

AIR QUALITY

August 2009 Issue 40

BULLETIN

CONTAMINATED LAND

Corby: dust is blamed

The High Court has decided that dust kicked up during a landfill could have caused birth defects.

The closed Corby steelworks was reclaimed by the council after its closure in the 1980s. A cluster of birth defects in the town led many to believe contaminated dust from clear-up trucks was to blame. Corby Council can now be sued for compensation to the children as the High Court says there is a legal case to answer that there is a causal link between the dust and birth defects.

Some of the claimants have missing or underdeveloped fingers, some have no fingers at all and three have deformities of their feet. The judge accepted evidence that millions of tonnes of toxic material were moved around the town in unsheeted lorries often leaving toxic waste

on the roads.

The children were born to mothers who either lived or regularly visited Corby between 1984 and 1999 during which time Corby Borough Council undertook the huge demolition, excavation and redevelopment works on the former British Steel site. This had been one of the largest steel works in Western Europe covering 680 acres and having four blast furnaces and two coke oven complexes. Over the fifty years that the site operated enormous quantities of industrial waste had been deposited on the site.

Collins Solicitors, acting for the claimants' children said: "Ultimately, the court found that any competent local authority operating from 1983 onwards should have been aware of the harmful effect of the toxic dust

generated by the reclamation works and taken the basic steps necessary to prevent the dust getting into the atmosphere.

Corby Council had expert witnesses including Fintan Hurley, a Comeap member and director of the Institute of Occupational Medicine. He had told the court that the number of defects could be down to random chance.

The judgement will have implications elsewhere. For instance protesters in Rugby claim that the cement works and associated traffic leads to excess toxic dust in the town. Likewise waste management sites that are known to cause air quality problems because of deposited and windblown dust should now be reassessed not just for nuisance, but also potential toxicological effects.

EUROPEAN DIRECTIVES

Lawyers hover: legal challenge draws closer

Environmental lawyers are close to launching a legal challenge to poor air quality in the UK.

The Campaign for Clean Air in London has linked up with legal activist firm ClientEarth which may launch the action. ClientEarth has branded its initiative *Cleanair for London*, it is demanding full compliance with air quality laws in London in time for the 2012 Olympics. ClientEarth is a "non-profit law group working for the benefit of civil society and the environment in the EU".

ClientEarth does not believe that the government is entitled to a time extension to comply with limit values for PM₁₀ and has written to the Commission

explaining in detail why the UK does not meet the preconditions for the time extension that the government seeks and it believes current plans to eliminate breaches of PM₁₀ in

London by June 2011 are not credible. It says: "We are taking legal action to compel the government to comply with its obligations immediately."

● www.clientearth.org



CCAil's Simon Birkett (third from right) among others at the launch

IN BRIEF

Commission rejects derogation requests

The European Commission has given decisions on PM₁₀ time extension notifications for nine EU countries – Austria, Belgium, Germany, Denmark, Greece, Spain, France, Hungary and the Slovak Republic.

In total the nine member states requested time extensions for 94 zones, however the Commission rejected 75 out of the 94 requests.

The 75 rejected requests covered zones in Belgium, Denmark, Greece, Spain, France and Slovakia. Here the Commission considered that the conditions have not been met, in many cases because insufficient data had been provided or because the measures outlined in the air quality plans submitted to the Commission did not demonstrate that the standards would be met at the expiry of the exemption period.

Epuk says that decisions on the final batch of PM₁₀ time extension notifications, including the UK's, are expected later in the year.

● Time extension website: http://ec.europa.eu/environment/air/quality/legislation/time_extensions.htm

Colin McMullen

Colin McMullen, a member of Defra's air quality team, has died following a long battle with cancer.

Defra's current air quality manager Robert Vaughan told AQB: "Colin was a cornerstone of the air quality team and had worked in this area for many years especially on the Clean Air Act and Smoke Control. He also worked on the air quality strategy since its conception to the latest version published in 2007."

Vaughan continued: "He was well known and appreciated by many in the air quality community and he will be sorely missed."

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LETTERS

Letter to the editor:

The AEA report referred to in last month's Air Quality Bulletin article "Report reveals FDMS teething problems" covered the period from October to December 08 which was the period in which the very first of the new PM_{2.5} FDMS systems were being installed into the AURN.

It is true that during this time a number of 'teething problems' were found, however this is not unusual with the deployment of any new technology when introduced into a network on a large-scale.

During the period in question, a meeting involving CMCU (Bureau Veritas), QA/QC (AEA) and the various equipment support units of the AURN was held and as a result revised operating procedures and guidance was issued to local site operators. This has resulted in improved data capture and data quality, as operators have become more familiar with the new equipment.

Approximately 100 monitors were installed or upgraded as part of this major exercise to bring the AURN into line with EU Directive requirements for both PM₁₀ and PM_{2.5} monitoring. The FDMS systems are now providing essential information on PM mass concentration as well as additional information on semi-volatile and non volatile fractions which can help in the understanding of the possible sources of PM and the resultant health effects.

The TEOM/FDMS is still the only real time monitor which has to date, been able to demonstrate equivalence for both PM₁₀ and PM_{2.5} reference methods, in accordance with EU requirements.

Jim Mills
Managing Director
Air Monitors Ltd

MONITORING

New monitor on the block

Another particle monitor has won official approval.

Those wishing to monitor particles in the UK traditionally used Teoms but the market was shaken up when the Teom failed in intercomparison trials (*AQB July 2006 p1*). More recently firms have been encouraged to use equipment such as Bams and FDMS Teoms which have passed Defra trials.

The new SWAM monitor has now won Mcerts approval and so is likely to pass intercomparison. It does PM₁₀ and PM_{2.5} at the same time and doesn't need a correction for either.

David Harrison of Bureau Veritas explained: "We ran the original equivalence trials from 2004 to 2006. Since then, more

instruments have become available. About a year ago, it was decided that future tests should run through the Environment Agency's Mcerts program, and be commercially funded by the instrument manufacturers. All manufacturers were contacted, and concerns were voiced about the need to test for equivalence in all member states and we decided to run a combined UK/German testing program with field studies in both countries.

"The first instrument to go through the tests has now gained an Mcerts certificate – the SWAM 5a Dual Channel Monitor made by FAI.

"The instrument collects 24 hour samples on glass fibre

filters and determines the mass concentration by beta. It collects both PM₁₀ and PM_{2.5} on separate channels. As such, it is a potential replacement for Partisols, negating the need to weigh filters, which would lower running costs and result in getting data quicker. As with Partisols the filters can be used later for further analysis if required."

This instrument is not yet officially equivalent (until approved by Defra) even though mathematically the expanded uncertainties relative to the reference methods are below 25%.

The FAI SWAM is available in the UK exclusively through Enviro Technology.

● www.fai-instruments.it

MONITORING DATA

Data directive progress outlined

Mouchel is working to link up Inspire data services with the Cafe Directive.

Ana Grossinho, who recently moved to Mouchel, has presented the interim findings of prototyping solutions of the European Commission (EC) project at this year's Inspire conference in Rotterdam.

The project, which examines the technical IT solutions necessary to effectively link Inspire services to the reporting and data exchange requirements of the Cafe directive, is being developed by teams from four European Union member states (Slovakia, Poland, Austria and the UK), with Mouchel leading

the Slovakian element of the study.

The study builds on the original Inspire project (*AQB May p4*). It aims to prototype the full national air quality reporting life cycle to fulfil Cafe obligations to Europe in line with the Inspire Directive requirements and will make air quality data and reports available online to a range of users across Europe and the world through an interchangeable format.

Grossinho said: "The Inspire Directive is revolutionising the way we share and publish air quality information collected and processed by or on behalf

of public authorities, changing the way we report air quality assessment results. The driving concept of the Commission's vision is to increase efficiency, transparency and best use of air quality and environmental data for an holistic and integrated approach to protect the environment.

"This is in line with the Treaty and helps air quality data users to be suitably directed to data relevant for their particular needs."

● For more information on the Slovakia interim findings, go to: http://www.gsdi.org/gsdi11/program_details.html#Anchor-Parallel-30198

ACTION PLANS

Final LTP guidance is released

Statutory guidance on local transport plans has been released following a consultation (*AQB March p1*).

The first and second LTP rounds covered 2001-06 and 2006-11. The new guidance applies to all LTPs after these rounds until further notice.

On air quality, the guidance notes that where local authorities have an AQMA and an action plan prompted by

local transport "the integration of air quality action plans with local transport plans will continue to provide a systematic way of joining up air quality management and transport planning. The LTP could examine and report on options on addressing air quality problems and any risks that policies might have on achieving targets and meeting the EU limit value deadline for

concentrations of nitrogen dioxide in air".

It adds: "Air quality reports should be made direct to Defra on an annual basis (possibly included as part of a wider LTP progress report). In two-tier and metropolitan areas, authorities should liaise closely in meeting their reporting requirement."

● The guidance can be viewed on www.dft.gov.uk/adobepdf/165237/ltpguidance.pdf

NEWS FROM THE ANNUAL FORECASTING CONFERENCE LAST MONTH

New forecasting forum launched

AEA has won a new three year air quality forecasting contract for Defra. It is setting up a specialist forum in a bid to improve air quality forecasting.

AEA's Iarla Kilbane-Dawe launched the forum at the recent annual forecasting meeting held in Birmingham. A dozen experts have already expressed an interest in joining the forum.

Kilbane Dawe introduced the forum plan saying: "The forum will mean we can work more closely together to ensure consistency and accuracy of national, regional and other forecasts issued in the UK. It will include an online facility set up to share ideas – all interested parties are invited to participate and meet regularly to discuss progress."

Defra is investing in forecasting as part of its duties under the European air quality directive. This requires publication of "the likely geographical extent of periods of high concentrations and the expected change in pollution (improvement, stabilisation or deterioration) and reasons for

those changes".

Plans for forecasting include:

- Enhanced graphical representations of the forecast outputs (currently being discussed with Defra and the devolved administrations);
- More detailed forecast accuracy statistics to be published online for public access; and
- Consideration of other models and developments to enhance the UK air quality forecasting service.

The latter could see changes to modelling procedures and relying more on the WRF-CMAQ model. This is being trialled at a 4km resolution with a view to providing forecasts at this resolution – and perhaps being used as boundary conditions for other high resolution urban models. Future work may also combine the forecasts into Google Earth for improved presentation of results.

● **Editor's comment:** *It is an opportune time to launch the forum – there is some good work being done but there is a*

lack of strategic direction.

AEA has taken the lead in forecasting, not least because it receives loads of money from Defra to carry out national forecasts. But in the wings there is good work being done by the likes of King's College London's ERG and Cerc who are providing air quality alerts for groups such as SussexAir.

Really it is quite absurd that there two competing air alert systems – thanks to the indifference of the Department of Health and health authorities, there is little money for such services and what little there is being split in half.

If Defra can't, or won't, take the lead on this, then the air quality forecasting forum could be the means by which heads can be banged together. The task will not be easy – why should Cerc or ERG give up their intellectual rights (realistically) to the behemoth that is AEA?

But a united front is needed to confront health professionals who see air quality as little more than a distraction.

POLICY

SussexAir seeks research funding

The SussexAir *airAlert* service is keen to carry out research to see if it can provide a more targeted cost effective service.

SussexAir's *airAlert* is a text/phone/email alerting service with forecasting provided by ERG. Speaking to the air quality forecasting conference held in Birmingham last month, SussexAir's Nigel Jenkins said that the service could become more targeted with primary care trust and GP support. He believed this would be cost effective: "Sussex primary care trusts have nearly 6,000 admissions due to COPD disease at a cost of £15m – £2,936 per admission. If we can prevent four COPD or 12 asthma admissions in a year from being admitted to hospital, this would cover the cost of the *airAlert* service for 1000-1,500 targeted patients."

Jenkins is proposing a two year study on the effectiveness

of using *airAlert* to deliver specific information to patients and GP/respiratory specialists. In summer this would be pollution, in winter pollution and COPD. Working with GPs and children's hospitals, patient interventions would be studied.

He added: "PCTs are required to provide information to

vulnerable people in the event of a heatwave under the heatwave plan for England. *AirAlert* can potentially integrate heat alerts and target selected vulnerable groups, pre-selected by the PCT and/or GP's. These tend to overlap with pollution episodes and patient groups."

● www.airalert.info

FINALISED 2008 AIR QUALITY INDICATOR RELEASED

	Urban	Rural
2000	20	28
2001	23	34
2002	19	32
2003	48	64
2004	22	45
2005	21	40
2006	38	55
2007	23	30
2008	26	45
Days moderate or higher		

The 2008 government air quality indicator has been finalised. Compared to provisional stats released in February, differences are minimal, the largest being a decrease in the number of days of moderate or higher pollution in rural sites from 47 days to 45 days, and a decrease in the annual average level of roadside PM₁₀ from 28µg/m³ to 26µg/m³. There have also been some minor revisions to historical data.

IN BRIEF

Heatwave SO₂ peak

Last month's warm weather has led to a number of sulphur dioxide events affecting London, Kent and further north into Hertfordshire and Bedfordshire, claims ERG, which provides monitoring services in south east England.

Several plume grounding events have been detected causing brief periods of elevated SO₂ over most of London with one episode reaching across north London and into Bedfordshire and further events affecting Sevenoaks. But even with the raised concentrations, levels were not more than 60% of the 15 minute objective: "However the concentration of 60 ppb, measured at Sevenoaks on 1st July, some 43 km from the source raises the possibility of a breach of the objective concentration closer to the source."

Previous episodes have been blamed on Thames-side power stations.

ERG said two Sussex sites reached noted 'high' ozone during the heatwave. Meanwhile AEA's analyses consistently showed "very complex" conditions during the June heatwave.

Incoming air to the UK came mainly from relatively unpolluted North Sea and Baltic Sea areas. In addition, cloudy conditions and showers helped to keep ground-level ozone down to moderate levels across all areas although there was a sting in the tail with some sites reaching poor.

"Noteworthy, however, was an unusual period of elevated sulphur dioxide levels. Satellite imagery suggests that this episode may actually have been caused by an eruption of the Sarychev volcano in Siberia."

Electrification boost

The proposed £1.1bn electrification of the Paddington-Swansea rail line will reduce air pollution especially for some areas alongside the Great Western main lines that are vulnerable to pollution.

THE ANNUAL AIR QUALITY BULLETIN CONSULTANCY RANKINGS

Air firms in numbers game?

Love it or loathe it, here is our annual attempt at ranking consultants involved with air quality in the UK.

The *Air Quality Bulletin* 2009 air quality consultants mini-survey involves asking firms "how many full time equivalent consultants are active on UK ambient air quality consultancy work (excluding technicians, IT, admin and research staff)".

Once again AEA is by far the largest firm operating in the sector with 100 consultants. Behind them are the likes of RPS, Bureau Veritas, Aecom and Atkins. Last year, there was talk of expansion and difficulties in recruiting. This year we suspect those issues are less of a problem!

AQB is well aware that surveys of this nature are fraught with danger – some consultants clearly have honesty or comprehension issues. As the UK air quality market is so small, over-egging the numbers is usually pretty obvious, we think most firms know this and are reasonably honest.

The numbers tell an interesting story – very few firms have expanded and there have been modest losses. It is a sharp recession and any firm that manages to maintain numbers is doing well, so no shame in contraction this year!

As well as asking for numbers, we also asked for comments. Even allowing for the usual corporate optimism, we think we've ended up with a pretty good picture of the air quality market mid recession:

● Once again **King's College London ERG** set the standard for honesty and volunteered that they weren't strictly consultants – but did employ 33 specialists working in monitoring and services.

ERG's Gary Fuller said: "Regarding the business outlook I think it is important to recognise the different financial cycles of the private and public sector at the moment. Those of us who work mainly for and in the public sector are facing the prospect of leaner times from next financial year."

● **Arup's** Michael Bull: "Our air quality business has held up very well during a difficult year but we expect trading conditions to be difficult for some time, I would not expect that we would return to pre crunch levels. For the 3-4 years before the crunch we were in a planning boom, I would expect business to stabilise to somewhere below the level of recent years."

● **Gavin Bollan, Atkins:** "We've yet to lose an employee to a competitor since the department was formally convened in 2005, which we're very proud of."

"I'm not sure the UK air quality business will look quite the same again – a lot of players have downsized, a lot of folk seem to have migrated to public sector positions and the nature of our clients' requirements is very different to a year ago. In my personal opinion, I think the rate of

contraction will now decrease but the market will remain very cautious for perhaps another couple of years. It is the first recession that many of us have worked (and indeed managed) through and it's taught us a lot about how to best look after our clients, who are subject to the same or greater pressures than us."

● **Dr Mark Broomfield Enviro's**

Consulting: "We are up one on last year. An interesting feature is that this modest increase is due to consultants with limited work in other areas working on projects in the more buoyant air quality field. To a limited extent, work from commercial/industrial clients has been replaced by increased work from public sector clients, but this has been fairly limited."

● **Environ's** Joanna Simpson: "We think we've seen the worst of the recession and we do think things will eventually return to pre-crunch levels."

● **ADM, David Harvey:** "With regard to turnover, ADM is holding steady and the level of met data sales suggest that there has been no widespread downturn across the UK's air quality consultancy."

● **Air Quality Consultants' Duncan**

Laxen: "We have not seen a downturn in our work and have been recruiting."

● **Mott MacDonald's** Jorge Gomez-Perales: "We are busy here in the UK and hope that this will continue. While we have seen a dip in enquiries over the past six months from the UK planning sector, our energy and environmental permitting work has generally remained strong."

● **Peter Brett Associates' Claire Holman:** "I think we are probably through the worst of it – we largely work in the land development and waste sectors, and they seem to be holding up."

● **BMT Cordah's** Stuart McGowan: "At present I don't think we have seen the worst of the recession although it is proving to be a mixed bag. Development-led projects are becoming rarer, however, renewable bioenergy and energy from waste are growing as sectors and are requiring greater air quality consultancy support. Public sector contracts have remained relatively constant."

● **Stewart Andrews of Stuart Michael Associates:** "Although we are not seeing any significant increase in workload at the moment we have not had a significant reduction in air quality workload over the last twelve months either."

● **Richard Lowe URS Corporation:** "Expansion was never an option this year but we also haven't had to let anyone on the air side go to date. We are seeing new developments starting to pick up again, both in commercial development in central London and also for smaller scale waste/

THE RANKING

Number*	Consultant
100	AEA Technology
32	RPS
20	Bureau Veritas
16	Aecom (Faber Maunsell)
16	Atkins
15	CERC
13.5	TRL
12	Mott Macdonald
12	NPL
12	Mouchel
11	Air Quality Consultants
11	Scott Wilson
10	Arup
10	Sanctum Consultants
10	URS Corporation
10	WYG Environment
9	Golder Associates
9	UWE
8	Wardell Armstrong
7	Enviro Consulting
7	Temple Env'l Consultants
6	BMT Cordah
6	Royal Haskoning
6	SLR Consulting
5	ERM
5	Peter Brett Associates
5	RSK
5	Waterman Group
4.5	Halcrow Group
4	Environ
4	Hyder Consulting
3	Northumbrian Water
2	Scientific Service (was AES)
2	ADM Ltd
2	Stuart Michael Assocs

Other firms known to be active in air quality include The Airshed, Evan Lester, Phlorum, Sadler Consultants, Smith Grant, Westlakes Scientific Consulting and the WSP Group. Some large firms declined to answer so we haven't included them.

* Numbers in answer to the question: "How many full time equivalent people in your firm operate on UK air quality consultancy work, excluding admin/technical support staff?"

biomass fired power plants across the UK. However, competition for the work is much greater and so prices are being driven down – there is always someone seemingly prepared to 'buy' the job by offering a very low price. Industrial compliance air requirements are certainly remaining less than they were as the Environment Agency continues with 'light touch' regulation and operators (understandably) avoid investment where possible."

● **Matt Stoaling, SLR:** "It is clearly hard to tell, but we have certainly been seeing some pick up in the number of fee proposals so I am going to be bold and say 'yes', we have seen the worst of the recession. I think that the market will pick up to pre-crunch levels,

● **Continued opposite**

TRENDS

ERG reports on London bad air

Nitrogen dioxide and particles continue to pollute London's air – but King's College ERG warns that the health consequences of increasing background ozone concentrations in the UK and across Europe being worse than existing particle impacts.

ERG's annual report on air quality for 2006/07 notes that background NO₂ concentrations declined in London until 2002 but have been relatively stable since. "Importantly during 2006 and 2007, the annual mean objective was exceeded at almost all roadside sites and it was also exceeded at background sites across inner and parts of east and west London.

"The mean concentration of NO₂ at roadside sites in inner London exceeded the annual mean strategy objective and EU limit value by a factor of more than two during 2006 and 2007. This has important implications for the government's intention to seek a five year extension to the 2010 date for attainment of the EU limit value."

ERG added: "Mean PM₁₀ concentrations show a steady slow increase at a mean rate of around 0.4% per year. Although the EU limit value has been attained at background sites since the late 1990's the EU limit value is regularly breached alongside the busiest parts of London's trunk road network and close to waste management sites.

"Use of the new volatile correction model (VCM), instead of the current 1.3 factor, to 'correct' Teom measurements to gravimetric equivalent will decrease the number of locations exceeding the EU limit value during 2006 and 2007 but breaches of the limit value remain around waste sites and the busiest sections of the trunk road network. Use of the VCM would likely have led to an increase in the breaches of the limit value during 2003."

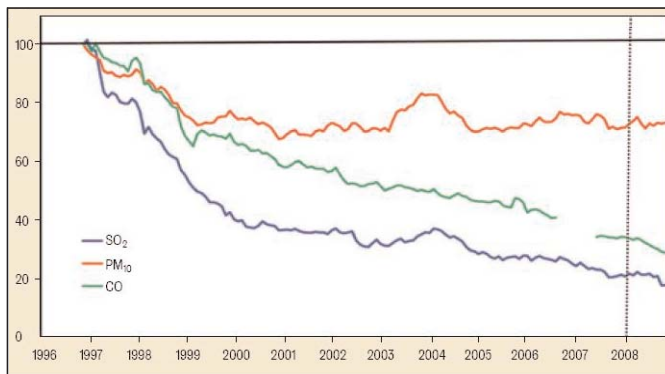
ERG said: "It is unclear why abatement measures are not yielding a reduction in measured PM₁₀ concentrations. Worryingly there is evidence to suggest that PM₁₀ concentrations arising from London's emissions have increased."

Annual mean concentration of ozone increased by 37% between the end of 1996 and 2007. This increase is thought to be due to changes in global

concentrations and also London-wide abatement of NO_x.

ERG also commented on policy: "The past 12 months also saw the publication of the long awaited updated EU air quality directive. Unfortunately, this has only caused dismay amongst health researchers as it is, in essence, a relaxation in relation to previous PM₁₀ limit values. The new PM_{2.5} limit value has been set at the upper end of exposure response curves from the major epidemiological studies, and hence not sufficiently protective of human health. Given that London is still having trouble meeting these insufficiently stringent particle targets, there is clearly no room for complacency and much to be achieved."

● *The fourteenth annual report of the London Air Quality Network (LAQN)* can be viewed on www.erg.kcl.ac.uk



Annual mean index values for CO, PM₁₀ and SO₂ showing worsening

IN BRIEF

Low carbon strategy

Government has released its low carbon strategy.

It sets out policies to reduce carbon use – but notes potential air quality side effects: "There are potential risks and benefits – for example, a shift to diesels could have adverse air quality impacts, whereas a shift to electric or hybrid vehicles could have air quality benefits. We have sought to minimise the risks to air quality through careful design of policy instruments and will monitor the impacts closely."

● *Low carbon transport: A greener future* can be viewed on www.dft.gov.uk/pgpr/sustainable/carbonreduction/

Bus fillip

A £30 million fund has been set up by the Government to encourage the purchase of low carbon buses.

DfT aims to encourage low carbon buses and improve air quality in urban areas. Bus operators and councils will be able to bid for the money which they can then use towards the additional up-front cost of buying low carbon buses.

Eligible low carbon buses deliver at least Euro V EU emission standards. The fund is also available for very low and zero emission vehicles, such as electric vehicles.

CONSULTANCY SURVEY (CONTINUED)

Comments on consultancy market (from previous page)

but not for a few years."

Mark Chapman, **Mouchel**: "For the UK market, both public and private clients will have to continue to fulfil their air quality-related statutory requirements both in the shorter and longer term as the cost of failing to comply may exceed the benefits of delayed action."

Anon: "Our air quality business has actually done OK during the crunch but this is buoyed up by big Government infrastructure projects. I would expect these would be the target for cuts when a new Government takes over next year. There is some private developer activity which is perhaps beginning to stir a little more now but I wouldn't expect that to reach a level

that would compensate for loss of big Government projects for a few years yet and much will depend on the state of the property market which I expect to be a very tentative recovery."

... and finally.

● "Looking at last years figures I know some of them are really inflated – I know, for instance, X only has two people working in air quality. Perhaps you should ask for CVs to back up numbers?"

● "You could ask them to send you a list with the names of the staff on the books? Data protection excuse? Our website includes photographs of our staff!"

● "Good luck with collating the information

– always amusing to see some of the numbers being put forward!";

● "It will be interesting to see how willing people are to spill the beans this year."

● "One interesting aside is that salary expectations are much, much lower these days than a couple of years ago based on the CV's that come across my desk – not ideal for any of us in the sector!"

Editor's note: *We've contacted as many larger consultants as we could.*

We'll do a 'scoop up' of any corrections and omissions in later editions, but before you complain about any omissions, please check your inbox for a fleet of unanswered emails asking you for numbers.

IN BRIEF

London strategy delay

The London air quality strategy revamp has been delayed.

There are continuing cuts in staffing within the GLA air quality and noise team which is leading to some functions being outsourced (*AQB July p7*).

London Assembly Environment Committee chair Murad Qureshi said: "It is essential that the Mayor does not delay his draft air quality strategy, setting out bold action to improve the air we breathe. This is not just about improving the environment in some abstract way – this is about saving lives."

Ozone remains high

A European Environment Agency report attempts to explain why ozone is failing to drop despite success in cutting emissions.

EEA's report, whose authors include the UK's Dick Derwent, states: "European countries have significantly reduced anthropogenic emissions of ozone precursor gases since 1990. In general, however, ambient air measurements in urban and rural areas of Europe do not show any downward trends in ground-level ozone."

Researchers compared modelling and monitoring data from across Europe. Findings include:

- There is some evidence that emissions of ozone precursors and ozone levels are falling across Europe. The modelled reduction is 20–30 % in 1995–2005;
- The biogenic emissions sensitivity analysis demonstrates that major uncertainties in modelled ozone levels are also related to the size and distribution of isoprene emissions from plants. For some metrics, the uncertainty can be as high as a factor of two or more;
- Sensitivity analysis suggests that ozone 'imported' into Europe via intercontinental transport accounts for some 10–30 % of surface ozone levels in western Europe.
- Technical report No 7/2009 www.eea.europa.eu

REGULATION

Defra sets out 'fair' enforcement

Defra and the Welsh Government are consulting on changes to environmental enforcement policy.

A new consultation contains proposals "for a more proportionate, fairer and more effective approach to enforcing environmental criminal offences in England and Wales". A key change will be to allow the Environment Agency to use civil sanctions which will plug some gaps in the criminal enforcement regime.

Three options are considered, the Government-favoured option is new civil powers coupled with tougher criminal sentencing.

Variable monetary penalties

would enable regulators to impose a proportionate and fair penalty that would reflect the seriousness of the case. A non-compliant person will be able to mitigate the offence and reduce a monetary penalty by offering to compensate individuals, communities or organisations adversely affected by the non-compliance. Fixed penalties of between £100 and £300 are proposed for minor offences such as failing to provide monitoring data, failing to record information and failure to notify works under the EPA.

The consultation says: "Our preferred option would involve strengthening the role of the criminal courts as well as

introducing civil sanctions. This will ensure a properly graduated system of sanctions, creating incentives to comply and to cooperate in regulation. It would be clearer to all concerned that a criminal conviction for an environmental offence signals the more serious offence, bringing the toughest sanctions, and the greatest stigma."

"Taken together, these proposals will enable regulators and the criminal courts to impose sanctions for non-compliance that will be better at changing non-compliant behaviour and ensuring environmental protection."

- www.defra.gov.uk/corporate/consult/env-enforcement

ALTERNATIVE ENERGY

Biomass strategy recognises AQ impacts

The Department of Energy and Climate Change has released a biomass strategy which reflects fears that increased wood burning in urban areas could lead to air quality problems.

The strategy says: "Clearly, biomass heating should not be used where, without appropriate abatement technology, it could cause local air quality to be significantly degraded, for the UK's international obligations on air quality to be breached, or for public health to be significantly affected. Our assessment shows that controls on the type of boiler used and understanding about where best to site biomass heating will do much to mitigate this risk."

It adds that problems should be avoided if:

- All new small-scale biomass plant are of high quality – corresponding to the best performing units currently available on the market;
- The majority of biomass heat uptake replaces existing coal and oil-fired heating, and is located off the gas grid or away from densely populated urban areas; and
- In AQMAs deployment is substantially lower than other areas (this would be the case if biomass is used primarily off the gas grid).

Decc added: "We will work with industry and other key stakeholders to introduce emission performance standards for biomass boilers sold on the market under 20 MWth size which are not currently covered

by other legislation. We are minded to set these at levels of 20g/GJ for PM₁₀ and 50g/GJ for NO_x."

"At this stage, the Government is not considering further powers for local authorities to allow them to require higher standards of products and emissions, given that we may impose high standards under the Renewable Heat Incentive scheme which will already be at the top end of performance. However, local authorities are able to develop local planning guidance to ensure that the uptake of biomass is appropriate for their area."

- The renewable energy strategy can be viewed on www.decc.gov.uk

TRENDS

Countries ranked in PM_{2.5} assessment

European countries have been ranked in terms of population weighted exposure to PM_{2.5}.

A European Topic Centre report looks at population densities and PM_{2.5} exposure, inferred from PM₁₀ measurements, to produce a map and rankings of European PM_{2.5} concentrations and impacts.

In a ranked table of years of life lost due to PM_{2.5} exposure, the UK was second only to German for cardiopulmonary

disease (191,600 years of life lost). UK came fourth (after Germany, Poland and Italy) in terms of years of life lost to lung cancer (37,800 years).

These figures are used to estimate a proposed average exposure indicator and subsequent exposure reduction target which ranges from 10% in the Nordic countries to more than 25% in eastern European countries.

The report adds: "The level of 25µg/m³, set as target value for

2010 and as limit value for 2015, is exceeded widely in Europe. In 2005 9% of the population is exposed to levels above this LV. In 2005 more than 25% of the population is exposed to concentrations above the PM₁₀ short term limit value (35 days above 50µg/m³). This indicates that the PM_{2.5} LV is less stringent than the short-term PM₁₀ limit value.

- http://air-climate.eionet.europa.eu/docs/ETCACC_TP_2009_1_European_PM2.5_HIA.pdf

Emission factors changed at last

For some years, air quality modellers have questioned whether emission factors are right. Now they've got some new ones, finds Jack Pease

Arguments about predictions that air is getting cleaner or dirtier have spilled out into the open of late.

Groups such as King's College London ERG and urban councils have noted that NO₂ (and in some cases PM₁₀) concentrations have been going up, not down (*AQB May p3*). All the while projections say that concentrations should be falling dramatically.

Future projections are based on emission factors – a series of Excel spreadsheets 'owned' by the DfT which state what emissions can be expected from different classes of vehicles over future years. Last year DfT consulted on a new set of factors based on vehicle tests and analyses carried out by TRL (*AQB August 2008 p1*) – the factors have now been finalised, and (sanitised) responses to the consultation released.

Few people understand the factors, or particularly want to. But while they may be dull, they are important. For instance, the update to the DMRB air quality screening programme has had to be held up endlessly by the Highways Agency because of the late running factors.

At the heart of recent problems with the factors has been the failure of new vehicle technology to deliver the emission reductions that were promised. Vehicles may have comfortably exceeded older emission standards, but newer vehicles may only scrape past newer standards, so the real life improvements are not as high as the changes in standards may suggest.

There is a suspicion that some manufacturers are 'cycle beating' – that is, designing their vehicles to behave well for the official tests, but once in the real world, delivering performance rather than low emissions. Lastly modern diesels have been

effective in cutting PM₁₀ but newer technology has unexpectedly led to increased primary NO₂ emissions. So while Euro standards may have cut NO_x, of that NO_x more is coming out as NO₂.

TRL's job in updating the factors has been to test vehicles to try to get realistic factors. It does that on a rolling road, which can be programmed to represent a series of 'realistic' drive cycles. Choosing those drive cycles is an art in itself – different countries and different cities prompt different driving conditions.

There are also limited budgets, and while TRL might have tested hundreds of older vehicles, for more modern vehicles (which will make up the bulk of the fleet in future years) there is very little test data, and little idea of the impact of aging on the emissions profile. There is much uncertainty, and TRL is left to make a lot of assumptions leaving plenty of room for error.

All that said, an uncertain estimate is better than no estimate and the new factors should now be used by consultants and local authorities predicting future concentrations. The most rigorous independent analysis of the impact of the new factors has been carried out by consultant Cerc which says the new factors are more pessimistic (see below).

For the official view, TRL's summary report notes:

- For all vehicle categories it was concluded that more representative driving cycles should be considered for future testing. In addition, urban buses and coaches should be treated separately when deriving emission factors;
- The results of the assessments indicated that the current UK emission factors probably provide a reasonably accurate characterisation of total emissions from

road transport. There is little justification at present for changing the current emission calculation method in the NAEI, but the emission factors for specific vehicle categories should be improved where possible;

- Further efforts are also required to categorise vehicles appropriately and to characterise operational conditions (such as road gradient and load);
- Reduction in fuel sulphur content to 10 ppm seems unlikely to bring substantial emissions benefits for Euro 3/III and 4/N vehicle technologies. It is possible that older petrol vehicles could show some degree of catalyst recovery (i.e. lower emission levels) when used on sulphur-free fuel. However, such effects are rather difficult to quantify as there seems to be little interest in testing old vehicles on new fuels;
- New hot exhaust emission factors were developed for road vehicles in the UK.

Consultees had a number of comments to make including:

- TfL pointed out the mismatch between HGV weights and axle counts;
- AEA said the emission factors for three different weight classes of bus and two weight classes of coach may also prove to be problematic for modellers who do not have information on sizes of such vehicles operating in their area from census data;
- The Highways Agency commented that Euro 3 and 4 vehicles only comprised 1% of the dataset used;
- ERG identified several issues and decided that data are unsuitable for use in the London atmospheric inventory until the issues are resolved.

Lots of emission factor reports can be found in electronic format on the DfT website at www.dft.gov.uk/pgr/roads/environment/emissions

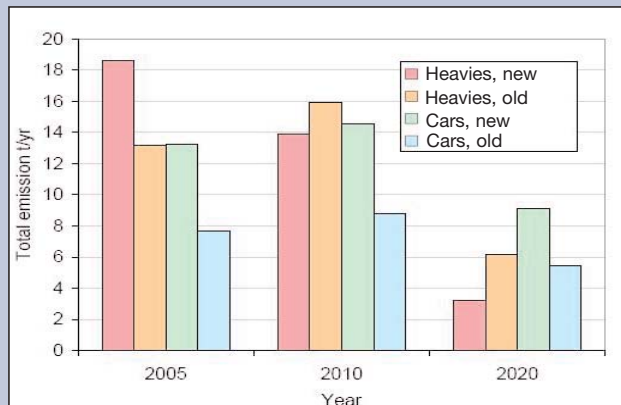
CERC MODELS THE DIFFERENCES BETWEEN NEW AND OLD FACTORS

In recent years *AQB* has been pestering TRL to spell out what difference the new factors will make to emission forecasts, something it has been unable to do.

Consultant Cerc appear to be the only body that has carried out the exercise and included its findings in the response to the consultation.

Cerc has its own emissions calculations tool (EMIT) and has used it to compare the new emission factors against the old. It found stark differences, mostly suggesting that old emission factors underestimated emissions. This ties in with evidence from monitoring data that forecasts and modelling are underestimating real life emissions.

Cerc submitted its detailed response to the consultation based on modelling of a 6 sq km area of London for years 2005, 2010 and 2020. It compared the new emission factors with those used for the recent Project for Sustainable Development of Heathrow modelling and found the new figures increased total emissions (see right).



Comparison of NO_x emission totals for 2005, 2010 and 2020

H4 on odour wafts in

Draft guidance on odour released in 2002 was never finalised. Will the latest draft fare any better asks Jack Pease?

O odour is a small but potent area of air quality. Overlooked by many, it requires many air quality techniques but is more a nuisance than a health issue. The Environment Agency is now consulting on new 'H4' process guidance.

Regulation of odour is tucked away on the Environment Agency website and difficult to find even by its standards. Defra is little better, odour is lumped in with the noise team, if anything does happen, it's easily missed.

But ignore it at your peril. Odours can be noticeable well below the threshold of detection. A few seconds exposure to a nasty whiff can lead to complaints, and once the complaints start, expensive mitigation may be needed.

The Environment Agency regulates larger industrial processes and issues guidance for firms running those processes. As well as industry-specific guidance, it produces horizontal guidance on issues such as noise and odour where there are common principles across different sectors. H4 on odour was released as a consultation draft in 2002. Responses were sought – the deadline came and went and seven years on, H4 never moved out of draft phase.

This kept the small band of UK odour experts in business arguing at planning inquiries. Where there is little guidance, there is plenty of room for argument, by failing to ratify H4 the Environment Agency found itself under fire for dithering.

Brogborough Landfill was a case in point

(*AQB February 2007* and see cutting, below). Arup's Michael Bull and ADM's David Harvey were slugging it out and our story at the time neatly highlights the difficulties caused by the uncertainty.

To be fair to the Agency, it has been doing work behind the scenes. Two years ago it commissioned experts including Jon Pullen to investigate where odour regulation should go. His reports were far reaching and welcomed by many – for the first time references were made to best practice overseas and firm recommendations were made, many of which appear to have been omitted in the latest draft.

What's new in the latest H4 draft? One obvious change is the length – much shorter and clearer. For those not heavily into odour, this gives a good chance of understanding it, for the experts, the lack of detail may lead to continued battles in the courts. The new document consists of 54 pages, the old one had 163.

Those who have had a quick read of the new consultation (and who are likely to be the ones to submit a formal response) suggest that the new consultation makes few changes (see box, right).

One expert told *AQB*: "The old one was so long and complicated that you could find anything in it to support your case. The new one is a lot more readable and clear."

But while it is clearly written, some experts will struggle with the detail. For instance it retains the broad banding for offensiveness of odours in its modelling

advice: "When the hourly average concentrations of odour are modelled over a year (8,760 hours in a year), 2% (175 hours) of those hourly average concentrations must not exceed 1.5 odour units for highly offensive odours, 3.0 odour units for moderately offensive odours or 6.0 odour units for less offensive odours. Any modelled results that project exposures above these benchmark levels, after taking uncertainty into account, should be interpreted as predicting an unacceptable level of odour pollution."

Some would like discrete offensiveness scores allocated to specific smells. They say that by maintaining the broad banding, the single biggest cause of argument at public inquiry remains – ie it remains a matter of opinion how offensive a smell is and that developers will try to argue they are in a less offensive band to avoid mitigation.

Others point out that any attempt to set numerical thresholds for modelling will be doomed to failure. They say that it is almost impossible to establish emissions, even with an established source, let alone a proposed odour value. Emission estimates for landfills, for instance, can vary by entire orders of magnitude.

Dispersion modelling itself is somewhat of a black art with huge potential discrepancies dependent on input assumptions. With odours capable of causing nuisance in seconds, the dodgy input data, imprecise met data and short averaging times needed to predict nuisance leave many models struggling. Given accurate predictions are so hard, this may explain why the Agency chose not to sharpen the odour unit benchmark levels.

Matt Stooling of SLR told *AQB*: "The release of a new draft is welcome, particularly given the increasing age of the 2002 draft. As time passed there was increasing uncertainty regarding whether it was valid to use, particularly at appeal. Why had it not been published? Were the impact criteria appropriate? Should a facility be designed against the most stringent criteria or would this result in unnecessary over-engineering and additional cost?"

"One thing that all those involved in assessment of (and regulation of) odour impacts have been looking for is clarity. Although I do not agree with everything in the draft, at least we have the opportunity to discuss the issues and drive the future legislation through the consultation process. At long last we can then all work from the same formal, final, guidance.

David Harvey of ADM said: "I was pleasantly surprised at the new draft which is considerably shorter than the 2002

APPEAL DECISION

Odour judgement questions H4

The Environment Agency's failure to ratify its H4 guidance on odour has drawn criticism from a planning inquiry judge.

Refuse firm Waste Recycling Group wanted to extend its Brogborough Landfill and appealed against Bedfordshire's refusal. In a judgement released just before Christmas, an appeal inspector dismissed the appeal, noise and landscape value were the key grounds for refusal but the inspector's comments on odour may spill over into future planning decisions.

The judge said: "I attach little formal weight to Guidance Note H4 given its draft status The expected odour impact of the proposed extension would not be so great as to justify refusal in itself."

The case saw two

heavyweight odour modellers pitted against each other – David Harvey of ADM, and Michael Bull of Arup.

Arup, for the council, told *AQB*: "While we won, I'm a bit disappointed with the Inspector's comments on H4 where he does not put much weight (if any) on the advice in the document."

"Since this is the only guidance around on odour standards it does seem unfortunate that the inspector discounted it. The problem that we all face is that the H4 document has remained draft for many years and there seems little prospect that it will ever be finalised. There does need to be some clarity from the Agency on how to handle odour issues – some of their other guidance

does appear to use the H4 standards although not directly refer to them (the poultry and pig odour guidance for instance)."

The judge noted that H4 considered 1.5 odour units to be an acceptable standard based on the disgusting smell of landfill. But he noted: "If the 1.5 OU/m³ line were treated as the limit of acceptability, it would seem to preclude landfill of putrescible waste from most of the populated areas of country."

"There would be some adverse effect at this location

Endless uncertainty about the status of the 2002 H4 draft came to a head in February 2007 as our cutting shows

version and therefore is much more readable. There doesn't appear to be a tightening of thresholds – so the new document is unlikely to upset operators – nor is it a licence to pollute.

“I note that they have dropped the term ‘no reasonable cause for annoyance’ which has been used to imply that one is unreasonable if annoyed when the odour emissions are within prescribed limits.”

We talked to the Environment Agency on what happened to H4 since it was first released for consultation in 2002.

Nick Sauer is the Agency's technical expert who has had most to do with developing the latest H4. He is hoping that the latest consultation will be wrapped up before next Spring – and explained why the last one was left in limbo: “I was one of the people who felt that we shouldn't take the 2002 draft consultation out of draft form. While it had a lot of good and useful information, it also contained a number of errors. One particular issue is the concept of ‘no reasonable cause for annoyance’.” He

explained that this phrase did not match up with nuisance law.

The focus is on the thresholds chosen – that a moderate odour at an intensity of three odour units would lead to 10% of people having no reasonable cause for annoyance. Sauer pointed out that if 10% of people were annoyed, that was a large number who could hardly be called unreasonable. “Are we really saying that it's okay to offend 10% of the people?”

We asked why the Agency hadn't decided to allocate particular odours with bespoke thresholds, as opposed to having three broad thresholds. Such thresholds are needed by developers keen to know what they need to do to avoid complaints – they neither want to overdesign the abatement – nor undershoot and find themselves in trouble.

Sauer shared many experts' scepticism that modelling of odours was particularly accurate, especially when it comes to setting out uncertainty. He felt that modelling could only go so far – especially

as odour emissions are so heavily influenced by the management of the process, which explains the document's emphasis on odour management plans.

He concluded: “Odour is really important and interesting – and it's great if the new H4 consultation gets more people excited about it. Odour is not the most important thing that the Agency does (when you compare it to something like agricultural deposition and the like), but it is one of top issues for the public. Odours have an immediate impact on people – if there is a bad smell, people assume the environment is polluted.

“But the great thing about odour – unlike issues such as agricultural pollution – is that when you solved an odour problem, that's it – it's gone!”

Sauer is urging interested professionals to comment on the H4 draft.

● Draft H4 odour guidance can be viewed on www.environment-agency.gov.uk/static/documents/Research/H4_Odour_Guidance_consult_v1_2_090626.doc

DETAIL FROM THE DRAFT H4 GUIDANCE

The new consultation says that permits should be streamlined and contain just two conditions on odour – an odour boundary condition, and odour management plan conditions.

If odours occur at a permitted activity, H4 explains what happens next: “If you are carrying out the measures we originally approved and they are operating as designed, but still not completely solving the problem then we will give you reasonable time to make proposals and implement improvements that will solve the problem.

“However, no odour plan covers every eventuality so we may consider immediate enforcement action if:

- The odour is caused by you not doing something you said you would do in the plan;
- The odour is caused by you not having specified, designed, operated, maintained and otherwise managed a measure in the plan; and
- There is a serious impact on the environment caused by something not in the plan that you could and should have reasonably foreseen – for example the wrong liquids are mixed causing a major release, but nothing was said in the plan.

It then gives helpful examples of when an operator can expect a heavy hand: “For a process plant, your odour management plan proposes a thermal oxidiser, probably stating its capacity. If the oxidiser turns out in practice to be insufficient we will work towards a solution with you as described below. If, however, you failed to design the control system properly so that a power or instrument failure caused the oxidiser to be ineffective and caused a significant incident then you would be liable to enforcement action.

“For a landfill, your odour management plan proposes gas scavenger lines of given diameters and extraction fans of a given capacity for the extraction of landfill gas. If these parameters prove in practice to be insufficient we will work towards a solution with you as described below. If, however, the fans fail because of a design flaw, poor maintenance, inadequate training of your staff or because you just decide to turn them down to save costs resulting in an odour incident then you would be liable to enforcement action.

“The sort of design flaw that could attract enforcement action would be something that should have been picked up as a matter of reasonable due diligence, that is, something that would be normal good practice. As with anything if the courts are likely to consider that it could not reasonably have been foreseen then we would be equally unlikely to take any enforcement action.

“For a farm, if your odour management plan proposes weekly removal of bedding and this turns out to be insufficient we will work towards a solution with you. If, however, you rely only on one contractor who does not turn up leading to a significant odour incident then you would be liable to enforcement action for having failed to arrange adequate contingency.

Further examples of the detail that are assumed to be within the competence of you or your contractors include issues such as alarms, corrosion, component failure and reliability.

Here's an example in an ‘engaging with neighbours’ section: “You must appreciate that your neighbours are likely to perceive odour differently from you or your employees. For you, the activity is your livelihood, and you do not want it interrupted. You only have to put up with the smell when you are working. You will become used to the smell, so it no longer seems to be a problem.

“For your neighbours, bad smells mean that they enjoy their homes and gardens less. They may worry that your activities will devalue their properties. The smell will reach them less often, and so they will be more conscious of it than you are. They may fear that the substances they smell will cause them more long-term harm.

“Your neighbours may feel threatened by your activities. They may also be concerned about other aspects such as lorry traffic, noise, dust or other pollution. Many of the complaints we receive are for multiple problems, including odour. It may be more than just odour that you need to address.

“Whatever the particular local issues, the perception of threat can be compounded if your company is disconnected from and unaccountable to the local community.”

SCIENCE SHORTS

Ammonia logged

Emissions of ammonia from livestock housing was closely monitored in The Netherlands.

Detailed measurements were carried out in a 3km by 3km area and emissions compared with models. The model showed an underestimation of about 15% overall, more when muck spreading was being carried out.

The VELD experiment: an evaluation of the ammonia emissions and concentrations in an agricultural area, W A J van Pul et al, *Atmospheric Environment* Vol. 42 (2008) pp8086-8095.

Bronchiolitis investigated in US

Researchers have tried to link levels of Bronchiolitis to traffic pollution.

Bronchiolitis is an infection of the small airways of the lung (the bronchioles). It is a common condition of babies.

Researchers analysed 2604 bronchiolitis cases alongside 23,354 controls and looked at mean PM_{2.5} exposure at various timescales before the illness appeared. A 10µg/m³ rise in PM_{2.5} led to a 14% increased risk of bronchiolitis hospitalisation and the risk was elevated for infants that lived within 150m of a highway.

Researchers added: "Given the high prevalence of illness attributed to the RSV bronchiolitis in infancy and the widespread population exposure to PM_{2.5} and traffic, even a small relative risk, if real, translates to large public health relevance. This study lends some support to a developing hypothesis that here may be a modest increased risk attributable to chronic traffic-derived exposure particularly for infants born just before or during the peak winter RSV season."

Infant exposure to fine particulate matter and traffic and risk of hospitalisation for RSV bronchiolitis in a region with lower ambient air pollution, Catherine Karr et al, *Environmental Research* Vol. 109 (2009) pp321-327.

TRAFFIC POLLUTION

Speed cuts lead to better air

Modelling has shown that speed cuts to 50mph can produce significant improvements to air quality.

Spanish researchers used models (WRF-ARW/Hermes/CMAQ) to study the impact of different speed assumptions on emissions and concentrations. Differences in emissions due to assumptions on constant speeds or variable hourly speeds based on measurement campaigns in the Barcelona urban area.

The model assumed that the

Barcelona area was suffering a summertime ozone event. By limiting traffic speeds to 80km/hr, local NO₂ reduced by up to 5.7%, SO₂ by up to 5.3% and PM₁₀ by up to 3% within the area affected by the speed limit. Ozone concentrations increased slightly in the urban area (2.4%) due to well known NO_x suppression effects (lower NO_x allows high ozone levels).

Researchers add: "The most positive effects of the management measure are

observed for PM_{2.5}, the most dangerous fraction for human health." They also note that the theoretical reductions may be unrealistic where traffic speeds are already below 80km/hr because of congestion.

Air quality models sensitivity to on road traffic speed representation: effects on air quality of 80km/hr speed limit in the Barcelona metropolitan area, Maria Gonzalves et al, *Atmospheric Environment* vol 42 pp8389-8402.

VEHICLE EMISSIONS

Gas vehicle use in Spain modelled

The impact of using gas powered vehicles in Spain has been modelled.

Researchers looked at seven different fleet replacement scenarios involving natural gas vehicles and modelled the impacts on common pollutants

such as ozone and nitrogen dioxide.

Replacing older commercial vehicles has a large effect in Barcelona, while replacing 10% of private cars has a larger effect in Madrid.

High resolution modelling of

the effects of alternative fuel use on urban air quality: introduction of natural gas vehicles in Barcelona and Madrid greater areas (Spain), Maria Gonzalves et al, *Science of the Total Environment* Vol. 407 (2009) pp776-790.

TRAFFIC POLLUTION

Roadside effect on exhaled breath

Exhaled breath may prove a better marker of traffic pollution damage than normal respiratory function measures.

Canadian researchers totted up the lengths of roadway near schoolchildren's residences. Air pollution was estimated at their residence based on fixed site monitors, lung function and exhaled nitric oxide results were collected for schoolchildren living in the study area.

Researchers concluded: "Each kilometre of local roadway within a 200m radius of the home was associated with a 6.8% increase in exhaled nitric

oxide. Each kilometre of all roadways within 200m was associated with a 10.1% increase in exhaled nitric oxide. Each microgram increase in PM_{2.5} was associated with a 3.9% increase in exhaled NO and 0.7% decrease in FVC function.

"Traffic from local neighbourhood roadways may cause airway inflammation as indicated by exhaled nitric oxide. This may be a more sensitive indicator of adverse air pollution effects than traditional measures of ventilatory function. Roadway density may

be a better indicator of traffic related respiratory health effects than are individual air pollutant measures."

The researchers emphasised that the study suggests that it isn't just the major highways that are likely to be leading to adverse health impacts due to pollution.
The influence of living near roadways on spirometry and exhaled nitric oxide in elementary schoolchildren, Robert Dales et al, *Environmental Health Perspectives*, Vol. 116, no 10, pp1423-1427.

PERSONAL EXPOSURE

Walking and cycling designs bad?

Spanish researchers have tried to quantify the trade off between urban design to encourage exercise and pollution health impacts.

In the US in particular, planners are attempting to design urban areas to encourage cycling and walking. But encouraging extra exercise in

urban areas can increase pollution impacts negating the benefits of exercise.

Modelling showed that on balance, the reduced pollution from lower car use made up for the increased intake of pollutants due to increased breathing rates during heavy exercise.

But large intakes of pollution on high pollution days could overwhelm the benefits.

The built environment and health: impacts of pedestrian friendly designs on air pollution exposure, Audrey de Nazelle et al, *Science of the Total Environment*, Vol. 407 (2009), pp2525-2535.

MONITORING

Traffic contribution larger fraction

Traffic pollution is responsible for a larger part of background particulate than thought, Birmingham University researchers suggest.

Researchers analysed three separate urban data sets which showed significant weekend reduction of PM₁₀, PM_{2.5} and PM_{2.5-10}. Significant weekday-weekend differences were also found for elemental carbon in the fine size fraction, and calcium in the coarse size fraction.

They were able to conclude that the annual average traffic

contribution to the urban increment is estimated at 1.6-4.4µg/m³ for background sites in London, and 1.8µg/m³ for rural Harwell.

Researchers concluded: "One significant result of this study is that it shows a larger traffic generated contribution to the urban background than the APEG receptor model and consequently suggest significant opportunities for air quality improvement by further controls of particulate matter emissions from road traffic.

"Since road traffic also

contributes significantly to the rural background of PM₁₀ (2.3 µg/m³ gravimetric equivalent at Harwell) the benefit of further road traffic emission reductions would be greater than that from reduction of the urban traffic increment alone."

The weekday-weekend difference and the estimation of the non vehicle contributions to the urban increment of airborne particulate matter, Alan Jones et al, *Atmospheric Environment* Vol. 42 pp4467-4479.

URBAN POLLUTION

Commuter exposure high in buses

Commuters are exposed to high levels of PM_{2.5} in buses.

Italian researchers equipped Florence commuters with portable PM_{2.5} monitors in a bid to see in-vehicle concentrations.

Researchers found: "The PM_{2.5} excess above the urban ambient level was on average

32µg/m³ and 20µg/m³ in buses and taxis respectively. PM_{2.5}-bound sulphur was also higher in buses than in taxis.

"As Florence residents spend 9.7% of their day in traffic and the corresponding average exposure is approximately 12% of their daily personal fine

particle PM_{2.5} exposure, the data could be used to plan interventions.

Fine particle concentrations in buses and taxis in Florence, Italy, M Cristina Fondelli et al, *Atmospheric Environment*, Vol. 42 (2008) pp8185-8193.

CHILD HEALTH

Ozone may prompt birth defects

Increased levels of ozone pollution may prompt cleft palates, Taiwan researchers believe.

Three quarters of a million newborns were studied between 2001 and 2003, among which there were 653 born with cleft palates. 6,500 were chosen as controls. GIS data was used to infer exposure to sulphur dioxide, NO_x, ozone, carbon monoxide and PM₁₀ during the

first three months of pregnancy.

The risk of cleft palate increase by 20% for a 10ppb rise in ozone in the first month of gestation and 25% in the second month. Researchers conclude: "This study provides new evidence that exposure to outdoor ozone during the first and second month of pregnancy may increase the risk of cleft palate. Similar levels of ozone are encountered globally by

large numbers of pregnant women.

No correlation could be found with traffic related carbon monoxide and NO_x levels, nor combustion related sulphur dioxide and PM₁₀ levels.

Ozone and other air pollutants and the risk of oral clefts, Bing-Fang Hwang et al, *Environmental Health Perspectives*, Vol. 116, No. 10, pp1411-1415.

AGRICULTURE

Odour related to particle levels

US researchers have matched levels of livestock odour with common pollutants.

100 non smoking volunteers living within 1.5 miles of intensive pig rearing facilities were asked to keep odour diaries. Peaks noted by participants were correlated to

weather, hydrogen sulphide and PM₁₀. Participants noted 1655 odour episodes in the two year study period.

Researchers concluded: "Bad smells from intensive swine operations and the physical and chemical agents with which it is associated have the potential to

negatively impact public health, especially in communities that are already vulnerable."

Air pollution and odor in communities near industrial swine operations, Steve Wing et al, *Environmental Health Perspectives* Vol. 116 No. 10 pp1362-1368.

SCIENCE SHORTS

Antimony levels

Port workers have been found to have high antimony levels in their blood.

This has been blamed on high levels of truck traffic and antimony dust contained in brake linings. Researchers describe the levels as the 'highest ever reported in literature'.

Heavy weight vehicle traffic and its relationship with antimony content in human blood, Waldo Quiroz et al, *Journal of Environmental Monitoring*, 2009, Vol. 11, pp1051-1055.

Interpolation possible

Detailed maps of European air pollution can be derived from EU wide databases, Dutch researchers believe.

They compared various statistical techniques, including kriging, against regression mapping to develop air pollution maps at a 1km by 1km resolution. For NO₂, PM₁₀ and ozone, universal kriging performed better than regression mapping or ordinary kriging. **Mapping of background air pollution at a fine spatial scale across the European Union, Rob Beelen et al, *Science of the Total Environment*, Vol. 407 (2009) pp1852-1867.**

Ethanol savings

Petrol blended with ethanol can reduce emissions of many pollutants.

Canadian researchers found that low percentage blends of ethanol eg E10 results in 16% less CO, but increases in emission of NMHC, acetaldehyde, 1,3 butadiene and benzene.

High percentage E85 results in 45% reduction in NO_x and NMHC, and 75% reductions in 1,3 butadiene and benzene but large reductions of formaldehyde and acetaldehyde.

Emissions from light duty gasoline vehicles operating on low blend ethanol gasoline and E85, Lisa Graham et al, *Atmospheric Environment*, Vol. 42 pp4498-4516.

The recent emission factors consultation is highly technical. Given the number of replies to many consultations, getting 17 responses was actually quite good. But why on earth send it to 453 consultees?

Is it really best use of resources to send highly detailed emissions calculations to bodies such as Wessex Tree Surgeons, the Usdaw trade union, the Northern Ireland Council on Disability and the Christian Road Safety League? Daft.

We've had fun doing our mini consultancy survey this month.

Rather like the website review, the survey was conceived during a rather thin month for news a couple of years ago. But it provoked a lot of interest so we decided to make it an annual event.

We like to think the survey is a useful snapshot of the current air quality market. But we know that for many, it is a source of amusement as to who is stretching the truth. The air quality world is simply too small to be able to get away with outrageous fibs, this year we hope we haven't spoiled the fun by pushing harder to get truthful answers out of people.

Of course some firms don't deliberately

mislead us. For instance one consultant tripped themselves up – having failed to get a reply out of one person, we asked another. Then both got back to us with numbers showing more variance than a dispersion model (100% out!)

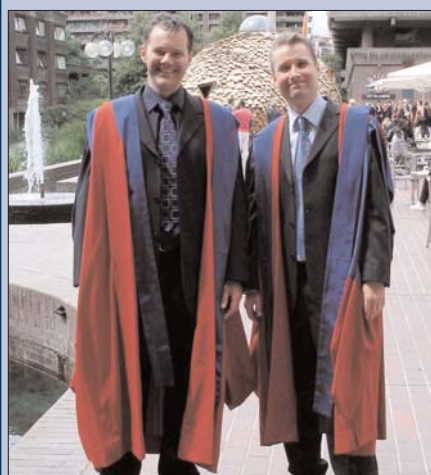
But the biggest surprise is that it appears to be impossible to contact some very large firms via official means. If those firms treat clients the same way they have treated our enquiries, then they deserve to fail (if they haven't done so already).

So the London Mayor is trumpeting his success in starting to get rid of bendy buses in the Capital.

He has explained that the unpopular bendy buses on one route have been replaced by new standard single deckers. Despite being more of them, he claims that total polluting emissions have dropped.

And what is the fate of the bendy buses? Their premature retirement has left them abandoned on some airfield up north – which seems a bit of a waste. In fact, just like the current slashing of the GLA's environmental team.

Double doctors



King's College London ERG's David Green (left) and Gary Fuller have both received PhD's for work on air quality.

We were challenged to come up with a funny headline, and concede to failing on that one.

A caption competition could prove more fruitful. We like: "Green and Fuller model the latest line in NOx-eating cloaks." Maybe readers could do better?

AIR QUALITY EVENTS 2009

15th-17th September

MEASURING AIR POLLUTANTS BY DIFFUSIVE SAMPLING

and other low cost monitoring techniques, AAMG international conference with posters and exhibition to be held in Krakow, Poland <http://rsc-aamg.org>

17th September

CLEARER FUTURE CONFERENCE

South Yorks/Low Emission Strategies Development Partnership conference to be held in Sheffield www.care4air.org

23rd September

BIOMASS AND AIR QUALITY: MANAGING THE IMPACTS

Epuk event to be held at the Royal Society in London Carry Key 01273 878776 www.environmental-protection.org.uk

24th September

NO₂: ARE WE UNDERESTIMATING THE PROBLEM?

CIWEM seminar to be held at Soas, London, contact Lauren Goozee (lauren@ciwem.org)

30th September

SOUTH WEST DIVISION AIR QUALITY MANAGEMENT EVENT

Epuk SW division event to be held in Bristol email jo.barnes@uwe.ac.uk

12th November

AIR QUALITY UPDATE

Epuk conference to be held in Birmingham, Carry Key 01273 878776 www.environmental-protection.org.uk

2nd December

INVESTIGATION OF AIR POLLUTION STANDING CONFERENCE

Iapsc's second conference of the year to be held at the Council House, Birmingham. Website www.iapsc.org.uk

9-10th December

MONITORING AMBIENT AIR 2009 AIR QUALITY – THE MAJOR

Challenges, AAMG conference to be held in London website <http://rsc-aamg.org/Pages/Meetings/MAA2009.html>

2010

12-16th September

15TH WORLD CLEAN AIR & ENVIRONMENTAL PROTECTION CONGRESS

to be held in Vancouver, Canada <http://iuappa.com/index.htm>.

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Printed and published
by Environmental
Management Publishing Ltd

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