

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 33 occasions up to December 2015, 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.

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 10 years, this remains a key influence 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 delivered an influential programme of research to the European Commission and UK regulatory authorities on the use of hydraulic fracturing for shale gas development. This set the baseline for the EC 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 ground breaking 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 Unconventional Gas Aberdeen 2014, 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 industrial supervisor of a PhD student at the University of Birmingham investigating emissions of brominated chemicals from waste facilities.

Key Skills

- + Air quality dispersion modelling and monitoring
- + Air quality assessment
- + Health and environmental issues associated with waste management
- + Odour assessment and management
- + Environmental impact assessment
- + Industrial permitting
- + Expert witness at public inquiry and other forums

Selection of Project Experience

2010 - present, Technical support to Defra and other bodies

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

2005 - present, Review of odour assessment and management studies

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.

2010 – Present, Review of planning and permit applications for waste to energy and biomass facilities

Mark Broomfield 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. He 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. Most recently, he 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.

2011 - Training on air quality and health impacts of waste and biomass facilities to Infrastructure Planning Commission inspectors

The IPC was part of the Planning Inspectorate until 2012. Mark Broomfield 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.

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

Mark Broomfield has contributed to a wide range of projects related to the procurement of waste collection, sorting, recycling, recovery and disposal services. This work has drawn on his specialist air quality and health risk expertise, and included audit of bidder submissions; provision of 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 has provided expertise on key health issues to North Yorkshire County Council, Surrey County Council, Cheshire County Council and others.

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

Mark Broomfield led the project team which carried out a highly influential review of the health and environmental effects of waste management for Defra. This report was published in 2004, and remains a key influence on waste management policy in the UK (see <http://archive.defra.gov.uk/environment/waste/statistics/documents/health-report.pdf>). 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.

2009, Measurement of landfill methane emissions (Environment Agency)

Mark Broomfield 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 Broomfield 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 of proposed waste to energy facility (Viridor and others)

Mark Broomfield 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 a planning application for a confidential project in the north of England.

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

Mark Broomfield 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 also 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

November 2012 - present, Knowledge Leader, Ricardo-AEA**2010 – November 2012, Knowledge Leader, 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 management.

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.

Professional Activities & Membership

- Member of Natural Environment Research Council Peer Review College
- Industrial supervisor of PhD student, University of Birmingham
- Contributor to Risk Assessment Masterclass, Cranfield University

Other**Expert Witness experience**

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
Windsor & 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
Staffs Engineering Consultants (1994)	Air Quality due to proposed Stafford Eastern and Southern bypass)

Major Projects Summary:

Government Bodies

Cabinet Office/Strategy Unit	Update of National Atmospheric Emissions Inventory projections
Ministry of Defence	Inventory of Persistent Organic Pollutants
DETR/DEFRA	Update and development of landfill methane inventory
DECC	Cost-benefit assessment for hexabromo cyclododecane
Department of Health	Detailed review of health and environmental effects of waste management
Oil and Pipelines Agency	Review of Expert Panel on Air Quality Standards and Air Quality
Planning Inspectorate	Health and odour impacts of diesel exhaust emissions
	Exposure assessment of landfill sites
	Convenor of seminar to identify research needs in waste and health
	Research into health effects of alternate weekly waste collections
	Design and installation of odour control at fuel storage facility
	Seminar on emissions from biomass facilities

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

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	Odour risk study of leachate treatment plant
Indaver Ireland	Expert witness evidence on air quality, odour and health issues
Grundon	
Veolia	
Amey Cespa	

Local government

North Yorkshire, Staffordshire, Surrey, Cheshire and Cornwall County Councils	Investigation, advice, presentation and open discussion of health and environmental effects of waste management
Norfolk County Council, South Lanarkshire Council, Perth & Kinross Council, Dundee City Council, Trafford MBC	Study of infant mortality
City of York Council	Review of air quality, health and nature conservation aspects of proposed EFW and biomass plant
Midlothian Council	Baseline air quality surveys and preparation for planning applications for waste management facilities
Colchester, Harlow, Tendring and Maldon Councils	Air quality review and assessment studies
London Borough of Hounslow	Expert witness evidence in relation to landfill odours and perception of health effects
Walsall Council	Advice on odour management at problem site
Fenland Council	Air quality studies of proposed Heathrow Terminal 5 development
Spelthorne Borough Council	Planning application for proposed Park and Ride

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

Water supply

Yorkshire Water PLC

Odour impact studies of new wastewater treatment works in sensitive areas

Thames Water PLC

North West Water PLC

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 Climate Action Network

Shale gas risk assessment for Maryland

Environmental campaign group

Review of public statements on unconventional hydrocarbons; review of consultation response

International

European Commission

Environmental risks and regulation of hydraulic fracturing

Hong Kong Environmental Protection Department

Regional study of airport site development, Hong Kong

World Bank

Strategic study of air emissions abatement options, China

Overseas Development Agency

Advice on strategic planning and air quality control, China

Los Angeles County ICI

Study of proposed river crossing, Ho Chi Minh City

Dalkia

Advice on health effects of landfill, USA

CB & I Ltd for Peru LNG Ltd

Due diligence advice for CHP plant, China

US National Academies

Air quality study for proposed major LNG plant, Peru

Research into alternative fuels to reduce airport PM2.5 emissions