report released earlier (*AQB June p1*), the current report adds more detail to HPA studies and monitoring of impacts of the oil storage depot blaze.

It restates the belief that favourable weather conditions meant smoke generally stayed aloft, so there was no significant grounding or public health impact. However some raised levels of PAHs were found in soil levels downwind from the fire, but on balance these are not thought to be a result of the fire.

● *The public health impact of the Buncefield oil depot fire* can be viewed on www.hpa.org.uk/publications/2006/buncefield/default.htm

Rugby reprise

Protesters are seeking leave to appeal against a decision that the Rugby Cement permit was legitimate.

In an appeal judgement released last month (*AQB July p1*), protesters were told that flaws in the permitting process were not sufficient to squash the permit. Anti cement works protester Lillian Pallikaropoulos is now petitioning the House of Lords for leave to launch a further appeal.

Off road emissions

The DfT is consulting on changes to standards for non road engine emissions.

Controls on construction plant emissions will be tightened and extended to railway engines. Under the new proposals new stage limits would be phased in to reduce emissions – sulphur free fuels will also be needed. Total costs would be £147m a year falling to £120m a year once fuel storage costs were paid off. Benefits would be a 27-51 kt annual reduction in NO_x, and 2.3-4.4 kt reduction in PM₁₀ emissions.

● *NRMM emissions final RIA* can be viewed on www.dft.gov.uk

LOW EMISSION ZONES

Go ahead for London LEZ

Following consultation on the shape of the London low emission zone, London mayor Ken Livingstone has confirmed he intends to go ahead in 2008 – one year later than his election pledge of 2007.

The Mayor has considered the results of Transport for London's public consultation – held at the beginning of the year – and will include the LEZ in his statutory air quality and transport strategies to allow for the scheme to be established. The next step will be a further consultation later this year on a draft scheme order which would set out the detail of the zone.

At the moment, the plan is from 2008, diesel lorries, coaches and buses that fail to meet a minimum pollution standard will pay a charge for driving in the Greater London area.

Ken Livingstone said: "The proposed low emission zone is the most effective way of quickly reducing pollutants that are among the most harmful to human health. It will make London one of the first cities in the world to have taken such a radical step to tackle air pollution and safeguard our environment."

Current plans are:
● Operate using cameras to identify registration numbers of

vehicles driving within Greater London. It would be in force all of the time, ie. seven days a week, 365 days a year;

● Use the DVLA database and others to identify a vehicle's emissions standards, whether it was liable for a charge and if that charge had been paid;

● Start with heavier lorries (defined as those over 12 tonnes (rather than 7.5 tonnes as proposed in the February 2006 consultation);

● Allow for coaches, buses and lighter lorries (between 3.5 tonnes and 12 tonnes) to be given more time to comply and be brought in in 2008;

● By 2010 be extended to heavier more polluting light goods vehicles and minibuses, the lightest LGVs (almost exclusively car derived vans) would be excluded from this stage as they have car-like emissions;

● Allow for the standard for lorries, coaches and buses to be tightened in 2012 to Euro IV for particulates (rather than 2010 as consulted on). This changed proposal follows representations that a 2010 start would impose unreasonable compliance costs;

● A road user charging scheme under the Greater London Authority Act is seen as the most appropriate way to establish the scheme.

A consultation on the detailed proposals – the scheme order – will start at the end of this year and run through to early 2007. That will outline the exact classes of vehicle emission standards, area covered and registration and enforcement procedures. Subject to the Mayor deciding to confirm the scheme order, the soonest the LEZ could go live is early 2008.

Emission based congestion charge

The mayor is also pledging to apply differential charges to the London congestion charge such that the largest engine cars (for example large 'Chelsea Tractor' 4x4s) will pay up to £25 while there will be reductions from the current £8 charge for smaller engine vehicles.

Taxi clean up

Meanwhile previously announced plans to clean up taxis are coming into force – this month taxis that were previously pre-Euro and Euro 1 emissions standards, will now have to present themselves for their annual licensing inspection with approved emission reduction equipment.

By July 2008 all taxis will have to be of Euro 3 standard in order to get a cab licence.

Congestion charge benefits diluted

Air quality benefits of the congestion charge are less than initially thought, the latest annual congestion charging report suggests.

Last year GLA officials calculated that the congestion reduction associated with the charge had cut emissions by up to 22%. But the latest calculations, using the recently revamped London emissions inventory, suggests the savings are still there – but more due to engine technology than the congestion charge.

The latest 4th Annual Monitoring Report confirms also notes that inclusion of PM₁₀ from non-tailpipe road vehicle sources, principally tyre and brake wear, was also

not included in the previous TfL estimates. As tailpipe PM₁₀ is cut, the non-tailpipe sources becomes relatively more important diluting the previous calculations based on out of

date emission inventories.

In combination, the traffic and speed changes together are estimated to have reduced emissions of NO_x by about 8% within the charging zone.

Measurements of concentrations (as opposed to emissions) of key air pollutants during 2005 reveals some "interesting developments" with some evidence of accelerated declines in concentrations of PM₁₀ within the charging zone, compared to the rest of London.

● TfL's report can be viewed on www.tfl.gov.uk/tfl/ccLondon/pdfs/FourthAnnualReportFinal.pdf

Emissions in the charging zone

Change (percent)	NO _x	PM ₁₀	CO ₂
Flow change:			
taxis	2.3	3.8	2.4
car	-4.5	-4.6	-11.2
bus & coach	2.9	1.0	1.2
rigid HGVs	-1.6	-1.0	-0.7
artics	-0.4	-0.2	-0.2
Traffic volume change	-1.4	-0.8	-8.4
Speed change	-6.5	-5.5	-7.3
Volume and speed change	-7.9	-6.3	-15.7
Vehicle stock change	-5.5	-9.2	-0.7
Overall traffic emissions change			
2003 versus 2002	-13.4	-15.5	-16.4
Overall traffic emissions change			
2004 versus 2003	-5.2	-6.9	-0.9

ROADSIDE VEHICLE TESTING

Screening key to remote testing

TRL has published its full report on local authority roadside emission testing.

Details from the study, funded by NSCA and BOC Foundation have trickled out over the past year, however the latest report gives more detail on costs and benefits of the tests carried out with £8m of funding from the DfT between 2002 and 2004. The funding and testing has now ceased in England – although the Scottish Executive is funding tests in Glasgow (*AQB June p4*).

TRL's conclusions include:

- Current test equipment is not that accurate – the US IM240 equipment is much more expensive but overall gives better value for money;
- Remote sensing has the potential to improve efficiency of random testing even accounting for the relatively high cost of the remote sensing equipment. TRL says that capital costs would be recouped after a relatively small number

of test campaigns, and equipment cost is likely to come down with new remote sensing systems coming onto the market;

- Remote sensing would be worthwhile until on board diagnostic (OBD) systems become more reliable and widespread – OBD can warn drivers and testers of high emissions;
- Emission failure rates are dropping, cars and light vehicle failure rates tend to be less than 6%, however taxis were 10%;
- Lowest failure rates were for petrol catalyst cars (3%), the highest rates were older petrol catalyst cars (8%) diesel vehicles were 6-7%;
- The highest failure rates was the London cab and Austin Rover vehicles;
- Local authority costs were between £70-90 per vehicle, far higher than estimated by the National Audit Office (£8) which failed to include ancillary costs such as publicity and

training. For Greater Manchester and Warrington, tests cost over £350 per vehicle;

- Roadside tests could cut carbon monoxide and hydrocarbon emissions by up to 20% – but the impact on concentrations would be very small.

The report included many recommendations – including:

- That local authorities with air quality action plans should be able to bid to use existing VOSA resources to carry out roadside tests in their air quality management areas;
- Taxis and older/high mileage vehicles should be targeted for roadside testing;
- Local authorities should regulate taxis by imposing stringent emission standards, especially where there is an air quality management area.
- *A review of roadside emission testing by local authorities in the UK* is published by TRL, Publications Unit tel 01344 770297

ET trials remote tests in London and Glasgow

Monitor firm Enviro Technology has demonstrated its remote testing equipment in London and Glasgow. It now plans to offer a bespoke monitoring programme for local authorities.

Using the Accuscan 4600 system, a remote sensing system that records the licence number, speed, acceleration as well as emissions values for CO, CO₂, NO, hydrocarbons and a smoke factor, over 4,000 vehicles were recorded. The system database stores the picture with the values stamped on it. Additional information is also recorded, such as date, time, temperature, humidity, pressure, wind speed and wind direction.

ET says the percentage of vehicles emitting over 1,500 ppm NO was similar at both sites at around 7%.

The highest recorded emission from any vehicle was 5621 ppm NO, an HGV in Glasgow and for a car or 4x4 it was 3334, also in Glasgow.

During the London session the most prevalent vehicle – the black cab averaged 800 ppm NO although brand new (06

registrations) were significantly lower.

The Accuscan 4600 enables comprehensive vehicle screening with the information being used for a number of different applications, for instance fleet characterisation and targeting of roadside emissions testing.

TRL has endorsed remote testing in a newly released report (see news above).

ET's Duncan Mounsor said: "These demonstration events showed local authorities just how rapidly vehicle emissions

testing technology has developed in the past few years. Technology has become more rugged and commercially available." The firm has now launched its first vehicle emissions monitoring programme. ET will work with the authorities to identify suitable testing sites and will then provide the manpower and technology to monitor vehicles over a specific time period.

Two contracts have already been signed.

- Enviro Technology Stephen Hoskin 01453 733200 .



ET's Duncan Mounsor during roadside testing in London

IN BRIEF

Ships to plug in

The European Commission has adopted the recommendation on the promotion of shore-side electricity for use by ships at berth in EU ports in a bid to cut emissions.

Shore-side electricity will avoid the need for ships to run their engines (often run on very dirty fuel oil). This will reduce local air and noise emissions from ships' engines while at berths in port.

The recommendation is not legally binding. Its objective is to promote the consideration of shore-side electricity as a means of abating ships emissions in EU ports, particularly in populated areas which suffer from poor air quality.

It aims to do this by providing information on practicalities, benefits and costs; by calling for harmonised international standards; and by highlighting the possible use of electricity tax reductions as an incentive to ship operators to use shore-side electricity.

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

Waste burning guidance

A third edition of the *Guidance on directive 2000/76/EC on the incineration of waste* has been published. It contains no new substantive policy or guidance. It consolidates previous updates and clarifications, such as AQ6(05) on cooking oil, and takes account comments on the previous two editions.

- AQ14 (06) – *Publication of the 3rd edition of WID guidance* can be viewed at www.defra.gov.uk/environment/ppc/wasteincin/index.htm

Holliday award

Colourant producer Holliday Pigments has won a Chemical Industries Association sustainable development award following its £20m investment on in flue gas desulphurisation plants at its Hull and Comines' (North France) sites leading to a large reduction in SO₂ emissions.

Experts help DfT clean Heathrow air

Are the DfT panels on air quality at Heathrow just a means of finding a way round an awkward pledge that may thwart plans for a third runway?

The DfT's mammoth report on air quality at Heathrow Airport has been released (see news, page one).

The three panels and a scrutiny panel pulled in just about every available expert in the UK in a bid to agree how air quality at Heathrow could be modelled and measured. It did this both through its own thinking and by commissioning small research projects to fill in the many gaps in data that have beset the project.

Emissions, meteorology, operating performance, and buoyancy of airplane fumes are just some of the uncertainties that have been tackled with varying degrees of success. Most have been answered sufficiently well for the DfT and ministers to get closer to deciding whether to let

further expansion at Heathrow go ahead.

The key pollutant of note is nitrogen dioxide. Airports have traditionally blamed any exceedences on vehicles on local authority roads. Of late, vehicle pollution has been dropping as engines are cleaned up, leaving aircraft emissions as a relatively larger problem that becomes increasingly problematic.

The report notes that over the period 1993 to 2004, there has been a "highly significant" downward trend in annual mean NO_x concentrations (over 6µg/m³ a year) at the airfield perimeter site, but only a minimal (but proven) downward trend in nitrogen dioxide concentrations (0.5µg/m³ per year).

"Analysis suggests that the direct

emissions from the airport contribute about 30µg/m³ (just over 25% of the total) to the annual mean NO_x concentration at the airfield boundary (north east side). This falls to about 6-10µg/m³ (or 8-14% of total) by a kilometre further downwind. Further away, the airport sources can be detected at least 2.8km from the airport.

Extracting monitoring data related to the daily switching in the use of the northern runway and southern runway for take-offs to the west, shows that aircraft emissions during take off make a significant contribution to concentrations at the airfield boundary. This also shows that during periods of stronger winds (>6 m/s), the

● continued on page 7, below right

DFT'S QUESTIONS AND ANSWERS ON PROJECT HEATHROW

Q What is the purpose of the report?

A The report sets out the recommended methodology for assessing air quality at Heathrow. These assessments will enable DfT to determine whether mixed mode and/or the addition of a third runway are possible within the strict air quality limits set out in the Air Transport White Paper. The report does not make any conclusions about the likelihood of meeting these air quality targets.

Q What happens next?

A Air quality at Heathrow will now be reassessed using this methodology. DfT expects to be able to consult on options for mixed mode at the end of the year, followed by decisions on this and a third runway in 2007.

Building on the recommendations in the report, the DfT is now preparing an emissions inventory for Heathrow, and is making arrangements to run the selected air quality models, in conjunction with the outputs from modelling of surface access scenarios.

Q Why was this report necessary?

A Previous work in this area was felt to be insufficient. Government therefore established a programme of work in spring 2004 to review the way in which air quality around Heathrow should be reassessed.

Q What was wrong with the previous methodology?

A Earlier technical work noted that there were problems related to representing background emissions, future aircraft operations, initial dispersion of aircraft plumes and future trends in the effects of nitrogen oxides and primary nitrogen dioxide. Previous technical work was relative, not absolute, and hence the emissions inventory uncertainty was large in some areas. These issues have been addressed in the technical panel report.

Q Is the DfT just trying to change the methodology to get the answer it requires?

A The DfT says no: "This review and report has been a necessary step to address uncertainties acknowledged at the time of the White Paper and to enable us to proceed to the next stage of inventory construction and scenario modelling.

Furthermore, it has been independently peer reviewed and cleared as unbiased, fair and technically sound.

Q What impact does this report have on meeting the EU limit on nitrogen dioxide emissions by 2010?

A It is well known that EU limit values are currently being breached in the immediate vicinity of Heathrow and adjacent to the M4, M4 spur and the A4 (and the report confirmed this).

The potential for introducing mixed mode operations and/or a third runway are subject to our being able to show that levels of NO₂ emissions at Heathrow can be managed within the EU limit as soon as possible. EU negotiations are underway on a new ambient air quality directive, if agreed, it will contain the possibility for member states to postpone compliance with the EU limit values for NO₂ for up to five years providing that a comprehensive action plan is produced and submitted for approval. Even if agreed, the UK will need to bring these areas within compliance with the limit values by 2015 at the latest.

Q How many monitoring stations were used in the study?

A There were 18 monitoring sites in total. Of this number, two sites breached the NO₂ limit in 2004. Particular attention would need to be paid to the area to the northeast of the airport, due to the prevailing south-westerly winds.

Q How much did the report cost and who paid for it?

A The technical panel work has cost around £700,000. The panels and the peer review process have been funded from within the Department for Transport's programme budget. Funding is in place to carry out the air quality modelling, reflecting the recommendations of this report.

Q When will the modelling be completed?

A Further modelling will be carried out in the coming months. DfT hopes to go out to public consultation later this year; however no policy decisions are expected before 2007.

Q Where can I get a copy of the report?

A The full technical report (300 pages) is available on DfT's website as is the executive summary.
www.dft.gov.uk/stellent/groups/dft_aviation/documents/divisionhomepage/612123.hcsp

Responses out in red tape review

The Government's continuing belief it can cut red tape led to plans to change the Part B permitting regime. What is the reaction so far?

Defra and the devolved regions have come under criticism for plans to reduce red tape in regulation.

Earlier this year it revealed plans to deregulate the pollution prevention and control regime through which some 17,000 business and industrial sites are permitted and monitored for compliance against air quality standards.

Between 3,000 and 4,000 of these businesses are not directly required to have a permit under European law in this regime and many represent a relatively low environmental risk – these may be taken out of regulation.

Defra says the second stage of the review will include an evidence-based assessment taking account of comments and looking at the wider implications for human health and environmental protection. Key interested parties will be involved, and a draft regulatory impact assessment will be produced before a second consultation, including the draft RIA, is published in 2007.

The review will look at:

- Whether the PPC regime is still the most appropriate way to regulate these businesses;
- Whether it would be possible to simplify procedures; and
- Whether alternative regulatory approaches could be used.

Defra pledges it will not remove from control any activities that are a significant source of air pollution and which would compromise air quality policy, objectives, obligations or agreements. Instead "it will look to review alternative approaches that deliver necessary environmental improvements in a way which doesn't place unnecessary regulatory burdens on business".

The Environmental Industries Commission welcomes Defra's commitment to ensure that the review will not undermine environmental protection: "However it remains impossible to see how proposals to remove some Part B activities out of LAPPC controls can lead to anything other than a decline in environmental protection."

EIC continues: "The LAPPC regime is a cornerstone of environmental protection in the UK. It has been built up to protect public health and improve our quality of life. However, Defra is threatening to cut away this very framework leaving the public breathing in higher levels of dangerous pollutants."

Other reactions include:

- **NSCA Scotland:** "Responsibility for Part B processes was originally moved to SEPA control to ensure consistency of operation throughout Scotland and this has proved to be a successful approach. As a result of this move the in-depth technical knowledge needed to regulate Part B activities no longer exists within Scottish local authorities. Moving the responsibility for Part B activities back to local authority control would create significant upheaval, including the possibility of SEPA needing to lose staff, and local authorities needing to train staff and recruit new staff."
- **The Law Society:** "It is important not to undermine regulation of Part B activities, now its benefits are recognised by regulators, local authorities, businesses, local communities. Change to 'Better Regulation' is not necessarily a step forward if confidence is eroded."
- **Dundee City Council:** "Who will judge what sources are significant and how will this be carried out? Will the significant sources bear any resemblance to those

highlighted in LAQM Technical Guidance 2003 (LAQM.TG(03)), Appendix E "Part B/A2 processes likely to require review and assessment analysis".

"In testing significance it should be noted that in Scotland there are more stringent objectives for certain LAQM pollutants than in England and Wales. Therefore, levels of emissions to atmosphere deemed insignificant when compared with LAQM objectives in England and Wales may actually be very significant in Scotland. Is there an intention that similar industries in different countries will be subject to different regimes?"

● **Composites Processing Association:** "It has been clear to operators of activities for some time that their source of air pollutants is frequently very small when compared to sources not regulated for emissions to air, in particular the aggregate emissions generated by citizens in the course of their daily activity. To load the costs of regulation and pollution control onto sectors which can have only very minor effect on air quality is perverse and only helps to damage valuable economic activity and reduce employment."

● **Hull and Goole Port Health Authority** Control of very large installations needs a comprehensive proactive regime such as Part B. Statutory nuisance controls for shipping operations involve many legal difficulties. The emission of dust from such operations is often a very real nuisance to our complainants in the widest sense but is seldom adjudged to fall within the scope of statutory nuisance. This makes for almost impossible regulatory control and fails to satisfy the public.

● The findings of the first consultation can be read in full at: www.defra.gov.uk/corporate/consult/ppcact-partb/index.htm

Heathrow (continued from p6, adjacent page)

aircraft contribution reduces by a factor of 10 between a close monitor (~200 metres from the centre of the runway) and a distant monitor (over 1200 metres) in a transect to the north of the northern runway.

Confirmation of the influence of aircraft emissions can also be determined by considering the variation in NO_x concentrations with day of the week. Whilst road traffic emissions are generally much lower at weekends, aircraft emissions remain relatively constant throughout the week. Sites which are strongly influenced by road traffic emissions demonstrate much lower NO_x concentrations at weekends.

"Bivariate pollution roses strongly

suggest that the aircraft emissions of nitrogen oxides behave as a buoyant source. This is consistent with the pattern of concentrations due to on-airport sources showing an unusual dependence on wind speed. Concentrations do not show a strong decline as wind increases, as would be expected for a ground level non-buoyant source.

"Strong winds are therefore still associated with significant contributions from the airport. This has an important implication for receptors to the northeast of the airport, as not only do the predominant southwesterly winds blow emissions in this direction, but there is also a greater probability of high wind speeds from this

direction. The areas to the northeast of airport will therefore register the largest contribution from aircraft.

"For NO_x and NO₂, additional fast-response monitoring was also undertaken next to LHR2, the site close to the airport perimeter and the northern runway take off area. Short-lived high concentrations of NO_x were observed, rising to over 1000µg/m³ as a 10 second average. In contrast, when the southern runway was being used for take-offs, short-lived peaks at LHR2 were only a few tens of µg/m³. This illustrates that the plumes from aircraft using the northern runway are still very coherent at the airfield boundary.

Dioxin report feeds into strategy

Later this year, Defra is due to produce a dioxins strategy – a new report may well influence that strategy

Dioxins have had a low profile of late – perhaps because the furore over incinerator building has died down a little.

But with the go ahead given to the huge Bexley incinerator, the issue will no doubt re-erupt. Never mind that incinerators produce very few dioxins compared to many other activities – they provide simplistic and eye-catching headlines for protesters keen to prevent incinerator building on Nimby and more complicated environmental arguments.

It is ironic that one of the largest culprits in terms of dioxin emissions is the public itself. Bonfires, domestic fires and fireworks between them produce nearly a fifth of total UK dioxin emissions, and a new report looks at what can be done to reduce this – or at least stop it rising.

There are real fears that domestic dioxin emissions might rise, the Enviro report produced for Defra suggests. This is because increased charging for waste is likely to encourage some to burn waste at home, and there is an enthusiasm for biomass heating, increasingly with sophisticated wood burning stoves.

Enviro's Mark Broomfield told *AQB*: "Dioxins from diffuse combustion sources account for a big proportion of UK total emissions. We studied domestic combustion to see if we could identify ways of reducing emissions from this source, and included recommendations that could be turned into

practical advice for the people who can make a difference – ie. householders!"

A key theme that screams out of the report is uncertainty. Almost every paragraph is punctuated by terms such as "reasonably confident", "likely", "can", and "possible". This uncertainty is to be expected given the diffuse nature of domestic pollution – but despite the lack of scientific evidence, the report attempts to make recommendations on how to reduce dioxin emissions – and for a publicity campaign.

Broomfield says: "We felt that, although we didn't know everything, and there were a number of areas of uncertainty, there was sufficient measurement information and technical basis to allow us to recommend three key messages for a public engagement campaign:

- Campaign 1: "Don't burn household waste indoors or outdoors, and especially not waste containing plastics";
- Campaign 2: "For people who have coal fires, choose coal with a low chlorine content, and make sure the fire burns efficiently";
- Campaign 3: "Don't burn waste on bonfires – in particular, avoid burning plastics".

Policy recommendations include:

- It is important to improve understanding of the factors affecting emissions from the sources under consideration, and recommendations are made for research work to address some of the key issues;
- Defra should maintain its involvement in international research and policy initiatives with a view to improving understanding of emissions of dioxins and dioxin-like PCBs;
- A watching brief should be maintained on the use of pellet burning stoves, to see if action to regulate the quality of wood pellets is needed;
- Any steps taken to discourage disposal of household waste could result in an increase in waste burning, and this would need to be strongly discouraged. Consideration should be given to limiting the chlorine content of solid fuels supplied to households.

The report notes that changing attitudes among householders may be difficult. Gardeners consider bonfires to be essential – and use of ash for the garden is encouraged. Some even like bonfires, and some might consider the ability to have a bonfire or open fire in their house as their 'right'.

The report looks at how much it might cost to change attitudes: "A significant proportion of members of the public currently ingest dioxins and furans above the UK Tolerable Daily Intake of 2 pg/kg body weight per day. The cost per patient of treating cancer is of the order of £100,000

ADVICE TO THE PUBLIC

A public information campaign to cut dioxins might include this advice:

- Burn only well seasoned wood;
- Burn hardwoods, minimise burning of softwoods;
- Never burn wastes (plastics, glossy or coloured paper, or scrap wood that has been preserved, painted or stained);
- Make sure the fire is hot and has good air flow. Don't try to choke it down
- Do not burn household waste – dispose of it properly;
- Never burn coal on a wood grate and vice versa. Coal should be burnt on a grate with holes in it, to allow air to pass through, whereas wood should be burnt on a solid plate;
- For wood, allow ash to build up in the base of the fire;
- Burn thin logs, especially when building up the fire to obtain an ash bed and charcoal;
- Make sure the fuel is kept dry;
- Clean the flue passageways and chimney to remove soot;
- Dispose of the ash carefully and never use as a soil conditioner, especially in the fruit and vegetable garden.

per case. If a publicity campaign contributes to the avoidance of a relatively small number of cancer cases, it will in overall terms provide a net economic benefit."

It costs three campaigns (highlighted by Broomfield above) at £10,000 each for the modest production of leaflets to £5m each for a high budget campaign using TV and radio ads. The report adds: "Alongside public engagement campaigns, more rigorous enforcement of legal restrictions on bonfires (e.g. relevant provisions of the Environmental Protection Act 1990, and the Clean Air Act, 1993) may also be a useful step in reducing emissions of dioxins and furans from open burning of wastes at domestic properties, construction sites and other premises. This could take the form of exemplary prosecutions, as well as ensuring that adequate alternative waste management facilities are available."

The report is intended to feed in to the current review of dioxin policy that will culminate in a UK dioxin strategy. The hope will be that the bottom up, cheap-to-implement but practical suggestions contained in the report will not get lost in an annex of a report obsessing about public controversy on incinerator derived dioxins.

- The full report can be downloaded from www.defra.gov.uk/environment/chemicals/dioxins-strategygroup.htm

KEY SOURCES OF DIOXINS AND DIOXIN-LIKE PCBs

- Burning of household waste is a key source of emissions of dioxins and dioxin-like PCBs to the atmosphere. It is also likely to be the primary source of dioxins and dioxin-like PCBs in solid residues. The elimination of household waste burning should be the first target of a public information campaign.
- Of the other sources, coal burning is potentially the next most significant. Provision of public awareness, guidance and (potentially) financial support to use low-chlorine fuels and improve combustion conditions should be the second target of a public information campaign.
- Emissions of dioxins and dioxin-like PCBs from bonfires may also be important. Because of the ready access to target audiences (gardening community) and target times (Bonfire Night in the UK and July bonfire season in Northern Ireland), there is also an opportunity for a useful campaign to reduce emissions of dioxins and furans from bonfires.

What's the fuss on biogas?

At a recent conference, NSCA launches a report looking at biogas that offers CO₂ and air quality benefits

NSCA has launched its report into biogas – methane produced from waste and crops. It suggests there are CO₂ and air quality benefits from encouraging the technology.

The report comes at a bad time for alternative fuels. Vehicle operators have a feeling they have been sold a pup with several years of government encouragement to go down the LPG gas route – only to find that as soon as it becomes viable, the Government pulls the rug out in terms of support.

LPG tax benefits are being whittled away in Budgets, and grants for gas vehicles have been scrapped. For years proponents of alternative fuels have battled against the inertia of operators that were suspicious of new technology and the Government's commitment to it – these were proved right.

Of course there have been rumblings for some time that LPG (derived from crude oil) was a stopgap solution – it wasn't much cheaper to run than the best diesels, and wasn't much cleaner than the best petrol cars. And refuelling infrastructure is sparse (although considerably better than it was).

So any new message promoting biogas will be received with extreme caution – and a deserved cynicism that it will take more than a subsidy or a grant for a vehicle operator to take the plunge.

But any push for biogas is likely to come from the production end rather than the users end. American farmers are finding, plant derived fuels offer the chance of making money at a time of troubled oil market. And in Europe pressure to process waste rather than landfill it means there is plenty of scope for capturing the methane that would otherwise be lost and possibly to help meet national CO₂ reduction targets.

Production of biogas is relatively straightforward and has taken place for years. What is new, and covered by the NSCA report, is how that biogas can be used as a transport fuel.

NSCA's conclusions include:

- The main feedstocks for biogas production through anaerobic digestion (AD) are agricultural manure wastes and food wastes. The UK generates some 30 million dry tonnes of this waste material a year, capable of producing some 6.3 million tonnes of oil equivalent of methane gas. Theoretically this could meet around 16% of transport fuel demand;

- To be used as a transport fuel biogas has to be upgraded to at least 95% methane by volume and it can then be used in vehicles originally modified to operate on natural gas. However, there is little availability of gas-fuelled vehicles and a very limited

refuelling infrastructure;

- Biogas fuelled vehicles can reduce CO₂ emissions by between 75% and 200% compared with fossil fuels. The higher figure is for liquid manure as a feedstock and shows a negative carbon dioxide contribution which arises because liquid manure left untreated generates methane emissions, which are 21 times more powerful as a greenhouse gas than CO₂.

Hence there is a double benefit by reducing fossil emissions from burning diesel and reducing methane emissions from waste manure;

- Biogas will give lower exhaust emissions than fossil fuels, and so help to improve local air quality, although technology changes in future years – for example, the introduction of particulate traps and selective catalytic reduction – may reduce this advantage;

- The availability of cost data for biogas production is poor, but data from Sweden and the US suggest that biogas can be produced in the UK at a cost of between 50-60p/kg, including duty (at the reduced rate of 9p/kg) but excluding VAT. This range is comparable to the current price of CNG at around 55p/kg;

- Nevertheless, the economics of using biogas or CNG sold at this price as a vehicle fuel are not very attractive. In terms of fuel costs, biogas is about 40% cheaper to run than diesel and 55% cheaper to run than petrol, but these fuel cost savings are off-set by higher capital costs, some £25,000 for heavy duty vehicles and £5,000 for light duty vehicles, and potentially higher maintenance costs.

When these are taken into account only HGVs using gas are competitive with a diesel vehicle over an operating life of four years. This reflects the current market position where the only gas-fuelled vehicles having any success are HGVs operating on trunk routes;

- Currently all the biogas that is produced in the UK from both sewage treatment and landfill is used to produce electricity and heat. The environmental and economic factors involved suggest that electricity production from biogas offers greater CO₂ saving benefits and better economics and requires a lower subsidy (in the form of the Renewables Obligation) than biogas used for road transport.

However, the balance is fairly fine and the report's analysis would be more robust with more research. It also suggests that only small changes in the economic variables on each side of the equation could switch the balance. For example the current rises in oil prices or the inclusion of biogas

in the Renewable Transport Fuels Obligation (RTFO) could shift the balance;

- The CO₂ benefits of biogas compared to other transport fuels seem fairly strong. However, if the UK is to pursue a policy of using biogas for transport it will be important to incentivise the market for biogas rather than the production plant itself. The main mechanisms that could be used are discussed in the report and include the RTFO, fuel duty rebates, vehicle grants and infrastructure grants;

- There is a significant resource available for the production of biogas in the UK allowing the UK both to manage a waste issue and to provide a source of renewable fuel. In developing a biogas industry a number of disciplines are involved from waste management, through energy use and production to transport operation. Success factors in other countries have been a greater level of integration between municipal authorities, waste management organisations and transport operators.

On emissions, the report says: "The range of methane-powered vehicles and emissions data available in the UK is limited. The only published data for light-duty vehicles powered by CNG are for the Volvo range of bi-fuel passenger cars. Here, CO emissions comfortably meets Euro V standards, and the NO_x figure is very low. However, the HC+ NO_x figure is worse than the Euro V standard although much better than Euro IV. This combined figure is largely a result of methane emissions from unburnt fuel.

With heavy-duty vehicles there is a voluntary EU emissions standard (Enhanced Environmental Vehicle (EEV)) that is more stringent than the Euro V standard being introduced in 2008. The EEV standard was introduced to allow member states to incentivise very low emission vehicles.

Data suggests heavies meet EEV standards for particulate matter, but not for NO_x. The spark ignition engines generally seem capable of meeting the EEV NO_x standard with some exceptions. Dual fuel technology would appear to have the same difficulty with NO_x emissions as a traditional diesel engine.

This would suggest that spark ignition gas engines are generally very clean, meeting Euro V or EEV emissions limits.

Dual fuel vehicles have very low PM emissions, as with the spark ignition engines, but suffer from higher NO_x emissions like a traditional diesel. Therefore in urban operation, air quality benefits will best be achieved with spark ignition buses and HGVs.

- The report is available at www.nasca.org.uk/assets/biogas_as_transport_fuel_june06.pdf

SCIENCE SHORTS

Long term air pollution worsens attack risk

Living in areas with higher air pollution can worsen the risk of having a fatal heart attack, Stockholm researchers suggest.

The researchers looked at the association between long-term exposure to source-specific air pollution and myocardial infarction (heart attack) in a case-control study of first-time heart attack cases and controls age 45 to 70 years in Stockholm county in 1992 to 1994.

Home addresses of the subjects spanning several decades were combined with historical emission databases and dispersion models to obtain annual mean levels of pollutants from traffic and heating during 30 years for 1397 cases and 1870 controls.

Nitrogen dioxide (NO₂), carbon monoxide (CO), and PM₁₀ were used as indicators of traffic emissions and sulphur dioxide (SO₂) as an indicator of emissions from residential heating.

While there was no association between long-term average air pollution exposure and overall heart attacks, there was an increased risk of fatal heart attack, especially if it occurred away from the hospital.

A 30 year exposure to increased NO₂ led to 50% raised risk of heart attack, a 22% increased for carbon monoxide, a 39% increase for PM₁₀ and 24% increase for SO₂.

For the 'out of hospital' heart attack deaths, the risk was more than doubled (odds ratio 2.17).

Researchers concluded that the study provides some support for an association between long-term air pollution exposure and fatal cardiovascular disease.

Long-term exposure to urban air pollution and myocardial infarction, *Epidemiology*, Mats Rosenlund et al, Vol. 17(4) pp383-390, July 2006.

MONITORING

No difference for heated inlets

Heated particle inlets do not appear to alter the oxidative potential of particles, Kings ERG researchers believe.

Particle monitors such as Teoms heat up the incoming air to drive off water, but this sometimes drives off volatiles that may be the cause of ill health effects. One theory being championed by ERG is that the health effects of particles are driven by their ability to oxidise lung cells – thus a good measure of particles is not mass, volume, surface area or chemical content, rather its oxidative potential.

Researchers say: "The

capacity to cause oxidation reactions at the air-lung interface, or the particulate oxidative potential, reflects a number of particle characteristics, including composition, size and surface area. Therefore a single measure of oxidative potential would effectively integrate a large number of PM characteristics into a measure of direct biological relevance."

On this basis, ERG measured the oxidative potential of Teoms operating with 50 deg C inlets and machines operating at 30 deg C and 4 deg C.

They concluded: "We found

no evidence to support the view that volatile material lost as a consequence of the heating of the Teom to 50 deg C contributed to the measured oxidative activity of the sampled PM.

"In light of these findings we believe the use of PM extracted from standard Teom filters will give an accurate estimate of the oxidative activity of the sampled PM air shed."

Comparing the toxicity of particulate matter (PM) collected by different samplers can be viewed on the reports section of www.airquality.co.uk

RESPIRATORY

DNA damage linked to hydroxyl radicals

German researchers have found that particles can damage DNA. But it is the hydroxyl radical properties of particles that does the damage, and this hydroxyl radical varies markedly in samples collected at different locations.

Researchers concluded: "We have demonstrated that particles both coarse and fine, sampled

over time and a different locations have the ability to generate hydroxyl radicals and elicit DNA strand breaks in human lung epithelial cells."

They continued: "Importantly, PM showed considerable variability with regard to sampling location and time. For instance PM samples from an industrial/urban

location showed higher ability for the formation of hydroxyl radicals than rural PM compared with equal mass."

Hydroxyl radical dependent DNA damage by ambient particulate matter from contrasting sampling locations, Tingming Shi, *Environmental Research* Vol. 101 (2006) pp18-24.

MONITORING

Partisol and FDMS monitors compared

A Kings College ERG study suggests there is some disparity between Teom FDMS and Partisol readings. The Teom FDMS was recently approved for use in the UK by Defra (*AQB July p1*).

Kings ERG says: "The wide range of PM monitoring equipment at Marylebone Road, North Kensington and Bexley allowed comparisons to be made between the measurements methods. Comparisons between individual instruments

showed that the FDMS does not measure PM₁₀ concentrations equivalent to the Partisol. However, whether these differences are due to measurement artefacts in the reference method (Partisol) or in the FDMS is unclear.

In summary, the FDMS improves our understanding of PM and its components. Specifically, the FDMS PM₁₀ purge measurement was found to agree very well with measurements of ammonium

nitrate mass in PM_{2.5}. The comparisons between the measurements provided by the FDMS and other instruments have highlighted the difficulty in measuring PM and its volatile components. Nevertheless, the FDMS did not measure mass concentrations equivalent those reported by the Partisol."

Measurements of particulate matter volatility can be viewed on the reports section of www.airquality.co.uk

ACTION PLANS

Tighter emission reduction policy questioned

Tougher emission reduction policies may not always be beneficial, a Belgium researcher suggests.

The researchers looked at policies that reduced particles faster than the 44% cut expected between 2000 and 2010 without taking any further

policy measures.

Use of particle filters, biofuels, reduction in the numbers of diesel cars and hybrid cars have the potential to cut emissions by a further 8% – and this is not cost effective. Only more effort to retrofit trucks and buses with particle

filters has a net benefit.

Costs and benefits of an enhanced reduction policy of particulate matter exhaust emissions from road traffic in Flanders, Liesbeth Schrooten et al, *Atmospheric Environment* Vol. 40 (2006) pp904-912.

VEHICLE EMISSIONS

Traffic in UK cancer link

Proximity to roads and railways can lead to increased incidence of childhood cancers, a UK researcher suggests.

The research recorded birth addresses of children dying from cancer between 1955 and 1980 in the UK. These were compared with proximity of railway stations, bus stations, ferry terminals, railways, canals and rivers.

Conclusions included: "Significant cancer excesses were found within short distances of bus stations, railways stations, railways, ferries and busier roads. The risk was double for those living within 100m dropping to nothing after about 3km, with roads showing the major effect. "Child cancers are strongly determined by prenatal or early

postnatal exposures to engine exhaust gases, probably through maternal inhalation and accumulation of carcinogens over many months. The main active substance is probably 1,3 butadiene.

Roads, railways and childhood cancers, E Knox, *Journal of Epidemiology and Community Health*, 2006, vol 60, pp136-141.

MONITORING

Leicester spies pollution from outer space

Leicester University has recorded "dramatic" increases in both UK land temperature and in air pollution, particularly in major cities in the recent heatwave.

An increase in NO₂ was noted on images from two sensors, the Advanced Along Track Scanning Radiometer (AATSR) on ESA's ENVISAT satellite and the Ozone Monitoring Instrument (OMI) on NASA's Aura Satellite. The AATSR data show clearly how temperatures in the UK rose rapidly in a few days whilst the OMI results show the large increases in NO₂.

In particular, the results show the extremity of the effects on large conurbations, such as

London, Birmingham, Manchester and Liverpool, suffering both extremes of temperature and pollution, whilst smaller individual cities such as Leicester show high temperatures but more moderate levels of pollution.

John Remedios, head of earth observation science at the University of Leicester said: "The latest satellite data shows a perspective on the environment in which we live that can only be obtained from space. The images show the temperature increase and increased pollution for every region in the UK. It is particularly striking to see the extent of temperature and

pollution increases in the large cities which have such a detrimental effect on the quality of life in those locations."

The OMI instrument is a Dutch-Finnish instrument, funded by the Dutch and Finnish government. OMI was launched in July 2004 on NASA's EOS-Aura satellite.

Pieter Levelt of the Royal Netherlands Meteorological Institute KNMI said: "OMI's global urban-scale air pollution measurements on a day-to-day basis are the best ever to date for air quality from space."

● For more information on OMI and OMI NO₂ contact Harry Geurts, KNMI, tel 0031 30 2206371

SUSCEPTIBILITY

Diabetes worsens impacts of air pollution

Diabetes can increase the chance that air pollution worsens health, Canadian researchers suggest.

Two studies were carried out – on a time series of analysis of deaths among diabetes sufferers and air pollution levels, the second based on health

insurance records.

Researchers say: "We found positive associations between most air pollutants and daily mortality from diabetes as well as among subjects diagnosed with diabetes one year before death. Those with diabetes and cardiovascular disease may be

susceptible to the short term effects of air pollution.

Associations between ambient air pollution and daily mortality among person with diabetes and cardiovascular disease, Mark Goldberg et al, *Environmental Research Vol. 100* (2006) pp255-267.

PARTICLES

Particle mutagenicity shifts

New Zealand researchers have found that particles become more mutagenic in winter.

Samples of PM₁₀ were collected from three urban sites where winter pollution was predominantly due to domestic home heating. Daily PM₁₀ levels ranged between 10 and 21 µg/m³ in summer and 22 and 61 µg/m³ in winter. Daily PAH concentrations at the three sites

respectively were 0.5, 0.45 and 1.5ng/m³ in summer and 52.1, 128.9 and 5.8ng/m³ in winter.

During winter 74% of PM₁₀ extracts showed significant mutagenicity compared to 25% in summer. Dioxin concentrations rose from a max of 3.6pg TCDD/m³ in summer to a max of 4000pg in winter indicating that PAH may represent most of the dioxin

activity present in PM₁₀.

The level of dioxin found in the air in Christchurch, point out the researchers, is "well above" WHO recommended levels.

2,3,7,8-TCDD equivalence and mutagenic activity associated with PM₁₀ from three urban locations in New Zealand, Leslie Brown et al, *Science of the Total Environment Vol 349* (2005) pp161-174.

SCIENCE SHORTS

Composting risk

High concentrations of aspergillus fumigatus from compost sites can drop to background levels within 100m, Cranfield researchers suggest.

Bioaerosol releases from compost facilities: evaluating passive and active source terms at a green waste facility for improved risk assessments, M Taha et al, *Atmospheric Environment, Vol. 40* (2006), pp1159-1169.

WHO estimate damage

The World Health Organisation says almost a quarter of all disease is caused by environmental exposure, much of which could be avoided.

Its report estimates that more than 13 million deaths annually are due to preventable environmental causes. Nearly one third of death and disease in the least developed regions is due to environmental causes.

Poor environments prompt four main diseases including lower respiratory infections which could be mitigated by action such as cleaning up fumes.

Diseases with the largest total annual health burden from environmental factors, in terms of death, illness and disability or (DALYs) are:

- Diarrhoea (58 million DALYS per year, largely from unsafe water, sanitation and hygiene;
- Lower respiratory infections are responsible for 37 million DALYs (Disability Adjusted Life Years) per year; 41% of all cases globally, largely from air pollution;
- Chronic Obstructive Pulmonary disease (COPD) adds 12 million DALYs per year; 42% of all cases globally).

In terms of mortality, environmental diseases claim 2.6m deaths annually from cardiovascular diseases, 1.5m deaths annually from lower respiratory infections and 1.3m deaths annually from chronic obstructive Pulmonary disease

● *Preventing disease through healthy environments* can be viewed on www.euro.who.int/air

Bio-enthusiasm from Volvo

Don Potts of Volvo was on fine form at the recent NSCA biofuels conference held in Greenwich.

He was scathing of UK efforts to encourage alternative fuels – and gushed over Swedish encouragement for biogas. “We were quite excited about getting a domestic gas compressor to market that would recharge a Volvo with gas overnight. Almost straight away we had a call from HM Customs and Excise asking what we were going to do about fuel duty!”

And the UK public were little more enthusiastic: “In surveys, the consumer rates the environment second to bottom – just above the CD player. And in a recent survey, 80% of company car drivers couldn’t make the connection between CO₂-based charging for tax and climate change.”

Even George Bush has gone green,” muttered a battle weary Potts.

PM^{fork}

And at the same conference, Michael Chesshire of Greenfinch, which is setting up a biowaste digester in Shropshire, had the same cheery confidence in gas – coupled with similar amounts of muttering.

Chesshire muttered that the plant was only running on 50% load because the incoming waste stream included too much garden waste and not enough kitchen waste.

“And too many garden forks,” was his final moan.

Carruthers in the dock?

Is David Carruthers in trouble?

You bet he is – he’s being indicted in the US for the heinous crime of being involved in the online gaming firm Betonsports. Luckily for the air quality world this is not ‘our’ David Carruthers trying to open a new market for his computer skills. Our man remains at the helm of Cerc which does software for air quality modelling rather than gambling. One air quality wag was quick to quip: “I always knew ADMS was a bit of a gamble.” Groan.

Ford has a funny turn

Car maker Ford has had funny turn and is trumpeting its conversion to the green cause.

Maybe it’s ownership of Volvo is fuddling its thinking as it now says it is a green manufacturer, adding how wonderful it’s new catalogue of environmental

initiatives is (biofuelled vehicles, micro diesel hybrids, etc etc), and how committed to the environment it is.

Is this the same company that just three years ago axed its ambitious and popular *Think!* programme that saw everything from bicycles to electric cars marketed to the masses? Built in Norway, the cars proved popular among many – but not profitable enough for Ford.

If Ford finds sales of its green products disappointing, it might well be because customers may remember how quick it was to abandon *Think!* to concentrate instead on pumping out enormous SUVs.

Ferry nice (not)

A recent holiday to France reminded your editor of quite how filthy shipping emissions are.

So just as the peak ferry season is in full swing, the heatwave prompted widespread ozone alerts and Dover is obliged to declare another air quality management area as a result emissions from burning the cheap and dirty sludge that passes for shipping fuel, it was with some irony that an email arrived in the junk email box from P&O Ferries headed: “Choose fresh air...”

You’d be better off in the Chunnel!

AIR QUALITY EVENTS 2006

September 6th

The Integration of air quality management with climate change

EMAP conference to be held at The Friends House, London, Sue Powditch on 0870 190 6551 or sue.powditch@aeat.co.uk

September 6-8th

Air Pollution and Environmental Health

From science to action: the challenge of particle matter, IUAPPA regional conference to be held in Lille, France, website www.IUAPPA-lille2006.org

September 12th-14th

4th CIWEM Annual Conference

Emerging environmental issues and future challenges, including session on odour, to be held in Newcastle on Tyne, contact CIWEM 01924 257891

September 13th

The Integration of air quality management with climate change

EMAP conference to be held at Cosla, Edinburgh, Sue Powditch on 0870 190 6551 or sue.powditch@aeat.co.uk

September 21st

The Integration of air quality management with climate change

EMAP conference to be held at Oakroyd Hall, Bradford, Sue Powditch on 0870 190 6551 or sue.powditch@aeat.co.uk

September 21st

A Cleaner Future

Good practice in air quality national conference 2006, Care4Air conference to be held in Sheffield, website www.care4air.org

October 3rd

Dispersion Modellers User Group (DMUG)

22nd meeting to be held in London, Contact Sally May, NSCA, 01273 878770

October 26th

Environmental and public health training day

Advanced update to include Integrated Pollution Prevention and Control, Sherman Education Centre, Guy’s Hospital, London Karen Hogan, 0207 771 5384 email chemicals.training@hpa.org.uk

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