

Dr Mark Broomfield

Specialist Consultant

Ricardo Energy & Environment

Qualification(s) *D.Phil by Research, Atmospheric Chemistry, University of York, 1992*

*BA (Hons) First Class Natural Sciences (Chemistry)
University of Cambridge, 1988*

Nationality *British*

Language(s) *English (Mother Tongue)
French (Intermediate)*



Profile

Mark Broomfield is an air quality, odour and health impacts specialist with a BA in chemistry from the University of Cambridge, and a PhD in atmospheric chemistry. He has worked in these areas since 1992, both within the consultancy sector and as an industry specialist at ICI. He provides technical, strategic and research support to industry and regulatory bodies. He has contributed to over 250 industrial permitting applications and follow-on support projects. He also works closely with clients to deliver obligations under the land-use planning and local air quality management frameworks

Mark has appeared as an expert witness on 37 occasions up to November 2018, on issues including odour and air quality impact assessment; environmental and health effects of waste management; perception of risks to health; and road traffic emissions. He works with local authorities, community groups and other stakeholders using health impact assessment and other techniques to achieve consensus on health and environmental issues relating to minerals and waste development. He has recently had overall responsibility for strategic air quality studies in London, Windsor & Maidenhead, Hampshire and the Isle of Wight.

Mark has a long record of providing support to the UK Government and other bodies. He is responsible for complex and challenging aspects of the UK's National Atmospheric Emissions Inventory (NAEI) and Greenhouse gas inventory, and he was the director of Ricardo's contract to deliver the UK POPs Inventory for Defra from 2010 to 2015. He is the project director for Ricardo's contract to support Defra in discharging its responsibilities in relation to the UK Pollutant Release and Transfer Register. Mark was the lead author for the landmark Department for Environment, Food and Rural Affairs (Defra) study "Review of Environmental and Health Effects of Waste Management". After more than 10 years, this remains influential on waste management policy. He has completed research for Defra and Scottish Environment Protection Agency into the control of dioxins and furans, and carried out influential evaluations of the Government's Expert Panel on Air Quality Standards and Air Quality Expert Group.

Mark was responsible for the delivery of an influential programme of research to the European Commission and regulatory authorities in the UK in relation to the use of hydraulic fracturing for shale gas development. This work set the baseline for the European Commission and UK regulators' understanding of the key issues linked to environmental and health risks, control of methane emissions, and legislative/regulatory issues. He authored a chapter in the first book published on legislative aspects of shale gas in Europe, and has gone on to deliver groundbreaking projects in environmental risk management, supply chain analysis, and industry forecasting in the UK and US.

Mark contributes to seminars and conferences on air quality, health and waste-related topics – for example, at Better Air Quality 2018 (November 2018, Malaysia), and as a trainer on air quality and health for Ricardo-AEA's EMAQ+ programme. He is a member of the UK Natural Environment Research Council Peer Review College and the Institute of Air Quality Management.

Key Skills

- + Air quality dispersion modelling and monitoring
- + Odour assessment and management

- + Air quality assessment
- + Health and environmental issues associated with waste management
- + Environmental impact assessment
- + Industrial permitting
- + Expert witness at public inquiry and other forums
- + Project director and manager

Selection of Project Experience

2017 – Present, Preparing Air Quality Improvement Program (2017–2019) in the Greater Beijing-Tianjin-Hebei Region, Asian Development Bank

Mark is project manager for a major project to develop air quality action plans for three cities in the Greater BTH region. This study includes the development of an air emissions inventory which is used as an input to a detailed dispersion modelling analysis, designed to identify the key sources of pollution and enable cost-effective solutions to the serious air quality issues affecting the region to be identified and implemented.

2017 – Present, Air Quality Safeguards Specialist, Asian Development Bank

Mark is providing support to ADB officers in evaluating environmental and social impact assessment studies carried out in support of ADB-funded projects. A key component of this project was writing and delivering a three-day training course for ADB project officers and other stakeholders (April 2017). This course was updated and repeated in November 2018.

2017 – Present, Strategic air quality studies and Expert Witness, Royal Borough of Windsor & Maidenhead

Mark is project director and has a key technical role in delivering strategic air quality modelling studies in support of local authority strategic planning. He was responsible for a study of air quality in support of the updated Borough Local Plan (BLP), focusing on air quality impacts for borough residents and providing input to the Habitats Regulations Assessment of the BLP. In June 2018, Mark was Expert Witness on air quality for RBWM at a public hearing. Mark has gone on to carry out a similar project director and quality review role for the Partnership for Urban South Hampshire housing strategy.

2010 – Present, Review of planning and permit applications for waste to energy and biomass facilities and Expert Witness, various local authorities

Mark has carried out peer review of planning and permit applications for a wide range of EfW and biomass energy facilities. The aim of this work is to focus debate on the key issues, and secure a satisfactory outcome for all parties, ensuring protection of environmental quality and public health. This work has been carried out for high profile and sensitive developments on behalf of Trafford Metropolitan Council, South Lanarkshire Council, Perth and Kinross Council, Dundee City Council and Norfolk County Council. Mark was Norfolk County Council's expert witness on air quality at the high profile public inquiry into the proposed King's Lynn waste to energy facility. He also acted as expert witness on odours for Perth and Kinross Council at a public inquiry into a proposed advanced thermal treatment facility: the Council's decision to refuse permission partly on the grounds of adverse odour impact was upheld at appeal. Mark has carried out a review of a planning application for a proposed waste gasification facility on behalf of the London Borough of Barking and Dagenham.

2017 – Present, Expert Opinion, Advanced Thermal Treatment Development Dispute (Dentons)

Mark is one of three experts providing opinion in relation to the causes of the failure to take up options to develop three advanced conversion technology (ACT) gasification facilities. The scope of advice includes opinion on the performance and deliverability of the technology, planning and permitting status, ability to finance the developments and delivery timescales, including in relation to deadlines on the land options and incentives. Mark has provided specialist input relating to the process to determine stack heights for alternative ACT configurations and if this was carried out appropriately.

2017 – Present, Expert Witness, Review of Environmental Impact Assessment (EIA) for Proposed Waste to Energy Facility (Darrois Villey Maillot Brochier)

Mark is one of three experts providing opinion in relation to arbitration proceedings in the International Court of Arbitration of the International Chamber of Commerce (ICC) (Paris). The dispute relates to the validity of a Government's rationale to terminate a waste disposal contract. Ricardo is providing opinion on whether the EIA prepared for a proposed energy from waste (EfW) facility in the Middle East Region met the requirements of the procuring client, local legislation and international guidelines. Mark is providing opinion on whether the EIA appropriately considered the potential impacts of air emissions on human health and the environment, including reviewing opposing expert opinion.

2011, Training Infrastructure Planning Commission inspectors on the air quality and health impacts of waste and biomass facilities, IPC

The IPC was part of the Planning Inspectorate until 2012. Mark provided training to IPC inspectors on the key issues associated with complex air quality modelling and health arguments which frequently occur in relation to large (>50MW) waste and biomass combustion facilities. The training covered dispersion modelling techniques; meteorological aspects of impact assessment; interpreting model results; health impacts of emissions to air; and health issues and views commonly expressed by developers and third parties.

2015, Audit of economic analysis of sewage sludge anaerobic digestion investment, DECC

Mark led a team carrying out a rapid turnaround audit of an analysis of the costs of investment in a range of established and leading-edge technologies for management of sewage sludge. This work was designed to ensure that a DECC-sponsored report was robust and credible as a basis for policy development and for wider circulation and publication.

2010 - Present, Technical support to governmental bodies and agencies, various clients

Mark is responsible for the landfill methane component of the UK Greenhouse Gas inventory and was project director for the UK Persistent Organic Pollutants inventory from 2010 to 2015. He has carried out projects in support of policy development for the European Environment Agency in relation to levels of metals across Europe and contributed to the development of tools for evaluating air pollution impacts on habitat sites for SNIFFER. Mark has carried out research for the European Commission, Scottish Enterprise, Environment Agency and Scottish Government on environmental, regulatory and market issues associated with shale gas and coal-bed methane development. He evaluated environmental and regulatory issues associated with nanomaterials for the European Commission.

2005 - Present, Review of odour assessment and management studies, various clients

Mark has brought his extensive experience of evaluating and managing odorous emissions to bear on the evaluation of existing and proposed odour controls at potentially odorous operations including landfill sites, composting facilities, and animal rendering facilities. This work has fed into the provision of written and aural evidence at court proceedings and public inquiries.

2009-2010, Health impact assessment for opencast mine scheme, South Wales

Mark was responsible for management and delivery of a health impact assessment for an opencast coal recovery and remediation scheme at the Rhyd-y-Car site in Merthyr Tydfil, South Wales. Mark led the team responsible for reviewing baseline health and environmental conditions; convening workshop meetings with a wide range of stakeholders; and producing a health impact assessment report.

2006 – Present, Waste procurement support to local authorities, various clients

Mark has contributed to a range of projects related to the procurement of waste collection, sorting, recycling, recovery and disposal services. This has drawn on his specialist air quality and health risk expertise and included audit of bidder submissions; expert advice to scrutiny bodies; contribution to public liaison activities; and contribution to Strategic Environmental Assessments. He provided expert input to a public scrutiny committee hearing on behalf of Spelthorne Borough Council and provided expertise on key health issues to North Yorkshire, Surrey and Cheshire County Council's and others.

2003 – 2010, Review of health and environmental issues of waste management, various (Defra; Waste Recycling Group; SITA; local authorities and others)

Mark led the project team that carried out a highly influential review of the health and environmental effects of waste management for Defra. The report was published in 2004 and remains a key influence on waste management policy in the UK. Mark has gone on to provide expert advice and briefings on health and environmental issues to a wide range of clients in the public and private sectors. This work has been published in the form of reports and briefing notes for use with non-specialists. Available at: www.plymouth.gov.uk/sites/default/files/DefraReviewOfHealthImpactsOfWasteDevelopment2.pdf.

2009, Measurement of landfill methane emissions, Environment Agency

Mark led a project team carrying out a trial programme of methane measurement techniques on behalf of the Environment Agency. This work built on expertise gained in a survey of methane emissions at six closed historic landfill sites, which included the development of a new protocol for measuring the contribution of substances other than methane to greenhouse gas (GHG) emissions from landfill sites. Four techniques for estimating methane generation and emissions were trialled at an operational landfill site, and compared with the levels obtained from consideration of the metered gas flow from a discrete landfill cell. Recommendations were made for the implementation of these techniques at closed historic landfill sites to assist in the management and mitigation of greenhouse gas emissions.

2000 – 2010, Exposure assessment of landfill sites, Environment Agency

Mark led a long-term project team which carried out a detailed risk/exposure assessment and measurement survey of air quality at locations adjacent to operational landfill sites. This work fed into the development of advice in relation to landfill sites which was published by the Committee on Toxicity in 2010 and the Health Protection Agency in 2011.

2008 – Present, Air quality assessment, proposed waste to energy facilities, Viridor and others

Mark has carried out detailed air quality, health and nature conservation assessments of proposed waste to energy facilities in Glasgow, Gloucestershire, Staffordshire and elsewhere. As well as dealing with air quality issues, this work included consideration of potential effects on health, control of odours, and designated habitat sites. He has been responsible for designing and implementing baseline air quality surveys. Mark has delivered similar projects for clients including North Yorkshire CC, Ayrshire Power Ltd, Coventry CC and others, and is currently working on applications for projects in Glasgow, Ayrshire and Yorkshire.

2000 – 2010, IPPC/Environmental permit applications, various (BP Oil UK Ltd/Petroplus, Cadbury Schweppes Ltd and others)

Mark has carried out detailed air quality studies in support of IPPC and Environmental Permit applications for a wide range of industrial facilities. This work included a wide range of studies for clients in the Food and Drink sector, including detailed consideration of odour controls and evaluation of complex fugitive emissions. An IPPC permit application was prepared for the BP refinery at Coryton in Essex. This required careful consideration of air quality issues in relation to sulphur dioxide levels, air quality measurements, and the management of potential effects on nearby designated sensitive habitat sites in the adjacent Thames Estuary and elsewhere.

2011, Secondment to National Permitting Group, Environment Agency

Mark was seconded to the Environment Agency for 3 months between January and March 2011. His responsibilities focused on assessing the potential effects of ammonia emissions from intensive farming facilities on designated habitat sites. He liaised closely with Natural England, the Forestry Commission and local wildlife trusts. He provided advice to farmers and specialist consultants and delivered internal training seminars.

2005 – 2009, Review of Defra advisory groups, Defra

Defra is required to carry out a review of the role and function of its Non-Departmental Public Bodies. Mark led the project teams which carried out a review of the Expert Panel on Air Quality Standards, and the Air Quality Expert Group (AQEG). These reviews were instrumental in Defra's decision to merge EPAQS with the Committee on the Medical Effects of Air Pollutants, and to retain AQEG in a modified form. Following the review of AQEG, a range of measures were implemented to improve the efficiency and effectiveness of the group while retaining the high scientific quality and reputation of its deliverables.

Career History**2010 – present, Principal Consultant/Associate Director, Ricardo Energy & Environment (formerly AEA Technology)**

Specialist in air quality and health issues associated with waste management. Leadership of project teams and development of new initiatives in management, monitoring and evaluation of air quality, waste management, EIA and unconventional oil and gas.

1998 – 2010, Senior/Principal Consultant; Technical Manager; Technical Director, Enviros Consulting Ltd/SKM Enviros

Provision of consultancy and expertise in air quality modelling and assessment. Specialist expertise in health and environmental issues associated with waste management; dispersion modelling; air quality monitoring; odour assessment and management; environmental impact assessment; industrial permitting. Expert witness, project director and manager; team leader.

1997 – 1998, Dispersion modelling expert, ICI Technology

Provision of specialist expertise in air quality modelling and assessment to ICI businesses. Contribution to design and assessment of industrial processes. Incident investigation. Development of standard dispersion modelling guidance document.

1992 – 1997, Consultant/Senior Consultant, Consultants in Environmental Sciences Ltd

Provision of consultancy and expertise in air quality modelling and assessment. Specialist expertise in dispersion modelling; air quality monitoring; odour assessment and management; environmental impact assessment; industrial permitting, road traffic emissions. Expert witness and project manager.

Selection of publications

- Author of a chapter on environmental risk and regulatory issues in the first book to be published on shale gas in Europe (see http://www.claeys-casteels.com/eu_energy_studies_5.php)
- J Webb, Mark Broomfield, Stephanie Jones and Brian Donovan (2014), "Ammonia and odour emissions from UK pig farms and nitrogen leaching from outdoor pig production. A review," *Science of The Total Environment* Vol 470–471, pp865–875
- Two publications in scientific literature drawing on DPhil research (*Chemical Physics Letters* and *Journal of Physical Chemistry*)
- Articles in environmental industry publications on control of odours and health/environmental effects of energy from waste.
- Numerous environmental statements, proofs of evidence, advice notes, project reports etc.

Presentations on topics including:

- Design and delivery of training course on air quality impact assessment of development projects
- Design and delivery of training course on air quality and planning appraisal
- Health effects, environmental effects and emissions from waste management;
- Health effects of landfill sites; waste incineration; air pollution episodes
- Unconventional hydrocarbons, including shale gas and hydraulic fracturing (fracking): environmental risks; industry forecasting; supply chain opportunities
- Dioxin and furan emissions from regulated processes;
- Modelling sulphur dioxide and nitrogen dioxide emissions
- Local air quality management;
- Practical air monitoring techniques
- Selection and use of environmental quality standards.

Professional Activities & Membership

- Member of Natural Environment Research Council Peer Review College
- Member of Institute of Air Quality Management
- Industrial supervisor of PhD student, University of Birmingham

Other

Expert Witness experience

Darrois Villey Maillot Brochier (2018)	Expert Witness, proposed EfW Facility, International Court of Arbitration of the International Chamber of Commerce (ICC)
Royal Borough of Windsor and Maidenhead (2018)	Expert witness on air quality at public hearing into Borough Local Plan
Endless Energy (2018)	Written submissions on assessment of air quality and nature conservation impacts of proposed EfW facility, W Yorkshire
Worcestershire Reg Services (2017)	Expert witness on impacts from residential development on an Air Quality Management Area and appropriate mitigation
Newcastle-under-Lyme Council (2016)	Expert witness on odours in relation to a proposed residential development adjacent to a landfill site
Kings Lynn & W Norfolk Council (2015)	Magistrate's Court proceedings for alleged breach of abatement notice at knackers yard (odours)
Kings Lynn & W Norfolk Council (2014)	Evaluation of proposed animal carcass incinerator; preparation of written representations (air quality, odours)
Norfolk County Council (2013)	Public inquiry into proposed waste to energy facility (air quality, health, nature conservation)
London Borough of Sutton (2013)	Planning committee meeting for proposed waste to energy facility (air quality, health)
Forest of Dean Council (2013)	Public inquiry into proposed wastewater facility (odour)
Perth and Kinross Council (2012)	Public inquiry into proposed waste facility (odour; air quality)

Environmental Services Assoc (2012)	Waste procurement open committee meeting (health risks of waste facilities)
London Borough of Sutton (2012)	Waste procurement scrutiny committee open meeting (health risks of waste facilities)
Coogan & Co., Belfast (2010)	Planning hearing into proposed fast food restaurant (odour control)
Individual client, Pembrokeshire (2010)	Planning hearing into proposed slurry tank (odour and bioaerosol risk)
Residents group, Shropshire (2009):	Planning inquiry into proposed biomass CHP plant (air quality impacts)
Individual litigants, ROI (2008):	Expert witness in the High Court, Dublin (mushroom compost odours)
Environment Agency (2008-9):	Provision of evidence on landfill exposures to Committee on Toxicity
Bartlett's Land Management (2008)	Evidence to Magistrate's Court in relation to waste burning
Greenstar, ROI (2005, 2007):	Expert witness on landfill air quality, dusts and odours at Oral Hearing
Surrey County Council (2006):	Health and environmental effects of waste management
Isle of Man Government (2006):	Air quality and odour effects of proposed animal waste processing plant
Royal Borough of Windsor and Maidenhead (2006):	Risks to health associated with proposed contaminated site remediation
Fenside Waste Management (2005):	Health impacts associated with hazardous waste at a landfill site
Biffa Waste Services Ltd (2004):	Odour impacts associated with proposal to extend landfill
Wexford County Council (2004):	Expert witness on landfill air quality, dusts and odours at Oral Hearing
Walsall MBC (2003):	Odour and air quality impacts associated with landfill site
Waste Recycling Group plc (2002):	Air quality associated with proposed waste to energy facility, Hull
Minosus Ltd (2001):	Air quality, dust and odour from hazardous waste storage
St James' Homes Ltd (2001):	Air quality at proposed residential development
Egger UK Ltd (2001):	Dust due to timber recycling (appeal hearing)
Fairview New Homes Ltd (2001):	Odour and air quality at proposed residential development
Patersons of Greenoakhill (2001):	Odour due to landfill operation (Support to expert witness)
Cory Environmental (1999-2000):	Odour relating to proposed landfill extension (Support to expert witness)
Group of London Boroughs (1998)	Air quality impacts of proposed Heathrow T5 (Support to expert witness)
Highways Agency (1996):	Air Quality due to proposed A453 trunk road improvement
Highways Agency (1995):	Air Quality due to proposed M63 motorway improvement
Staffs Engineering Consultants (1994)	Air Quality due to proposed Stafford Eastern and Southern bypass)

Major Projects**Government Bodies**

Cabinet Office/Strategy Unit	Update and development of landfill methane inventory
Ministry of Defence	Detailed review of health and environmental effects of waste management
DETR/DEFRA	Exposure assessment of landfill sites
DECC	Update of National Atmospheric Emissions Inventory projections
Department of Health	Inventory of Persistent Organic Pollutants
Oil and Pipelines Agency	Cost-benefit assessment for hexabromo cyclododecane
Planning Inspectorate	Update and development of landfill methane inventory
	Detailed review of health and environmental effects of waste management

Regulatory Bodies

Environment Agency	Advice on regulating processes in air quality management areas
Scottish Environmental Protection Agency	Evaluation, management and monitoring of methane from unconventional gas
Scotland & Northern Ireland Forum for Environmental Research	Unconventional gas industry foresighting analysis
	Evaluation of ammonia emissions from intensive agriculture
	Research into reduction of dioxin/furan emissions from regulated processes
	Exposure assessment of landfill sites
	Development of air pollution episode protocol
	Secondment to National Permitting group

Water supply

Yorkshire Water PLC	Odour impact studies of new wastewater treatment works in sensitive areas
Thames Water PLC	
North West Water PLC	

Petrochemical Sector

ICI Chemicals and Polymers	Development and application of innovative technique to evaluate site-wide benzene emissions
Huntsman Petrochemicals	
Burmah Castrol group	Preparation of advice on regulatory issues

Minerals Sector

Blue Circle Cement Ltd	Preparation of IPC applications
Chelwood Brick	Foresighting and study of brickworks emissions against emerging air quality guidelines
Ibstock Brick	Contribution to PPC permit and variation applications
Maxwell Brothers (NI)	Health impact assessment of proposed opencast and land remediation scheme
Quinn Cement	
Merthyr Village Ltd	

Waste Management

Hanson Waste Management;	Hazardous waste market analysis
Cory Environmental;	Discussion of health effects of landfill sites with liaison group
Biffa Waste Services Ltd;	Measurement/expert witness evidence in relation to odours from composting facility
Waste Recycling Group PLC;	Measurement and control of bioaerosols and odours associated with extended period of waste storage
Sita Group;	Air quality and odour components of PPC applications
United Waste;	Air quality studies of waste-to-energy plants
Minosus Ltd;	Air quality, health impact and odour studies of landfill sites to support planning applications, public inquiry and possible legal proceedings
Fenside Waste Management	
Indaver Ireland	
Grundon	
Veolia	Odour risk study of leachate treatment plant
Amey Cespa	Expert witness evidence on air quality, odour and health issues

Property development

Fairview New Homes	Air quality studies for housing and commercial developments in sensitive areas
Cala Homes	
Persimmon Homes	Advice on development of sites potentially affected by odour sources
Taylor Woodrow	
RW Gregory LLP	Presentation of expert witness evidence
Isis Property Development	Management of emissions resulting from building decontamination by burning
Volkswagen Motors	
BAE Systems	Odour studies for proposed commercial store development adjacent to sewage works
Asda	

International

Asian Development Bank	Advice and training on air quality assessment of investment projects
European Commission	Air quality action planning in three cities in China
Hong Kong Environmental Protection Department	Environmental risks and regulation of hydraulic fracturing
World Bank	Regional study of airport site development, Hong Kong
Overseas Development Agency	Strategic study of air emissions abatement options, China
Los Angeles County ICI	Advice on strategic planning and air quality control, China
Dalkia	Study of proposed river crossing, Ho Chi Minh City
CB & I Ltd for Peru LNG Ltd	Advice on health effects of landfill, USA
US National Academies	Due diligence advice for CHP plant, China
	Air quality study for proposed major LNG plant, Peru
	Research into alternative fuels to reduce airport PM2.5 emissions

Food and Drink

Kraft Jacobs Suchard/Kraft Foods	Odour and air emissions measurement and dispersion modelling; specification of process improvements
South Suffolk District Council	
Scottish Courage	IPC application for spent coffee grounds WTE plant
Cadbury Trebor Bassett	Advice on regulating animal rendering/pig swill production facility
Milklink	Input to IPPC applications on air quality, odour and other issues

Agricultural Confederation	Industries	Management of effects of emissions to air on sensitive habitat sites
British Sugar		Air quality and odour assessment for intensive livestock permit applications
Moy Park, Westbury Dairy		Odour, taste and health taint assessment and baseline survey
Local government		
Royal Borough of Windsor & Maidenhead		Strategic air quality and habitats regulations assessments in support of local plan development
Consortium of South Hampshire authorities		Investigation, advice, presentation and open discussion of health and environmental effects of waste management
North Yorkshire, Staffordshire, Surrey, Cheshire and Cornwall County Councils		Advice and expert witness on odour management at problem sites Study of infant mortality
Norfolk County Council, South Lanarkshire Council, Perth & Kinross Council, Dundee City Council, Trafford MBC		Review of air quality, health and nature conservation aspects of proposed EfW and biomass plant Baseline air quality surveys and preparation for planning applications for waste management facilities
City of York Council, Midlothian Council, Colchester, Harlow, Tendring and Maldon Councils		Air quality review and assessment studies Expert witness evidence in relation to landfill odours and perception of health effects
London Borough of Hounslow; Spelthorne Borough Council		Air quality studies of proposed Heathrow Terminal 5 development
Walsall Council		Planning application for proposed Park and Ride
Fenland Council		
Chemical Industry		
Ineos Acrylics / Lucite		Dispersion modelling of industrial process emissions
Mitchell Cotts Chemicals Ltd		Fenceline air quality modelling
Robinson Brothers Ltd		Preparation of IPC/IPPC permit applications
Transportation		
Highways Agency		Expert witness on air quality for proposed trunk road/ motorway improvement schemes
Staffordshire Consultants	Engineering	Study of nitrogen dioxide levels around a new bus/tube interchange
London Transport Buses		Air quality and energy use studies for Metrolink lines
Greater Manchester PTA		Study of air quality within bus stations
Morgan Stanley		Due diligence in relation to proposed airport investment
Carillion		Environmental statement for proposed Truro bypass
Other clients		
WDL Solicitors		Statement of case on behalf of local residents' group;
National Society for Clean Air		Research into emissions from waste management
Bishop's Castle Group		Expert witness on air quality in relation to proposed biomass CHP
Individual clients		Expert witness on odours in relation to proposed slurry pit
Chesapeake Network	Climate Action	Shale gas risk assessment for Maryland
Environmental campaign group		Review of public statements on unconventional hydrocarbons; review of consultation response