

CURRICULUM VITAE

PERSONAL DETAILS

Name: Dr Christopher Busby
Email: christo@greenaudit.org, christo@liverpool.ac.uk
Date/Place of Birth: 01/09/45, Paignton Devon UK
Nationality: British

FURTHER/HIGHER EDUCATION

BSc, PhD, C.Chem, MRSC
Qualifications: 1969 University of London First Class Honours Special Degree in Chemistry
1970-71 SRC research studentship for PhD Physical Chemistry (nmr spectroscopy), Queen Mary College, London
1974 Elected Member of Royal Society of Chemistry
1974 Chartered Chemist
1981 PhD Chemical Physics (Raman spectroscopy/electrochemistry) University of Kent, Canterbury
Learned Societies: Elected: Royal Society of Chemistry; Member: International Society for Environmental Epidemiology
UK Government Committees: Member: (Department of Health and DEFRA) CERRIE Committee Examining Radiation Risk from Internal Emitters (www.cerrie.org); Member: Ministry of Defence DUOB Depleted Uranium Oversight Board (www.duob.org)
Other Committees: Scientific Secretary: European Committee on Radiation Risk (www.euradcom.org)

EMPLOYMENT

1969 – 1974 Research physical chemist, Wellcome Foundation, Beckenham
1975 - 1978 Self employed (inshore fisherman, yacht deliveries, ultrasound surveys, general boat person).
1979 – 1981 PhD student University of Kent
1981- 1982 SERC Research Fellow University of Kent
1983- 1992 Self employed scientific consultant and science writer
1992- present Science Director, Green Audit, commissioned to research the health effects of ionizing radiation and funded by a number of charities and independent bodies.
1995 Funded by the Joseph Rowntree Charitable Trust to write and produce 'Wings of Death- The health effects of low level radiation.'

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1997-2000 Directed research at Green Audit Funded by Irish State to research health effects of Sellafield

1997 Appointed UK Representative of European Committee on Radiation Risk (ECRR)

2001 Appointed Scientific Secretary of ECRR and commissioned to prepare the report ECRR 2003- The Health effects of low doses of Ionizing Radiation (Published 2003)

2001 Appointed to UK Government Committee Evaluating Radiation Risk from Internal Emitters (CERRIE)

2001 Appointed to the UK Ministry of Defence Oversight Committee on Depleted Uranium (DUOB)

2002 Funded by the Joseph Rowntree Charitable Trust to write a new book on the epidemiological evidence of health consequences of exposure to ionizing radiation: 'Wolves of Water'

2003 Appointed Honorary Fellow, University of Liverpool, Faculty of Medicine, Department of Human Anatomy and Cell Biology

1992- present: Science Director, Green Audit

2003 Funded by Joseph Rowntree Charitable Trust to write Book Wolves of Water

2004-2006 Leader of Science Policy for(EU) Policy Information Network for Child Health and Environment PINCHE based in Arnhem, The Netherlands

Editorial boards (Current):

European Journal of Biology and Bioelectromagnetics

RESEARCH INTERESTS.

Chris Busby spent seven years at the Wellcome Foundation, where he conducted research into the physical chemistry and pharmacology of molecular drug receptor interactions. He subsequently moved to the University of Kent at Canterbury where he studied Laser Raman Spectro-electrochemistry in collaboration with Shell Research and later as SRC Research Fellow, a project which resulted in a PhD in Chemical Physics. He developed and published theoretical and experimental details of silver and gold electrodes with surface array properties which enable acquisition of laser Raman spectra of adsorbed molecules in dilute solution.

In the late 1980s he became interested in the mechanisms of low dose internal irradiation and developed the Second Event Theory, which distinguishes between the hazards of external and internal radiation exposure. In 1995 he was funded by the Joseph Rowntree Charitable Trust to develop his arguments and write 'Wings of Death: Nuclear Pollution and Human Health', an account of the results of his research into radiation and cancer and also into cancer increases in Wales, which he argued were a result of global weapons fallout exposure. In 1997 he became the UK representative of the European Committee on Radiation Risk. His analysis of the increases in childhood leukaemia in Wales and Scotland

following Chernobyl was recently published in the journals Energy and Environment and the International Journal of Radiation Medicine.

From 1997-2000 he was funded by the Irish Government to carry out research into cancer incidence and proximity to the coast. In June 2000 he was invited to present evidence to the Royal Society committee on Depleted Uranium and health, and shortly after this was invited to Iraq to measure DU in the country and relate exposure to health effects which followed the Gulf War. In 2001 he was asked to visit Kosovo to investigate the dispersion of DU using field monitoring equipment. He discovered DU in many areas from analytical measurements made on samples he collected (paid for by the BBC) he showed that there was atmospheric resuspension of DU particles. His work and expertise in the field of environmental health and radioactivity has been recognised by his appointment to CERRIE a Government committee reporting on the effects of low level radiation on health. Following his evidence to the Royal Society on the effects of Depleted Uranium, he was appointed to the UK Ministry of Defence committee on Depleted Uranium in 2001. He was invited to address the US Congressional Committee on Veterans Affairs of the Health effects of Depleted Uranium in 2002. He is presently also the Scientific Secretary of the European Committee on Radiation Risk and was commissioned to organise the preparation of the new risk model on radiation exposure and to organise the publication of ECRR 2003: The Health Effects of Exposure to low Doses of Ionizing Radiation, published in January 2003 and now translated into and published in French, Russian, Japanese and Spanish. In 2004, he (jointly with two other colleagues) published the *Minority Report of the CERRIE committee* (Sosuimi Press). In 2006 he produced and jointly edited with Prof. Alexey Yablokov of the Russian Academy of Sciences *ECRR2006 Chernobyl 20 Years On*.

RESEARCH EXPERIENCE

Dr Busby's early research was in the Physical Chemistry aspects of molecular pharmacology at the Wellcome Research Labs. This involved the use of spectroscopic and thermodynamic methods for examining cell drug interactions at the molecular level. For a while he began a research degree in NMR on molecular conformational changes on protonation but left to return to Wellcome and resume his drug interaction research. From there he moved to developing descriptions of intercellular and intracellular communication mechanisms, a subject which he is still engaged in researching in the laboratory. Later he moved to examining molecular behaviour at charged interfaces and developed Surface Raman spectroelectrochemical methods as a Science Research Council Fellow at the University of Kent.

Between 1992 and 2004 Dr Busby was engaged in research in three areas associated with ionising radiation and health and also was funded for a year (1997) by the *Foundation for Children with Leukemia* to research the interaction between non ionising radiation and ionising radiation. His research in the area of

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ionising radiation has been split between the development of theoretical descriptions of radiation action on living cells and the epidemiology of cancer and leukaemia in small areas. After 1994 he conducted survey epidemiology of Wales and England and was the first to point out (in a letter to the *British Medical Journal*) that increases in cancer in Wales might be related to weapons fallout. Later he examined childhood leukaemia mortality near the Harwell and Aldermaston nuclear sites and suggested that the excess risk might be related to inhalation of radioactive particles. These results were also carried in a research letter in the *BMJ* which attracted considerable criticism. His description of the mode of radiation action from sequential emitters (his Second Event Theory was developed originally in 1987 and has attracted a great deal of interest and also criticism. Between 1997 and 2000 he was funded by the Irish State to carry out epidemiological studies of cancer rates and distance from the Irish Sea using data from Wales Cancer Registry and through a collaboration with the Irish National Cancer Registry. Following this he and his team in Green Audit developed novel small area questionnaire epidemiological methods and applied them to a number of areas in different studies which included Carlingford Ireland, Burnham on Sea in Somerset and Plymouth Devon. In addition he carried out cancer mortality small area studies in Somerset and later in Essex. He extended these to wards in Scotland in 2002. At present he is supervising a PhD student at the University of Liverpool in the Faculty of Medicine in an epidemiological study of cancer mortality in Scotland with regard to proximity to putative sources of cancer risk. In all the small area studies he carried out it was possible to show a significant effect of living near radioactively contaminated intertidal sediment. The papers and reports were all published by Green Audit and most have been presented by invitation at learned conferences in Europe including through invitations by the Nuclear Industry itself.

In addition to this, in 1998 Busby set up a radiation measurement laboratory and equipped it with portable alpha beta and gamma measuring systems including a portable gamma spectrometer made in Dresden which uses a 2" NaI detector. He used these to show the presence of Depleted Uranium in Southern Iraq in 2000 when he was invited by the Al Jazeera TV channel to visit the country as a consultant and examine the link between leukaemia in children and levels of Depleted Uranium. In 2001 he visited Kosovo with Nippon TV and was the first to show that DU was present in dust in towns in Western Kosovo and through isotope measurements funded by the BBC was able to report to the Royal Society in 2001 and the EU Parliament in Strasbourg that DU became resuspended in dry weather and was rained out, and that it remained in the environment for a considerable time. This subsequently led to UNEP deploying atmospheric particle measuring equipment in areas where DU had been used. More recently Dr Busby has been developing laboratory methods for measuring radiation conversion and amplification by high atomic number micron diameter

metal and metal oxide particles (Uranium, Gold). It is his recent contention that such particles amplify background radiation effectiveness by photoelectron conversion.

In 2005 he was invited by various organisations in New Zealand to give evidence on the health effects of Depleted Uranium. In 2005 and 2006 he worked with Prof Alexey Yablokov on the ECRR2006 report on Chernobyl which was published on the 20th anniversary of the accident. Most recently he has conducted a study of the health of people living in the vicinity of the Trawsfynydd Nuclear plant in Wales for HTV and also a study of the veterans of the Porton Down human experiments in the 50s. His study will be used in the Court action that is being brought by the veterans against the MoD.

In 2006 he was consulted by the government Committee on Radioactive Waste Management CoRWM on the health effects of exposure to nuclear waste

INVITATIONS TO SPEAK.

Year	Place, Subject etc.
1995	House of Commons. Symposium on Low Dose Radiation
1995	Jersey, Channel Islands: International conference on nuclear shipments; Health effects of low dose radiation
1995	Oxford Town Hall: Low dose radiation effects
1995	Drogheda, Ireland: Sellafield effects
1997	Strasbourg EU Parliament: Euratom Directive
1997	Brussels, EU Parliament STOA workshop on criticisms of ICRP risk models
1997	Kingston Ontario: World Conference on Breast Cancer: paper on cohort effects and weapons fallout
1998	Muenster, Germany, International Conference on Radiation: Second Event effects
1998	Manchester Town Hall, Ethics and Euratom
1999	Copenhagen: Danish parliament: Euratom Directive and low dose effects
1999	Carlingford, Ireland: Sellafield effects
2000	Kos Island: ASPIS (EC) meeting on 'Is cancer an environmental effect'; low dose radiation and cancer
2000	London: Royal Society: low dose effects and Depleted Uranium
2001	Strasbourg: Green Group; Health effects of Depleted Uranium
2001	Bergen: International Sellafield conference, Sellafield effects on health
2001	Oslo: Nobel Institute: Health effects of low dose radiation and DU

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Wolves of Water

2001	London: Royal Society: Health effects of Depleted Uranium (again)
2001	Kiev: WHO conference on Chernobyl: paper on infant leukaemia
2001	Prague: <i>Res Publica</i> International Conference on Depleted Uranium
2001	Strasbourg: EU Parliament, with UNEP; Health effects of Depleted Uranium
2002	Bergen: Conference on Sellafield
2002	Helsinki: Health effects of low dose radiation
2002	London : US Congressional Committee on National Security: Gulf war syndrome and Depleted Uranium
2002	London Greenpeace: Small area statistics and radiation effects
2002	Chilton: Health effects of radioactive waste
2002	Oxford, British Nuclear Energy Society: Effects of low doses of radiation
2002	Royal Society of Physicians: Small area health statistics and radiation
2003	Birmingham: Non ionising radiation. Chaired
2003	Liverpool University: Depleted Uranium and Health
2003	Oxford University: Health Effects of Radiation from Internal Emitters
2003	Munich: Whistleblowers
2003	Copenhagen: Radiation and the foetus
2003	Hamburg: Depleted Uranium
2004	Berlin: Low level radiation
2004	London: PINCHE, child health and environment
2004	London, Westminster: Children with leukaemia
2004	Chicago: Radiation studies
2005	New Zealand Royal Society, Wellington
2005	New Zealand, Auckland University
2005	Chicago: Small area epidemiology by citizen groups
2005	Salzburg, Austria. PLAGE; International Nuclear Law and Human Rights
2005	Stockholm, Swedish Parliament; Low Dose Radiation and Depleted Uranium
2006	ECRR, Berlin, Health effects of the Chernobyl Accident
2006	Hiroshima Japan, Depleted Uranium

Including the above, Chris Busby has given invited presentations at meetings in Strasbourg (5), Brussels (2), Jersey, Alderney, Copenhagen (2), Bergen (2), Oslo

(2), Vienna, Helsinki, Muenster, Kiev, Hartford Ct, Kingston, Ontario, Baghdad, Pristina (Kosovo), Manchester (4) Oxford, Newbury (2), Cardiff (3), London (6), Prague, Dublin (2), Carlingford, Drogheda, Harlech, Bangor, Llandrindod Wells, Hastings, Weston Super Mare, Burnham on Sea (2), Bridgwater, Reading, Ulverston, Liverpool, Plymouth, Brighton, Kingston and Aberystwyth (5).

PUBLICATIONS

See reference section of *Wolves* for the radiation and the epidemiological papers

Books and articles

Busby, C. C. (1996a), ' in Bramhall, R. (ed.), *The Health Effects of Low Level Radiation: Proceedings of a Symposium held at the House of Commons, 24 April 1996* (Aberystwyth: Green Audit).

Busby, C. C. (1998), 'Enhanced mutagenicity from internal sequentially decaying beta emitters from second event effects.' In 'Die Wirkung niedriger Strahlendosen- im Kindes- und Jugendalter, in der Medizin, Umwelt und Technik, am Arbeitsplatz'. Proceedings of International Congress of the German Society for Radiation Protection. Eds: Koehnlein W and Nussbaum R. Muenster, 28 March 1998 (Bremen: Gesellschaft für Strahlenschutz)

Busby C.C and Scott Cato M (1999) 'A Planetary Impact index' in Molly Scott Cato and Miriam Kennett eds. *Green Economics- beyond supply and demand to meeting peoples needs*. Aberystwyth: Green Audit, Numerous articles for 'The Ecologist' on low dose radiation effects have been translated into many languages and reprinted.

EXPERT WITNESS

Since 1997 Chris Busby has been engaged as an expert witness in several cases that relate to the effects of radioactive pollution on health, in several refugee appeals (Kosovo) based on Depleted Uranium risks, several trials of activists accused of criminal damage at weapons establishment and one at the House of Commons (evidence on Depleted Uranium and other radioactive substances), one MoD pension appeals tribunal for the widow of a A Bomb test veteran and once in the Connecticut State Court for an appeal against licensing releases of radioactivity from the Millstone reactor on Long Island Sound. He is currently acting or has recently acted as expert witness on two cases in the UK involving the health effects of internal irradiation from Depleted Uranium. One of these is in the Royal Courts of Justice and also in three cases in the USA. Two of these (against Exxon) have recently been won. The third, a landmark case involving childhood cancer near a nuclear plant in Florida is currently being appealed. He was also commissioned as an expert witness on the effects of Uranium weapons in the recent criminal damage case of Pritchard and Olditch and the USAF bombers at Fairford which they disabled at the time of the second Gulf War.

Science is more than just cold blooded, rational analysis and laboratory experiment. The laboratory is just that. It is a place. It is actually quite a strange place, not part of the real world. It is an artificially created place where influences are controlled, away from the world. But the world and its dynamic are also (or should be) our laboratory. 'Scientific' has come to mean 'True' and is now used as equivalent to 'I am right (and you are wrong)'. Along with the technological advances, the digital watches and lasers, we have developed a kind of science-induced blindness that arises out of the belief that we can atomise observational facts and deal with them as separate entities in a cultural vacuum and then reassemble them to obtain the truth.

This book is about corporate responsibility as it is applied to national governments. Part biography, part textbook, part warning, part entertainment and part celebration of life, it is an account of one man's decision to take on the might of the nuclear/ military lobby using the methods of science and epidemiology. Most of all it is a message to the planet and its inhabitants to take control of the science/ policy interface before the products of science and scientific ways of thinking destroy us all. The book charts developments in Dr Busby's researches on the subject of radioactive pollution from the nuclear industry since his *Wings of Death* (1995) introduced the thesis that the releases to the environment of novel radioactive substances like Caesium-137, Plutonium-239 and Strontium-90 were the cause of the present cancer epidemic. Presenting his research on the health effects of Sellafield and cancer near the Irish Sea as a hook, Busby dissects the workings of the government advisory establishment, the biased science and the institutional cover-ups of the causes of cancer and other illnesses.

From cancer near nuclear sites and contaminated coasts, he moves on to radioactive dust in middle England, plutonium in your children's teeth, buried nuclear reactors under housing estates and the effects of Uranium weapons on people living thousands of miles from battlefields. Packed with anecdotes, asides, poems, photographs, songs, quotations, graphs and tables of data, this colourful, informative and empowering work is recommended reading for epidemiologists, environmental activists, scientists, philosophers, politicians, regulators, lawyers and perhaps criminologists.

After reading this book, the world will not seem the same place.

Chris Busby is a radiation scientist, a Fellow of the University of Liverpool, Scientific Secretary of the European Committee on Radiation Risk and was a member of two UK government committees.

A searchable index for this book
is online at
www.llrc.org/wolvesindex.htm

Price £12 (€20)



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