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National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

United Kingdom of Great Britain and Northern Ireland

April 2007

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

SCOTTISH EXECUTIVE

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Executive Summary

The Stockholm Convention is a global treaty to protect human health and the environment from Persistent Organic Pollutants (POPs). POPs are a group of chemicals which persist in the environment, may bioaccumulate in food and human tissues and are toxic. These chemicals also have the potential to be transported long distances and deposited far away from their place of release including pristine environments such as the Arctic. The Convention requires that Parties adopt and introduce measures aimed at reducing the releases of POPs into the environment with aim to reduce human and wildlife exposure.

There are 12 POP chemicals listed in the Convention. The 12 POPs fall into three broad categories: pesticides (aldrin, chlordane, dieldrin, endrin, hexachlorobenzene (HCB), heptachlor, mirex, toxaphene and DDT), industrial chemicals, polychlorinated biphenyls – (PCBs) and unintentionally produced by-products of combustion and some industrial and non industrial processes (dioxins, furans, HCB and PCBs).

As a Party to the Stockholm Convention, the UK has developed this National Implementation Plan (NIP). The NIP sets out how the Stockholm Convention is being implemented in the UK and outlines the next steps to be taken in the management of POPs.

The use of all the pesticides and industrial chemicals listed in the Convention has been banned in the UK for many years. Action on POPs is delivered at the international, European Union and national levels. Most UK legislation concerning the control of POPs arises from European Community legislation. In addition, to ensure sound management of any waste containing or contaminated with POPs, the UK has legislation in place which requires that any such waste is disposed of, or recovered, in such a way as to ensure that the POPs content is destroyed or irreversibly transformed.

The NIP includes the UK Dioxins Action Plan which summarises actions taken so far to control unintentional emissions of dioxins, PCBs and HCB and human exposure via food. It also outlines future research and initiatives that will be taken forward over the next five years to address further unintentional emissions these substances.

The UK has already taken a number of measures to control emissions. These measures have included controls on:

- industrial processes such as municipal waste incineration, metal processing plants, power stations and chemical manufacturing plants;
- open agricultural burning;
- marketing and use controls on chemicals contaminated with dioxins and HCB; and
- vehicular emissions.

During the last 10 years these measures have lead to substantially reduced emissions to the environment. In addition, a recent survey on the levels of contamination in UK soil and herbage indicate that levels of dioxins and PCBs in soil and herbage are falling. The results strongly suggest that urban and industrial areas are no longer significant sources of dioxins,

and that diffuse sources may now be more important. The data are consistent with emissions estimates from the National Atmospheric Emissions Inventory (2004) which also indicate that diffuse emission sources are now dominant.

The major route of human exposure to dioxins and dioxin-like PCBs is through the food chain. Over the past 10 years, there has been approximately a 70% reduction in levels of dioxins and dioxin-like PCBs in food. This is consistent with a reduction in exposure via the environment. The Food Standards Agency continues to monitor the UK food supply and animal feeds for dioxins, dioxin-like PCBs to further reduce human exposure.

As the contribution of larger industrial sources of emissions has been reduced, so a range of smaller more diffuse sources have come to dominate the UK source inventory. Due to the persistence of these chemicals in the environment the Government will continue to take measures to continue to reduce emissions and to further improve our understanding of their production in particular from diffuse sources. The NIP outlines 14 activities to be taken forward in this area.

Future work will include improvement and updating of source inventories for releases to air, land and water which will facilitate the development of a more comprehensive multimedia inventory for dioxins, PCBs and HCB. In particular, work will be undertaken to reduce levels of uncertainty in activity statistics and emission factors for diffuse sources such as bonfires, small scale burning and accidental fires to provide a more accurate understanding of the contribution of these sources to the UK's emissions. Actions to further reduce emissions from industrial sources are being considered along with an awareness raising programme to tackle diffuse domestic sources. Human exposure through the food chain will continue to be monitored and regulated.

Evaluation of the success of the UK Dioxins Action Plan is crucial to the successful implementation of the NIP. Further reductions in emissions of dioxins, PCBs and HCB will be monitored through the Toxic Organic Micro-Pollutants (TOMPS) air monitoring programme. Current emission trends will be compared with those detected in 2011 in order to review success of UK policy to control the unintentionally released POPs and in put into a review of the Plan in 2011.

The UK Government will continue to support research on POPs and to facilitate the training of young scientists. This work will contribute to the UK's implementation of the provisions of the Stockholm Convention on information exchange, awareness raising and education on POPs.

The UK NIP was finalised after a period of public consultation. The NIP will be subject to periodic updating and revision in the future in response to the dynamic nature of the Convention, for example, in its identification and inclusion of additional persistent organic pollutants.

Section 1

Introduction

1.1 Purpose of the UK National Implementation Plan

The Stockholm Convention on Persistent Organic Pollutants (POPs) entered into force on 17 May 2004. It is a global treaty signed by 151 States and regional economic integration organisations with the objective to protect human health and the environment from persistent organic pollutants. The Convention web address may be found at:

http://www.pops.int/

Parties to the Convention are required to develop, and endeavour to put into practice, a National Implementation Plan (NIP) setting out how they will implement their obligations under the Convention. This plan should be submitted within two years of the date on which the Convention entered into force for that Party. The UK ratified the Stockholm Convention on 17 April 2005 and consequently must submit its NIP by 17 April 2007.

The UK NIP will be subject to periodic updating and revision in the future in response to the dynamic nature of the Convention, for example, in its identification and inclusion of additional persistent organic pollutants.

1.2 Development of the UK National Implementation Plan

The UK NIP has been developed by the Department for Environment, Food and Rural Affairs (Defra) in close collaboration with the Scottish Executive, the Welsh Assembly Government, the Department of Environment, Northern Ireland and other relevant Government Departments and Agencies.

Defra established a Dioxins Strategy Group to assist with the development of the UK Dioxins Action Plan which forms part of the implementation plan. The role of the Dioxins Strategy Group was to appraise the results of Government's monitoring and scientific research programmes and to advise on the identification of areas for future action. The mandate for the Dioxin Strategy Group and a list of its Members may be found at Annex 1. In addition, the Dioxin Action Plan was issued for a public consultation in autumn 2006 to seek feedback from stakeholders and members of the public prior to its finalisation.

1.3 Structure of the UK National Implementation Plan

The UK's NIP is organised into eight sections. Section one provides a brief background to POPs and the aims and obligations of the Stockholm Convention. Section two outlines the legislative and policy framework for the management of POPs. Section three gives an overview of the management of intentionally produced POPs in the UK. Sections four, five and six, set out the UK Dioxins Action Plan on releases of unintentionally produced POPs and outlines the future actions to be undertaken in the UK to further reduce emissions. Section

seven outlines the reduction or elimination of POPs releases from stockpiles and waste. Section eight outlines the rest of the obligations under the Convention. A glossary of terms and units used is appended in Annex 2.

1.4 What are Persistent Organic Pollutants?

POPs are a group of chemicals that are toxic, persist in the environment, bioaccumulate in fatty tissues and biomagnify through the food chain. In addition, POPs have the potential to be transported long distances and deposited far from their place of release including in pristine environments such as the Arctic and Antarctic. POPs have been identified as priority chemicals for many years in the UK and the international community has called for actions to reduce and eliminate the production, use and release of these substances.

1.5 Overview of the 12 Persistent Organic Pollutants

The Stockholm Convention on POPs currently focuses on reducing and eliminating releases of the following 12 POPs:

Aldrin – A pesticide applied to soils to control termites, grasshoppers, corn rootworm, and other insect pests.

Chlordane – Used extensively to control termites and as a broad-spectrum insecticide on a range of agricultural crops.

DDT – DDT was widely used during World War II to protect soldiers and civilians from malaria, typhus, and other diseases spread by insects. It continues to be applied against mosquitoes in several countries to control malaria.

Dieldrin – Used principally to control termites and textile pests, dieldrin has also been used to control insect-borne diseases and insects living in agricultural soils.

Dioxins – The term 'dioxins' is used throughout the NIP as an umbrella description for polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF). Dioxins are families of structurally related compounds and belong to a class of environmental pollutants known as organochlorines. Dioxins are toxic, do not readily breakdown in the environment and accumulate in human and animal tissue. They were never produced intentionally (except for small-scale research purposes e.g. to investigate formation chemistry) and may be found as trace by-products from a number of industrial and non-industrial processes.

Endrin – This insecticide is sprayed on the leaves of crops such as cotton and grains. It is also used to control mice, voles and other rodents.

Furans – Throughout this NIP the term "dioxin" is used to include reference to furans.

Heptachlor – Primarily employed to control soil insects and termites, heptachlor has also been used more widely to control cotton insects, grasshoppers, other crop pests, and malaria-carrying mosquitoes.

Hexachlorobenzene (HCB) – HCB was primarily used as a fungicide. Unintentional releases of HCB can occur in the manufacture of specific pesticides where HCB remains as an impurity and can also be produced as an inadvertent by-product from the manufacture of some chlorinated solvents. HCB emissions may also arise from combustion sources.

Mirex – This insecticide is applied mainly to combat fire ants and other types of ants and termites. It has also been used as a fire retardant in plastics, rubber, and electrical goods.

Polychlorinated Biphenyls (PCBs) – These compounds were used in industry as heat exchange fluids, in electric transformers and capacitors, and as additives in paint, carbonless copy paper, sealants and plastics. They can also be formed unintentionally as by-products in some chemical and combustion processes. It is now known that some PCBs exhibit similar biological activity to dioxins and these compounds are therefore referred to as dioxin-like PCBs. The rest of the NIP considers total PCBs in the environment whilst the section on analysis of exposure to PCBs via the diet makes a distinction between dioxin-like PCBs and total PCBs.

Toxaphene – This insecticide, also called camphechlor, is applied to cotton, cereal grains, fruits, nuts, and vegetables. It has also been used to control ticks and mites in livestock.

Table 1: The 12 POPs listed in the Stockholm Convention

Chemical	Pesticide	Industrial chemical	Unintentional – by-product
Aldrin	x		
Chlordane	x		
Dieldrin	x		
Endrin	x		
Heptachlor	x		
Hexachlorobenzene	x	x	x
Mirex	x		
Toxaphene	x		
Polychlorinated biphenyls (PCBs)		x	x
DDT	x		
Dioxins			x
Furans			x

1.6 Measurement of toxicity for dioxins (Toxic Equivalency Factors)

Dioxins are found and released to the environment as complex mixtures of chemical congeners. There are 210 congeners in total, only 17 of these congeners are considered biologically active and exhibit toxicity similar to that of 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD), the most toxic congener. In order to give a single measure of the toxicity of a sample and to simplify the handling of data on these compounds various 'toxic equivalent' (TEQ) schemes have been proposed. These schemes provide a series of 'toxic equivalency factors' (TEFs) that are applied to the measured concentrations or amount of each congener to give a measure of the overall toxicity of a mixture. The toxic equivalent concentration is the amount of 2, 3, 7, 8-TCDD that is estimated to give the same overall effect as the mixture present.

There are two systems in current use for presenting toxic equivalency factors for dioxins; the International TEQ (I-TEQ) and the more recent World Health Organisation the (WHO TEQ). The latter also includes the dioxin-like PCBs. These are given in Annex 3a and 3b.

In the UK, the Committee on the Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) adopted the use of WHO-TEQ, while the I-TEQ scheme is widely used in UK and EU legislation. For purposes of this document both terms I-TEQ and WHO-TEQ will be used where appropriate. WHO reviewed their TEQ scheme in mid-2006 and have recommended some amendments, at time of publication of this report the WHO TEQ were being re-assessed for possible use in the UK or EU legislation.

1.7 Provisions of the Stockholm Convention

The Stockholm Convention establishes a strong international framework for promoting global action on the twelve POPs which are divided into three groups according to their mechanism of production and level of restriction.

Nine of the intentionally produced chemicals (aldrin, chlordane, dieldrin, endrin, HCB, heptachlor, mirex, toxaphene and PCBs) are subject to a ban on production and use except where there are generic or specific exemptions. In addition, the production and use of DDT is severely restricted.

Parties are required to take measures to reduce releases from the unintentional production of dioxins, PCBs and HCB with the goal of their continuing minimisation and, where feasible, ultimate elimination. The main tool for this is the development of a Dioxins Action Plan which should include source inventories and release estimates as well as plans for release reductions. The use of Best Available Techniques to limit releases of unintentionally produced POPs from the major source categories is also required.

There are special provisions for those Parties with regulatory assessment schemes to review existing chemicals for POP characteristics and to take regulatory measures with the aim of preventing the development, production and marketing of new substances with POP characteristics.

The Convention also foresees the identification and safe management of stockpiles containing or consisting of POPs. Waste containing, consisting of or contaminated with POPs should be disposed of in such a way that the POP content is destroyed or irreversibly transformed. Where this does not represent the environmentally preferable option or where the POP content is low, waste shall be otherwise disposed of in an environmentally sound manner. Disposal operations that may lead to the recovery or re-use of POPs are forbidden.

The Convention recognises the particular needs of developing countries and specific provisions on technical assistance and on financial resources and mechanisms are included in the general obligations.

Section 2

The UK's Legislative and Policy framework on Persistent Organic Pollutants

Action on Persistent Organic Pollutants is delivered at the international, EU and national levels.

2.1 International level

Due to the long range transportation of POPs, a global approach is necessary to agree the control of these substances. In addition to the Stockholm Convention, the UK has additional commitments at the international or regional level.

2.1.1 The United Nations Economic Cooperation for Europe (UNECE) Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants

The Executive body to the UNECE Convention on Long Range Atmospheric Transportation of Air Pollutants adopted the Protocol on POPs on 24 June 1998. It focuses on a list of 16 substances comprising eleven pesticides, two industrial chemicals and three unintentionally produced by-products. The objective of the Protocol is to eliminate discharges, emissions and losses of POPs. It bans the production and use of some chemicals outright (aldrin, chlordane, chlordecone, dieldrin, endrin, hexabromobiphenyl, mirex and toxaphene). Others are scheduled for elimination at a later stage DDT, heptachlor, HCB, and PCBs. It includes provisions for dealing with the wastes of chemicals that will be banned. It also obliges Parties to reduce their emissions of dioxins, furans, polyaromatic hydrocarbons (PAHs) and HCB below their levels in 1990 (or an alternative year between 1985 and 1995). For the incineration of municipal, hazardous and medical waste it lays down specific limit values. The UK ratified in 2005. Further information can be found at:

http://www.unece.org/env/lrtap/persistent organic pollutants_h1.htm

2.1.2 The Rotterdam Convention on the Prior Informed Consent for certain hazardous chemicals and pesticides in international trade

The Rotterdam Convention is a global agreement which seeks to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment. It establishes a Prior Informed Consent (PIC) procedure, which seeks agreement from importing countries to accept shipments of certain hazardous chemicals. The POPs listed in the Stockholm Convention are all included in the Rotterdam Convention. The UK ratified in 2004. In the UK, the Prior Informed Consent procedure is operated by the Health and Safety Executive which has been nominated as the National Designated Authority. Further information may be found at:

http://www.pic.int/

2.1.3 The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their disposal

The Basel Convention is a global agreement which addresses the problems and challenges posed by the movement and management of hazardous wastes, including those consisting of containing or contaminated with POPs. The Basel Convention uses a Prior Informed Consent (PIC) procedure to control transboundary movements of waste whereby hazardous waste cannot be shipped from one country to another without the consent of those countries involved, including countries of transit.

The Basel Convention was amended in 1995. The amendment prohibits the export of all hazardous waste from Parties that are members of the EU, OECD and Liechtenstein to all other Parties to the Convention. While the ban is not yet in force in its own right, the ban is implemented in the EU through the Waste Shipment Regulation. The UK ratified in 1994, further information may be found at:

http://www.basel.int/

2.1.4 The World Summit on Sustainable Development

The World Summit on Sustainable Development (WSSD), held in September 2002 in Johannesburg, agreed an Intergovernmental Plan of Implementation setting out what needs to be done to achieve global sustainable development. The plan of implementation included a number of chemicals related targets, including the implementation of existing chemicals conventions and the development of a Strategic Approach to International Chemicals Management (SAICM).

2.1.5 The Strategic Approach to International Chemicals Management

The International Conference on Chemicals Management held in February 2006 finalised and adopted the Strategic Approach to International Chemicals Management.

SAICM is a global framework to improve chemicals management. It is a voluntary agreement supported by a high-level declaration and contains a toolkit of policies and activities aimed at raising the standards of chemicals management, particularly in developing countries. SAICM will pull together international bodies with responsibility for chemicals management and will support and enhance the global treaties that cover chemicals and hazardous waste.

http://www.chem.unep.ch/saicm/

2.2 European Union

As a Member State of the European Union, there is close co-operation between the European Union and the UK on policy and legislation on chemicals and most UK legislation concerning the control of chemicals arises from European Community legislation.

2.2.1 European Union Environmental Strategy

The main current strategy document on the Community's environmental policy is the 6th Environment Action Programme for years 2000–2010 adopted in 2002. The Programme is focusing on certain key areas of concern, environment and health being one of them. This Programme also contains several objectives and actions related to POPs.

The 6th Environment Action Programme aims at a high level of quality of life and social well being for citizens by providing an environment where the level of pollution does not give rise to harmful effects on human health and the environment. Related to chemicals, it aims to achieve within one generation (2020) that chemicals are only produced and used in ways that do not lead to a significant negative impact on health and the environment. Moreover, chemicals that are dangerous should be substituted by safer chemicals or safer alternative technologies not entailing the use of chemicals, with the aim of reducing risks to man and the environment. Impacts of pesticides on human health and the environment should be reduced and pesticides in use which are persistent or bio-accumulative or toxic or have other properties of concern should be substituted by less dangerous ones where possible.

2.2.2 European Union legislation on Persistent Organic Pollutants

The Community Implementation Plan currently under preparation by the European Community for the Stockholm Convention will include a full list of relevant European Legislation. Once the Community Implementation Plan is completed the UK NIP will include a weblink to this document. As this has yet to be published, a section from the draft community plan which lists the relevant Community legislation is at Annex 4A and 4B. The key instruments are also outlined below.

Regulation (EC) 850/2004 on POPs is directly applicable in UK law and implements the most important obligations of both the Stockholm Convention and the UNECE POPs Protocol. It prohibits the production, use and marketing of the POPs listed in the Annexes of both instruments and contains provisions on stockpiles and wastes, which are stricter than those stipulated in the Stockholm Convention.

Council Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls aims at disposing completely of PCBs and equipment containing PCBs as soon as possible, and for 5 litre equipment before the end of 2010. It also sets requirements for the environmentally sound disposal of PCBs.

With regard to unintentionally produced POPs, there are several instruments that have an impact, either directly or indirectly, on the reduction of releases of these substances. The main release control measures are set out in the (Directive 96/61/EC) on Integrated Pollution Prevention and Control (IPPC).

The IPPC regulation, and other relevant legislation, is outlined in greater detail in section 5.8.3 of the NIP which deals with specific legislation on dioxins and PCBs.

2.3 National level

The UK Government's Chemical Strategy was published in 1999 and aims to:

- phase out chemicals posing an unacceptable risk to human health or the environment as soon as possible;
- reduce as far as possible the risks posed by chemicals that are essential in our everyday lives, thus finding a balance between protecting health and the environment and retaining the socio-economic benefits that many chemicals provide; and
- make full information publicly available about the environmental and health risks of chemicals.

Key elements of the Strategy are:

- a precautionary approach, bringing forward chemicals for priority review and beginning the risk reduction process even if full scientific evidence is not available;
- voluntary agreements with industry to reduce the risks posed by chemicals to the environment and human health. Where these are not satisfactory, the Government will consider action at the national or European level; and
- a Chemicals Stakeholder Forum involving representatives of all those groups with an interest in the impacts of chemicals on the environment and human health which advises on the selection and assessment of chemicals of concern and on industry's risk management strategies.

2.3.1 UK Regulation on Persistent Organic Pollutants

Defra is currently consulting on the Persistent Organic Pollutants Regulations 2007 which supplement the Community Regulation EC 850/2004. It designates the Environment Agency as the Competent Authority and enforcement agency for the EC POPs Regulation in England and Wales and the Department of the Environment as the Competent Authority and enforcement agency in Northern Ireland. Scottish Environment Protection Agency (SEPA) in Scotland. The Regulation also specifies the duties of the Competent Authority and the Member State.

2.3.2 UK roles and responsibilities

UK Government Departments and Agencies with an implementation and/or enforcement role for the Stockholm Convention include the following:

- *Department for Environment, Food and Rural Affairs (Defra)* – Defra leads for the UK in consultation with the devolved Administrations, other Government Departments and other stakeholders on the further development and implementation of the Stockholm Convention. Defra's aim is to promote sustainable development, which includes a better environment at home and internationally and the sustainable use of natural resources. Underlying this are a number of objectives including: to protect and improve the rural, urban, marine and global environment and to lead integration of these with other policies across Government and internationally; and to protect the public's interest in relation to environmental impacts.

In the UK environmental responsibilities have been devolved to the following bodies:

- *The Scottish Executive* – one of the Scottish Executive Environment and Rural Affairs Department (SEERAD) main aims is to help improve the economic performance of Scotland's agriculture, aquaculture, fishing and food industries within the wider context of sustainable exploitation of land, sea and freshwater resources and rural development, while safeguarding the interests of consumers, and protecting and enhancing the environment. SEERAD encourages action to reduce pollution and other measures to safeguard the environment. Specifically, it develops and oversees the implementation of policy on, for example, integrated pollution prevention and control, the water environment, waste management, air quality, and sponsor the Scottish Environment Protection Agency (the regulatory and enforcement authority for environmental protection and pollution control in Scotland, covering discharges to air, land and water);

- *Welsh Assembly Government* – the Welsh Assembly Government is committed to the full integration of environmental and socially sustainable development throughout all Government policy. Its responsibilities include: environmental water quality, waste management, contaminated land and land quality, air quality, and industrial pollution controls and sponsors the Environment Agency in Wales; and

- *Northern Ireland Department of the Environment (NIDOE)* – part of Northern Ireland DOE's objectives are to protect, conserve and enhance the natural environment and to ensure that development takes place in ways which will contribute to a quality environment and meet economic and social aspirations. Its Environment and Heritage Service takes the lead in advising on and in implementing the Government's environmental policy and strategy in Northern Ireland and carries out a range of activities which promote the Government's key themes of sustainable development, biodiversity and climate change.

One Department with a particular interest in promoting the success of multilateral environmental agreements in developing countries, such as Stockholm Convention, is:

- *Department for International Development (DFID)* – The Department for International Development is the UK Government Department responsible for promoting sustainable development and reducing poverty. The central focus of Government policy is a commitment to the internationally agreed Millennium Development Goals which include aims such as the eradication of extreme poverty and hunger, the reduction of child mortality and the improvement of maternal health, but also to ensure environmental sustainability. DFID's assistance is concentrated in the poorest countries of sub-Saharan Africa and Asia, but also contributes to poverty reduction and sustainable development in middle-income countries, including those in Latin America and Eastern Europe. It works in partnership with Governments committed to the Millennium Development Goals, with civil society, the private sector and the research community. It also works with multilateral institutions including the World Bank, the Global Environment Facility, United Nations agencies and the European Commission.

In England, Wales and Scotland the responsibility for enforcing environmental and chemicals legislation rests with the following bodies:

- *The Environment Agency (EA)* – the EA is the main environmental regulator in England and Wales. It was set up as a non-departmental public body (NDPB) sponsored largely by Defra and the Welsh Assembly Government. The Agency issues various permits, licences, consents and registrations, including permits under Integrated Pollution Prevention and Control to reduce unintentional release of POPs. Before users carry out an activity that may need a licence it can offer advice on ways of reducing that activity's effect on the environment. Part of its role is to regularly inspect and monitor licence-holders to ensure that the standards that have been set are being met and the Agency can take legal action against those committing environmental crime. EA is the proposed enforcer of the Stockholm Convention in England and Wales;

- *The Scottish Environment Protection Agency (SEPA)* – SEPA is the main environmental regulator for Scotland, an NDPB sponsored by the Scottish Executive, with the main aim of providing an efficient and integrated environmental protection system that will improve the environment. In broad terms it regulates activities that may pollute water and air, the storage, transport and disposal of waste, and the keeping and disposal of radioactive materials. SEPA is the proposed enforcer of the Stockholm Convention in Scotland in relation to regulated activities that come under the remit of SEPA.

In summary the two environment agency organisations have similar roles and responsibilities except that in England and Wales the IPPC processes with less potential to release dioxins (i.e. Pollution Prevention Control Part (B) and Part A(2) processes are regulated by Local Authorities while in Scotland they are regulated by SEPA).

There are also a number of other Departments that have specific responsibilities for the management of chemicals. These include:

- *Pesticides Safety Directorate (PSD)* – PSD is an executive agency of Defra and administers the regulation of agricultural, horticultural, forestry, food storage and home garden pesticides. The principal functions of PSD are to evaluate and process applications for approval of pesticide products for use in Great Britain and provide advice to Government on pesticides policy. Its aims are to protect the health of people, animals and plants, to safeguard the environment, and to ensure that methods of pest control are safe, efficient and humane, by providing effective controls on the sale, supply and use of pesticides; and

- *Health and Safety Executive (HSE)* – the UK Health and Safety Commission and HSE are responsible for the regulation of almost all the risks to health and safety arising from work activity in Britain. HSE deals with a range of health risks, including noise, vibration, pathogens and radiation, but also the risks posed by chemicals and non-agricultural pesticides/biocides. For both the Existing Substances Regulations and the Notification of New Substances Regulation HSE act jointly with Defra as the UK Competent Authority. On behalf of the UK Government, HSE ensures that the risk to people and the environment from biocides and non-agricultural pesticides are properly controlled by implementing UK and European permissioning schemes under the Control of Pesticides Regulations and the Biocidal Products Directive. HSE's Field Operations Directorate aims to reduce the risks and protect people at work by providing advice and guidance on how to comply with the law, inspecting workplaces, investigating accidents and complaints and taking enforcement action where necessary.

And there are other bodies with responsibilities for human health and the environment, including:

- *Health Departments* – The aim of the UK's health departments is to improve the health and well-being of people. This involves a range of activities including providing specialist guidance to general practitioners, dentists and social workers to helping promote healthier lifestyles and living. The Department of Health for England's Toxicology and Radiation Branch plays a role providing policy advice relating to possible impacts on human health of chemicals in the environment. The Department works closely on environmental chemical issues with other Government departments and international organisations such as the European Union, World Health Organisation and OECD. It obtains expert scientific and medical advice from the Health Protection Agency (HPA) which was formed in April 2003 combining the existing functions of a number of national bodies, including the Public Health Laboratory Service and the National Focus for Chemical Incidents. The HPA is assisted in formulating expert advice by a number of independent advisory committees. The HPA also provides a dedicated field service and an integrated approach to protecting the public to chemical hazards, radiation and microbiological hazards;

- *Food Standards Agency* – the Food Standards Agency is an independent food safety watchdog set up to protect the public's health and consumer interests in relation to food. Its Food Safety Policy Group deals with all aspects of food safety and nutrition, including the development of policy and provision of advice on chemical contaminants in food, and is responsible for safety limits for chemicals in food;

- *Local Authorities* – in England and Wales Local Authorities enforce local air pollution controls. Under this, conditions are included in authorisations for prescribed processes to ensure that the process is operated using the best available techniques not entailing excessive cost; and

- *Her Majesty's Revenue and Customs (HMRC)* – have enforcement responsibility at the frontier against imports and exports of regulated chemicals under the Stockholm Convention.

Section 3

Implementation of action on intentionally produced Persistent Organic Pollutants

This section considers the current situation regarding POPs in the UK focusing on the ten intentionally produced pesticides and industrial chemicals. Unintentional production of dioxins, HCB and PCB are assessed in the Dioxins Action Plan in section four, five and six.

3.1 Persistent Organic Pollutants – pesticides

Article 3 of the Convention requires that Parties take measures to reduce or eliminate releases from intentional production and use. The pesticides listed in the Stockholm Convention have been banned in the UK for many years. Their use was banned in European Union under Council Directive 79/117/EEC which prohibits the placing on the market and the use of plant protection products which could cause harmful effects on human health or the environment. In 2004, the production, use and import and export of these pesticides was additionally banned by the Regulation (EC) 850/2004 on POPs. The pesticides mirex and toxaphene have never been approved for use in the UK.

Table 2: Effective date of ban for the pesticides listed in Stockholm Convention

Substance	Effective date of ban in UK
Annex A	
Aldrin	1991
Chlordane	1981
Dieldrin	1981
Endrin	1991
Heptachlor	1984
Hexachlorobenzene	1981
Annex B	
DDT	1986

3.2 Monitoring information in water for some of the pesticides listed in the Stockholm Convention

The Environment Agency monitors for some of the pesticides listed in the Stockholm Convention. The results of this monitoring are included in Table 3. This data shows the number of samples reported with a corresponding percentage of results greater than 100ng/l or 500ng/l. The data show that concentrations of these chemicals in water are below detectable limits for most of the reported pesticides, although trace amounts are still present. For example, for DDT, the number of results greater than 500ng/l for DDT is zero for the period 2001–2004 (DDT was banned in the UK in 1986). A similar pattern is observed for Endrin (Endrin was banned in the UK in 1991).

Table 3: Monitoring data for some of listed Stockholm Convention pesticides in water

Substance	Number of Results Reported					
	1999	2000	2001	2002	2003	2004
Dieldrin	14731	14690	9706	11247	10086	9495
Aldrin	9161	9731	8146	9223	8127	8372
DDT pp	8617	9103	7494	8352	7827	7745
DDT op	7794	8084	6796	7672	5242	6031
Endrin	8888	9341	7625	8750	8324	7992

*DDT pp refers to isomeric form para para' – DDT
*DDT op refers to isomeric form ortho para ' – DDT

Substance	% Number of Results Greater than 100ng/l					
	1999	2000	2001	2002	2003	2004
Dieldrin	0.3	0.4	0.2	0.4	0.1	0.3
Aldrin	0	0	0	0	0	<0.1
DDT pp	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DDT op	<0.1	<0.1	0	0	0	0
Endrin	0	<0.1	0	0	0	<0.1

*DDT pp refers to isomeric form para para' – DDT
*DDT op refers to isomeric form ortho para ' – DDT

Substance	% Number of Results Greater than 500ng/l					
	1999	2000	2001	2002	2003	2004
Dieldrin	<0.1	0.2	<0.1	<0.1	<0.1	0.2
Aldrin	0	0	0	0	0	<0.1
DDT pp*	0	<0.1	0	0	0	<0.1
DDT op*	0	<0.1	0	0	0	0
Endrin	0	<0.1	0	0	0	0

*DDT pp refers to isomeric form para para' – DDT
*DDT op refers to isomeric form ortho para ' – DDT

3.3 Polychlorinated biphenyls (PCBs)

PCBs were manufactured in large quantities and found a wide range of applications due to their high thermal, chemical and electrical stability. They were first produced commercially around 1930 and approximately 66,500 tonnes were manufactured in the UK between 1951 and 1976. Of this, around 27,000 tonnes were exported to other countries where it would have been used in a range of products. There are no figures available on quantities of PCBs imported into the UK. Commercial PCBs were manufactured by the direct chlorination of biphenyl leading to the production of oils containing mixtures of PCB congeners with between 21% and 60% chlorine. Commercial PCB mixtures were sold under a variety of trade names, the most common in the UK being the 'Arochlor' range.

Prior to the mid-1970s PCBs were used in a wide range of applications, including the following:

- 'closed' uses of PCBs – in the UK around 14,000 tonnes of PCBs were used in the manufacture of sealed electrical equipment such as capacitors, transistors and electrical switching gear; and

- 'open' uses of PCBs – around 25,000 tonnes of PCBs were used in a diverse range of products such as carbonless-copy paper, as a plasticiser in some plastics manufacture, in most coating and covering applications including paints and varnishes, in many building materials including sealants, in some pesticides and herbicides and, at one time, in chewing gum. The open use of PCBs ceased in the 1970s, although it is possible that some products such as building sealants may still be in place in older properties. A significant amount of the PCBs in the environment will have arisen from the past use of these products.

Releases to the environment also occur from:

- reservoir sources – PCBs will be released to the atmosphere from historically contaminated soils or sediments or from landfills which may contain PCB from previous disposal of electric appliances. Some measurements indicate that release of 'historic' PCB back into the environment may be the most significant contribution to the current atmospheric burden in the UK (Coleman et al 1997); and

- industrial and non-industrial combustion processes – PCBs may be formed as a trace by-product during combustion processes in a similar manner to dioxins. This contribution is assessed in the UK Dioxins Action Plan which is contained in Chapter four, five and six of this NIP.

3.4 Controls on PCBs

The sale of PCBs for use in open applications was prohibited in 1972 and their manufacture and use in new plant and equipment were prohibited in 1986 under the Control of pollution (supply and use of injurious substances) Regulations 1986 (SI 1986 No. 902) as amended. Since that time the only remaining uses have been PCBs sealed inside older existing equipment.

Council Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls requires the phasing out of remaining identifiable PCBs no later than 2010. The Environmental Protection (Disposal of Polychlorinated Biphenyls and Other Dangerous Substances) (England and Wales) Regulations 2000 (SI 2000 no.1043) came into force on 4 May 2000 to implement the provisions of the PCB Directive. The equivalent Northern Ireland Regulations are The Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) Regulations (Northern Ireland) 2000.

These requires holders of PCBs to register any contaminated equipment (including any transformer, capacitor or receptacle containing residual stocks) of greater than 5 litres in volume with the Environment Agency or with the Scottish Environment Protection Agency by 31 July 2000. In Northern Ireland registration with the Department of the Environment was required by 31 October 2000. In addition, actions were required to label such equipment and to make arrangements for final disposal at one of the UK waste management facilities licensed to handle PCBs or decontamination of PCB holdings by 31 December 2000 or by 31 March 2001 in Northern Ireland.

Electrical transformers may be held until the end of their useful life once registered, provided they are decontaminated or contain less than 500 parts per million of PCBs. However these too must be disposed of prior to 2010. Equipment of less than 5 litres should still be collected and removed separately when they are taken out of service so that safe disposal can be achieved. The PCB Directive does not cover concentrations of less than 50 parts per million of PCBs.

The Environment Agencies now hold registers of all remaining PCB holdings in the UK, which are available on request. On 20 September 2006, the register showed that 62 companies registered their equipment in England and Wales, 6 of which have holdings in Wales. There are a total of 25,164 items of equipment, of which particulars are registered in England and Wales, 278 of which are in Wales. On 30 September 2006, the register held by Scottish Environment Protection Agency showed that there were 10 registered holders and 251 registered holdings in Scotland.

Section 4

Unintentionally produced POPs: The UK Dioxins Action Plan

The UK Dioxin Action Plan is set out in section four, five and six of the National Implementation Plan.

4.1 Scope of the Dioxins Action Plan

The UK Dioxins Action Plan evaluates the current controls to limit environmental and human exposure to the unintentional formation and release of dioxins, PCBs and HCB and outlines the UK Government's plans for future actions on these chemicals.

4.2 What has already been achieved?

The UK Government produced a review of dioxins and dioxin-like PCBs in the UK environment in 2002. The document may be found at:

http://www.defra.gov.uk/environment/consult/dioxins/

This document reviewed the then current state of knowledge on dioxins and dioxin-like PCBs, the effects of regulatory actions to date and made proposals for future actions. The responses to the consultation on this document highlighted two areas requiring further investigation. Firstly, the need to review current research to identify gaps and therefore prioritise work. Secondly, the need to have up to date information on the costs and benefits of further measures for reducing dioxins emissions. Therefore, two further reports were produced and the recommendations from these reports have informed the development of the Dioxin Action Plan. These reports are:

i) Research Priorities for Dioxins and Polychlorinated Biphenyls (PCBs) (2003)
Report may be found at:

http://defraweb/corporate/consult/dioxins-two/report1.pdf

ii) Development of UK Cost Curves for Abatement of Dioxin Emissions to Air (2003).
Report may be found at:

http://defraweb/corporate/consult/dioxins-two/report2.pdf

The UK has already taken a number of measures which have significantly reduced emissions of dioxins, PCBs and HCB. These measures have included controls on:

- industrial processes such as municipal waste incineration, metal processing plants, power stations and chemical manufacturing plants;

- open agricultural burning;
- marketing and use controls on chemicals contaminated with dioxins and HCB; and
- vehicular emissions.

During the last 10 years these measures have substantially reduced emissions to the environment and concentrations of these chemicals in food:

- approximately 60% reduction in emissions of dioxins to air;
- approximately 75% reduction in emissions of PCBs to air;
- approximately 70% reduction of dioxins and dioxin-like PCBs levels in food;
- approximately 90% reduction in emissions of HCB to air.

The data in UK Soil Herbage Survey (UKSHS) indicate that dioxin levels in soils are not declining – because the persistence of dioxins in soil means there will be a time lag before the reductions in emissions feeds through to soil.The PCB data indicates that levels of PCB in soils have dropped approximately 800 fold from their peak in the 1960/70's.

4.3 Content of the Dioxins Action Plan

Article 5 and Annex C of the Stockholm Convention contain provisions for measures which should be taken to reduce the total releases of dioxins, PCBs and HCB from industrial and diffuse source categories. One key measure is the development of a Dioxins Action Plan.

Article 5 (a) requires that the Action Plan presents the following information:

- an evaluation of current and projected releases inventory for dioxins, PCBs and HCB;
- the effectiveness of the current legislative framework and policies relating to management of dioxins, PCBs and HCB (including the use of Substitute or Modified Materials, Products and Processes);
- the development of strategies and measures taken to further reduce unintentional production of dioxins, PCBs and HCB;
- plans for the promotion of education, training and awareness raising of those strategies and measures; and
- an implementation strategy and a strategy review mechanism with indicators that could be used to assess progress towards successfully meeting obligations of the Convention.

Section 5

Evaluation of the current releases of dioxins, HCB and PCBs

5.1 Source inventories

One of the requirements of the Stockholm Convention is that an evaluation of current releases be undertaken. This includes the development and maintenance of source inventories and release estimates for dioxins, HCB and PCB. Evaluation of the inventories allow Governments to assess the progress made towards the goal of continuing minimisation and identify where further control measures are required.

The UK is well placed with respect to emissions to air as the National Atmospheric Emissions Inventory (NAEI) provides a standard reference air emission inventory for a wide range of pollutants including POPs. The UK does not currently have data on projected releases but will consider projected releases as part of research activities listed in the UK Dioxin Action Plan of the UK National Implementation Plan. The inventory may be found at:

http://www.naei.org.uk/

The NAEI is based on activity estimates and emission factors from all UK emission sources, both industrial and non-industrial for the whole of the UK.

In addition, the Environment Agency operates a Pollution Inventory for England and Wales which covers releases to air, water and land for large industrial processes which are regulated under the Integrated Pollution Prevention and Control Directive (IPPC Part A(1)). The Environment Agency Pollution Inventory is based on data submitted annually by operators and is also used for reporting data required under the obligations of the European Pollutant Emission Register (EPER) Directive (2000/479/EC). The latest version of the Pollution Inventory may be found at:

http://www.environment-agency.gov.uk/business/444255/446867/255244/

The Scottish Environment Protection Agency (SEPA) operates the Scottish Pollutant Release Inventory and compiles an emissions inventory for emissions reporting under the IPPC Directive and emissions from processes which fall within European Pollutant Emission Register (EPER) in Scotland. It should be noted that the Scottish Pollution Release Inventory only lists the installations emitting above the threshold of 0.00001 kg/year. The SEPA inventory may be found at:

http://www.sepa.org.uk/data/eper/mainpage.htm

The Northern Ireland Department of Environment and Heritage Service Pollution Inventory (EHSPI) covers Northern Ireland and provides an inventory of industrial emissions for the purposes of EPER and point source data, further information may be found at:

http://www.ehsni.gov.uk/

5.2 Uncertainty analysis of the UK National Atmospheric Emissions Inventory

In order to inform the potential for improvements of the National Atmospheric Emissions Inventory, Defra recently commissioned a review to identify the key sources of uncertainty in the current emissions inventory and to consider how this could be improved. The review may be found at:

http://www.defra.gov.uk/science/project_data/DocumentLibrary/CB01068/CB01068_3412_FRP.pdf

Appropriate quantification of uncertainty in emissions inventories provides the basis for prioritisation of control strategies and future work needed for inventory improvement. Estimates of activity/production data are available and of high quality for larger industrial sectors. In the UK, measured data has been applied to develop accurate process-specific emission factors for the larger industrial sources listed in the NAEI. Development of emission factors from such measured data has enabled a reliable calculation of dioxins, PCBs and HCB emissions to air.

In contrast, for the non-industrial sources, it is often difficult to estimate emissions due to the lack of activity data, widely varying conditions and/or the uncontrolled nature of the emissions. For example, activity statistics relating to many diffuse sources can often be difficult to obtain and estimates may have to be derived from secondary indicators of activity (e.g. population statistics). Since the factors influencing the emissions from the non-industrial sources are typically complex and available emission factors given in the literature vary considerably, the non-industrial emissions are generally subject to higher levels of uncertainty.

Quantitative uncertainties calculations for 2004 emissions show that there are 3 diffuse sources which account for around 90% of the total UK inventory uncertainty, these are:

- small-scale waste combustion;
- accidental fires; and
- agricultural waste combustion.

5.3 Current releases of dioxins, PCBs and HCB in UK

5.3.1 Releases to air

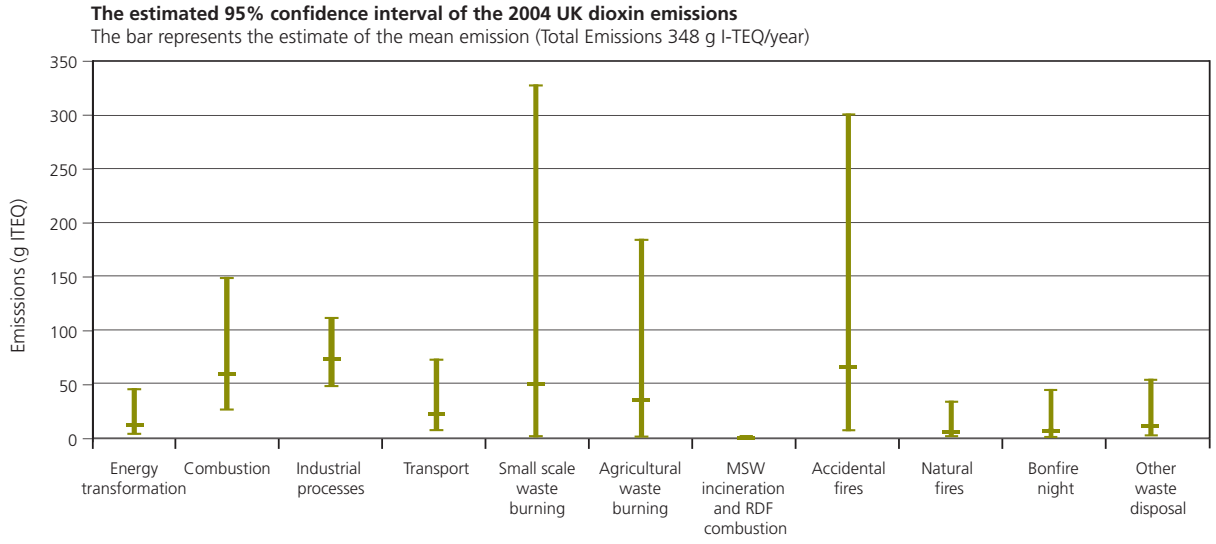
In the UK, the National Atmospheric Emissions Inventory provides estimates of releases of dioxins, PCBs and HCB from point sources for air. Dioxins are expressed in g I-TEQ/year, PCBs are measured in kg/year and HCB in kg/year. The most recently published inventory provides release estimates for the year 2004. Figures 1–3 below show the contributions to overall emissions from different source sectors in 2004 for dioxins, PCBs and HCB and illustrate associated uncertainty values. Trends in emissions since 1993 are given in Section 5.8.

5.3.2 Dioxins releases to air

Annual releases of dioxins to air were estimated to be 348 g I-TEQ/year in 2004. Release estimates to air for 2004 indicated that the largest sources of dioxin emission were accidental fires, the small scale combustion of waste and agricultural waste burning, although such estimates still carry a significant degree of uncertainty. The largest industrial source was from sinter production in integrated iron and steel works at 27 g I-TEQ/year.

The incineration of municipal waste historically was a major source but was reduced by 99% between 1993 and 2004. In 1993 municipal waste incinerator emissions were estimated at 409 g I-TEQ/year and were 0.54 g I-TEQ/year in 2004, which accounts for less than 0.5% of the total UK emissions.

Figure 1: Dioxin releases in the UK (2004) Total Emissions 348 g I-TEQ/year



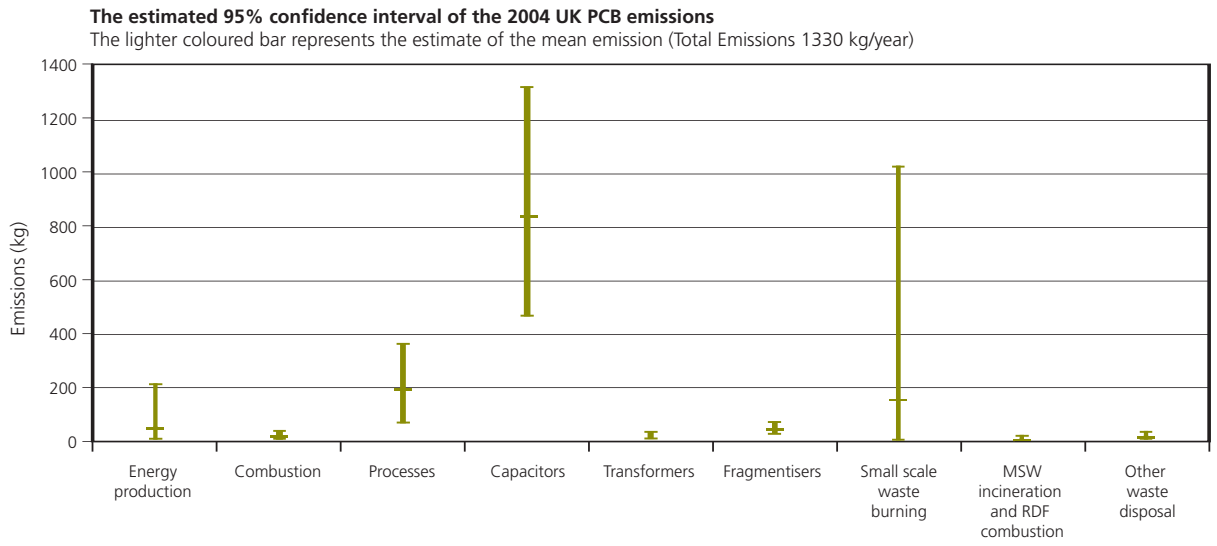
*Note: The 95% confidence interval for a source gives the estimated range of values which is likely to include the emission from that source 95 times out of a 100. This explanation applies to figures1-3.

5.3.3 Polychlorinated biphenyls releases to air

Inventories of PCB emissions are usually reported as total PCBs and include congeners which do and do not exhibit dioxin-like toxicity. The main reason for reporting total PCBs only is due to the lack of robust information concerning which PCB congeners are released by specific sources.

Annual releases of PCBs to air were estimated to be 1330 kg/year in 2004. PCBs have not been manufactured and used in the UK for many decades but old PCB-containing equipment still exists. It is estimated that 68% of unintentional emissions to air are associated with such in-service appliances, although emissions during disposal are also estimated to be significant. Section two of the NIP explains the general position and legislative requirements for disposal of PCB containing equipment in the UK.

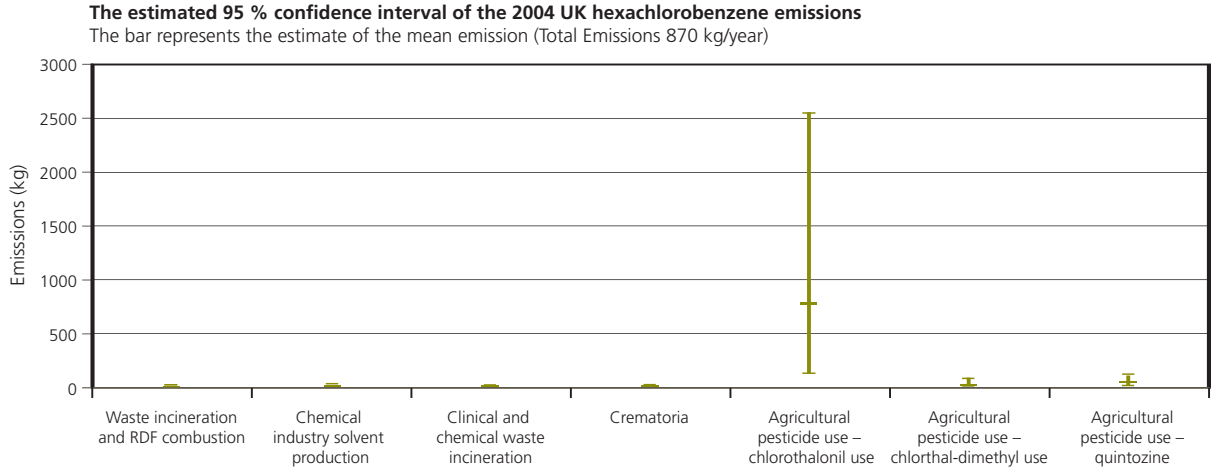
Figure 2: PCBs releases in the UK (2004) Total Emissions 1330 kg/year



5.3.4 Hexachlorobenzene releases to air

Annual releases of HCB were estimated at 870kg in 2004. There is no manufacture of HCB in the UK. Current unintentional releases are associated with the use of imported chlorothalonil in which HCB is an impurity, for agricultural pest control and also with solvent production. Although the major source of HCB is associated with chlorothalonil use there are other minor sources associated with agricultural pesticide use such as the use of picloram, chlorthal-dimethyl and quintozine. Release estimates for 2004 indicate that pesticide use is the largest source of releases. In the past non-ferrous metal production was a significant source. It is known that combustion processes that lead to formation of dioxins may also lead to the formation of HCB, however data for combustion sources of HCB is very limited.

Figure 3: HCB emissions in the UK (2004) Total Emissions 870 kg/year



5.4 Releases of dioxins, PCBs and HCB to land and water compartments

Dioxin releases into land and water in the UK were last reviewed in 1997 by Dyke et al. Releases to land were estimated at 1500–12000 g I-TEQ/year, significantly more than releases to air and water. The bulk of releases to land were to landfills rather than the open environment. From the data available at that time, the open use of chemicals including the disposal of pentachlorophenol (PCP) treated wood, the manufacture of pesticides; the incineration of municipal solid waste (MSW) and accidental fires were the largest contributors.

Processes with greatest potential for releases to water were identified as open use of chemicals, sewage treatment, disposal of waste oil, accidental fires, production of pesticides and chlorophenols and chemical waste incineration. However for the majority of these processes studied, the trend was towards reduced releases to land and water. The review recommended that more information is required to estimate releases to water and land and to assess sources of exposure to these media more reliably. It was recognised that the study was limited by the lack of data on releases of dioxins to media other than air in the UK or overseas.

The UK does not currently have complete PCB and HCB inventories for releases to water and land and future work will review current understanding and knowledge with view to updating source inventories. The Pollution Inventories maintained by the respective Environment Agencies in the UK currently contain information on the releases of such chemicals from certain licensed industrial processes but do not presently include information on releases from other potential sources, such as diffuse sources.

5.5 Monitoring levels of dioxins and polychlorinated biphenyls in the environment

Information on the concentration of dioxins and dioxin-like PCBs in the UK environment was published in the UK consultation document *'Dioxins and Dioxin-like PCBs in the UK Environment'* in 2002. Since that time the Government has continued to support further monitoring to assess the concentration of dioxins and PCBs in the environment and food. This NIP will focus only on the new information published since 2002.

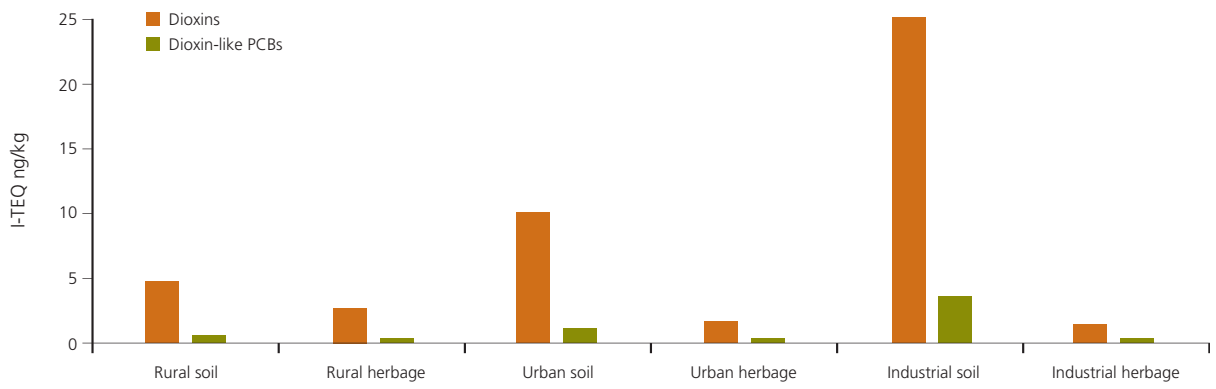
5.5.1 UK Soil and Herbage survey

In 2001 the UK Soil and Herbage Survey was carried out to establish a baseline for pollutant levels in soil and herbage across the UK. The pollutants analysed for included dioxins and dioxin-like PCBs which were measured in urban, rural and industrial sites. Over 200 sites were sampled from across England, Scotland, Wales and Northern Ireland.

The results of the survey showed that the concentration of dioxins in UK soil ranges from 0.77–71.56 ng/kg I-TEQ in industrial soils; the corresponding range for dioxin-like PCB in soil was from 0.23–3.56 ng/kg I-TEQ. As shown in figure 4 below, there was a clear distinction between the levels at rural, urban and industrial sites, almost certainly reflecting the presence of significant localised dioxin sources in urban and industrial areas in the last 10–30 years.

The concentration of dioxins in UK herbage ranges from 0.24–4.15 ng/kg I-TEQ in industrial herbage; the corresponding range for dioxin-like PCBs was from 0.01–0.38 ng/kg I-TEQ. In contrast to soil levels, the concentration of dioxins in herbage from urban and industrial areas is significantly lower than that from rural sites (figure 4). Because of their persistence, dioxin concentrations in soil may be assumed to reflect inputs over preceding years. Concentrations in herbage more closely reflect current conditions. The results strongly suggest that urban and industrial areas are no longer significant sources of dioxins, and that diffuse sources may now be more important. These results are consistent with emissions estimates data from the National Atmospheric Emissions Inventory (2004) which indicate that diffuse emission sources are now a dominant source.

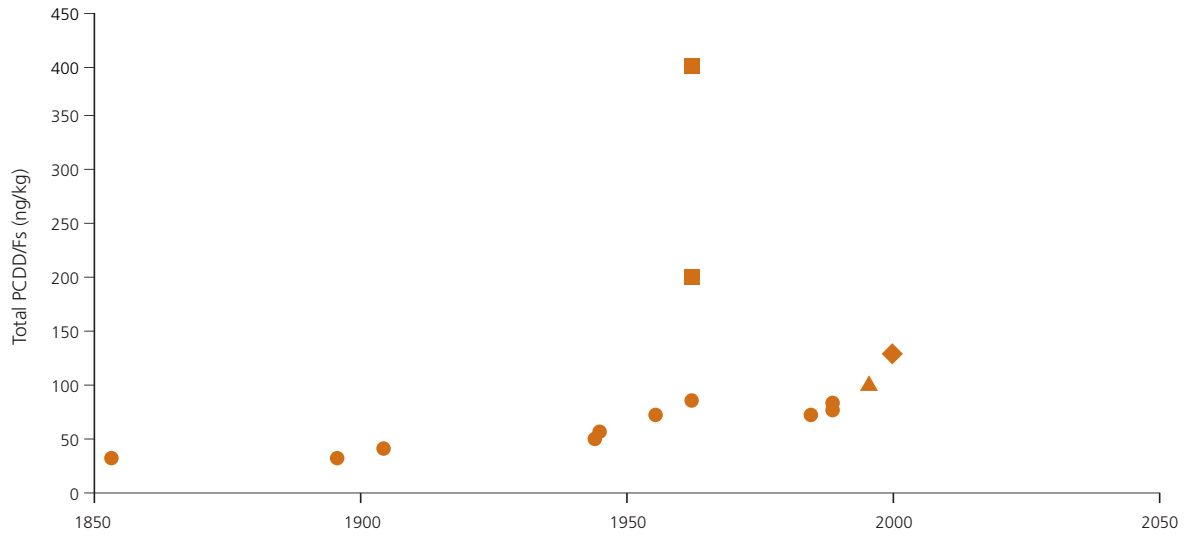
Figure 4: Dioxin and dioxin-like PCBs in UK Soil and Herbage



Results from this survey have been compared to earlier surveys in an attempt to determine temporal trends, although such comparisons are extremely approximate because of differences in methodology and sampling techniques used in the various studies.

Figure 5 shows the temporal trend for dioxins in selected UK soils. The graph has been constructed using data from analyses on archived soils at Rothamsted Experimental Station (Kjeller et al., 1991); from surveys by the Environment Agency (EA, 1997); Her Majesty's Inspectorate of Pollution (HMIP, 1989); and the median rural soil dioxin concentration from the current UK Soil and Herbage Survey.

Figure 5: Total Dioxin time trends in selected UK soils



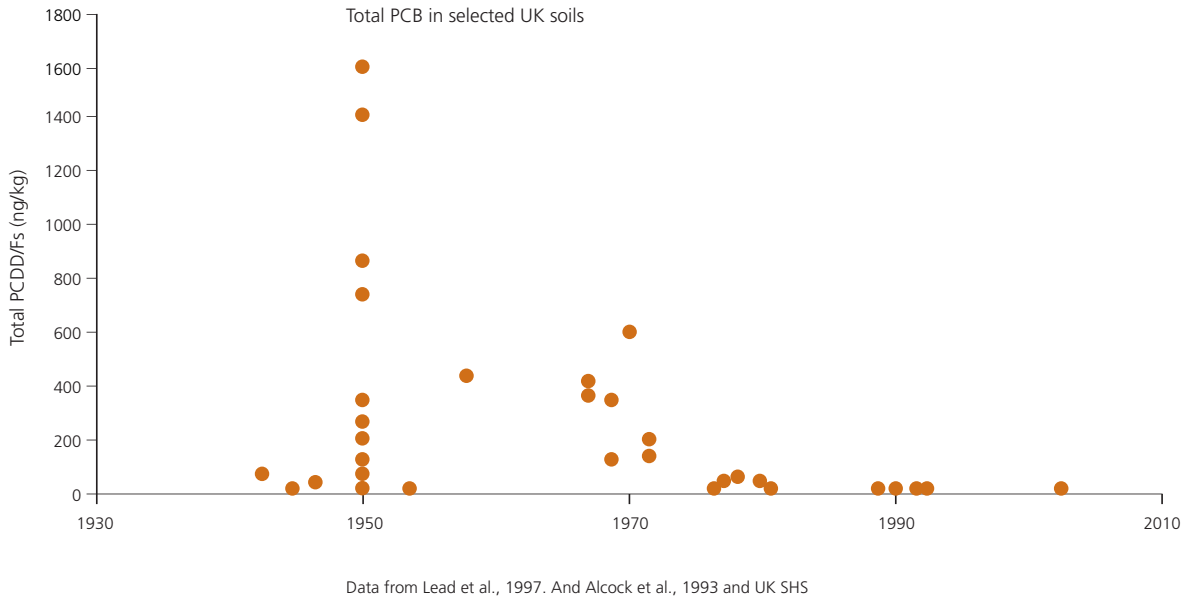
Circles from Kjeller et al., 1991. Environ. Sci. & Tech. 25.
Diamond data point from EA, 1997
Diamond data point in 2002 from UK SHS
Square data points from HMIP, 1985 (Rothamsteddata only)

Comparison of the results from this survey with earlier studies are equivocal; although no statistically significant trend is apparent, levels may appear to have increased since the beginning of the 1900s, though this may reflect the extreme persistence of dioxins in soils and the time taken for long-term trends to be reversed. The lack of a clear trend and an apparent increase in levels in the 1980s may reflect the differences in methodology and sampling techniques used at that time.

Figure 6 shows the temporal trend for total PCBs in selected UK soils. The graph has been constructed using data from analyses of archived soils at Rothamsted Experimental Station (Alcock et al., 1993); from a survey of PCBs in UK and Norwegian soils (Lead et al., 1997); and from the median rural soil PCB concentration from the recent UK Soil and Herbage Survey. As for the dioxin trend data, such comparisons are at best approximate.

Comparison of the data indicates that PCB concentrations in UK soils are continuing to decline from a peak in the 1960s and 1970s.

Figure 6: Total PCBs time trend in selected UK Soils



Data from Lead et al., 1997. And Alcock et al., 1993 and UK SHS

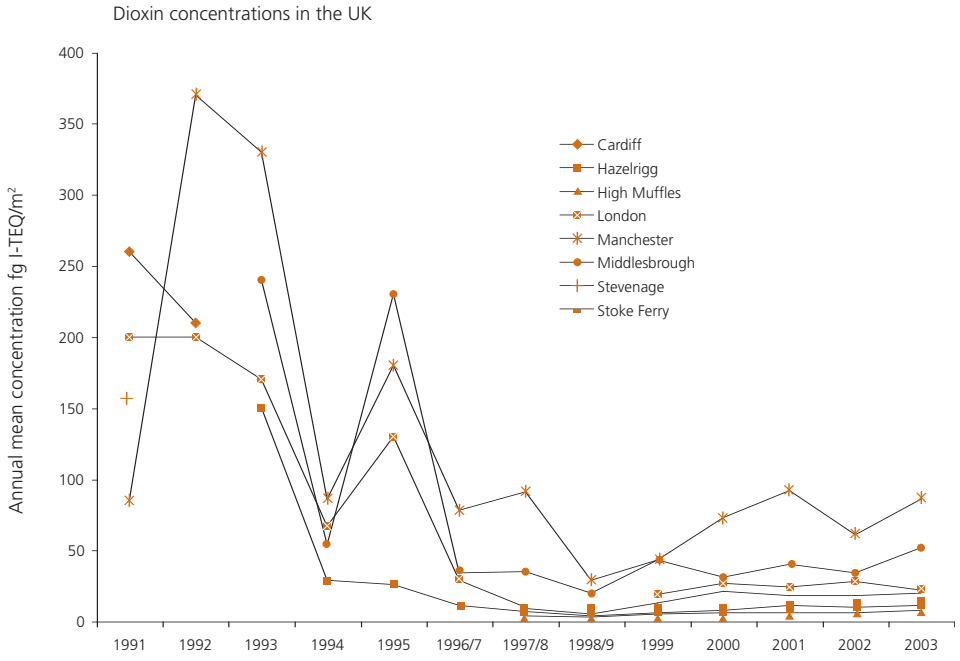
The UK Soil and Herbage Survey has shown that there are some significant geographical differences between the levels of dioxins and dioxin-like PCBs across the UK. For example, dioxin concentrations in rural and urban soil and herbage are lower in Northern Ireland compared to England, probably reflecting the lower industrial activity in the area. However, despite some geographical differences in total dioxin concentrations, the congener profiles of dioxins are broadly similar across the four countries of the UK, suggesting that source congener profiles are rapidly lost through atmospheric weathering and the mixing of large air masses over the UK.

In addition to dioxins and PCBs the survey also looked at a range of other pollutants including heavy metals and Polycyclic Aromatic Hydrocarbons (PAH). The final report of the UK Soil and Herbage Survey will be published shortly.

5.5.2 Toxic Organic Micro-Pollutants (TOMPS) monitoring network (air)

The objective of the Toxic Organic Micro-Pollutant network is to measure air concentrations in air for a range of pollutants including dioxins and PCBs at rural and urban locations in the UK. The network was set up in 1990, with Lancaster University becoming the main contractor in 2004. The university is responsible for maintaining the six sites and for the analysis of samples from all of the sites. The sites include three urban and three rural locations respectively; London, Manchester, Middlesbrough, High Muffles, Hazelrigg, and Stoke Ferry. Figure 7 shows annual mean dioxin concentrations up to 2003. The data indicate a declining trend since 1990, which is consistent with estimated emissions from UK National Atmospheric Emissions Inventory in for the past decade.

Figure 7: Annual Mean Dioxin Concentration measured at the TOMPs sites (fg I-TEQ/m3)[3]



5.5.3 Concentrations of HCB in the environment

HCB is distributed throughout the environment. Concentrations of HCB in air are low and vary slightly from 25–76.1 pg/m^3 in different regions of the UK. In sediment, ranges are between 0.03–2 ng/g dry weight and background levels in soils vary from 0.03–2.58 ng/g dry weight. Levels in vegetation between 1992–93 were 4200 pg/g dry weight. Concentrations in marine mammals vary widely and reflect location. Low concentrations are present in areas distant from point sources. However, higher levels are measured in areas near point sources reflecting historical contamination rather than current releases (see Table 4 below) (Jones et al 2005).

Table 4: Summary of data on levels of HCB in various environmental media in the UK (adapted from Jones et al 2005)

Media	Mean	Min	Max
Air (in pg/m^3)	39.2	25.0	76.1
Sediment (in ng/g/dw)	1.4	0.03	2.00
Soil (in ng/g/dw)	0.4	0.03	2.58
Vegetation (in pg/g/dw)	4200	–	–

5.5.4 Concentrations of dioxins in food

The Food Standards Agency (FSA) has been monitoring levels of dioxins and PCBs in food since the early 1980s. Targeted surveys are conducted to gain a greater understanding of the contributions from food groups. FSA has adopted the use of WHO-TEQ's for expressing levels of dioxin and total WHO-TEQ which include dioxin plus dioxin-like PCB in foodstuffs. Table 5 illustrates how the dioxin and total TEQ levels have fallen in eleven key food groups since 1982. Compared with the 1982 levels, average levels of dioxin and total TEQ had fallen to about half by 1992, two thirds by 1997 and, by 2001, were only 12–15% of the 1982 levels.

Table 5: Dioxin and total WHO-TEQ levels in main food groups 1982–2001

Food Group	Upper bound concentrations (ng WHO-TEQ/kg fat basis)							
	1982		1992		1997		2001	
	Dioxins	Total*	Dioxins	Total	Dioxins	Total	Dioxins	Total
Offals	15.76	19.05	10.33	13.21	6.29	8.76	5.88	7.32
Fish	5.83	17.07	3.14	7.75	2.4	6.93	1.06	4.63
Milk	5.21	7.88	2.38	3.61	0.83	1.57	0.47	0.9
Milk products	4.08	5.77	0.89	1.44	1.12	2	0.48	0.89
Carcass meat	3.16	5.04	1.15	2.01	0.8	1.87	0.42	0.73
Poultry	5.89	8.18	1.85	2.74	1.01	2.32	0.18	0.71
Eggs	8.93	11.12	1.97	2.91	0.77	1.41	0.24	0.44
Meat products	1.5	2.2	0.43	0.77	0.77	1.38	0.18	0.4
Bread	1.38	2.33	1.35	2.04	0.74	1.02	0.2	0.35
Miscellaneous cereals	1.79	3.46	2.15	2.5	0.43	0.81	0.13	0.26
Oils & fats	1.29	2.54	0.29	0.64	0.44	0.8	0.07	0.19

* Total WHO-TEQ for dioxins + dioxin-like PCBs.

Given the downward trends in dioxin concentration in key food groups the FSA is now putting a greater emphasis on surveys targeted at specific food types, such as fish and offals.

5.6 Human exposure to dioxins, PCBs and HCB

Human exposure to dioxins, PCBs and HCB can be through air, water, soil, food, dermal contact and occupational exposure. Studies have indicated that in contemporary industrialised settings more than 90% exposure of the general population to these compounds is through food. In the UK, the decline in emissions from industrial sources has resulted in reduced exposure from these sources. It is now recognised that other exposure routes such as inhalation exposure could play a role.

5.6.1 Exposure from food

The Food Standards Agency estimates dietary exposure to dioxins and dioxin-like PCBs through Total Diet Surveys. For Total Diet Studies, foods are placed into representative groups and the levels of dioxin and dioxin-like PCBs are measured in each group. This not only enables the calculation of human dietary exposure but also identifies the food groups that contribute most significantly to dietary exposure.

Table 6 shows the trend in the dietary exposure of adults to dioxins and total WHO-TEQ which includes dioxin and dioxin-like PCBs between 1982 and 2001. The average data represent an adult on a normal diet, whereas the high level figures are for an adult consuming a diet higher in the types of fatty foods that tend to contain higher levels of dioxins.

Table 6: Dietary exposure to dioxins of adults from 1982–2001

	Estimated dietary exposure (pg WHO-TEQ/kg bodyweight/day)							
	1982		**1992**		**1997**		**2001**	
	Dioxins	Total*	Dioxins	Total	Dioxins	Total	Dioxins	Total
Average	4.6	7.2	1.6	2.5	0.9	1.8	0.4	0.9
High level	8.3	13.0	2.8	4.3	1.6	3.1	0.7	1.7

Human exposure has been shown to have significantly reduced since 1982 as a result of a general fall in dioxin levels in food due to increased controls/legislative measures on major industrial sources, to the extent that Total Diet Studies now provide information of limited value. Instead, a greater emphasis on targeted surveys of specific food groups enables human exposure to dioxins and PCBs to be further reduced by eliminating food groups which are very high in dioxins from the food chain or by issuing appropriate advice to consumers. Full reference data on Total Diet Surveys may be found at the FSA website:

http://www.food.gov.uk/science/surveillance/fsis2003/fsis382003

5.6.2 Dietary exposure to non-dioxin-like PCBs

Data are also presented for the trends in non-dioxin like PCB concentrations in food groups from the Total Diet Study (Table 7) and the calculated dietary intakes (Table 8). These results also show a general decline with time (the 1992 results appear anomalously low) but this trend is not as marked as that seen for dioxins. Concentrations in offal appear quite variable, probably reflecting the heterogeneous nature of the samples and concentrations in fish appear to be still rising which is a contributory factor in the slow down in the decline in intakes.

Table 7: Non-dioxin-like PCBs in main food groups 1982–2001

Food Group	Concentrations (µg/kg fresh weight)							
	1982		1992		1997		2001	
	ICES 6	∑14	ICES 6	∑14	ICES 6	∑14	ICES 6	∑14
Offal	0.22	0.30	0.059	0.12	0.43	0.50	0.29	0.34
Fish	1.65	2.08	0.39	0.54	2.30	2.95	3.15	3.83
Milk	0.11	0.15	0.048	0.17	0.064	0.084	0.04	0.057
Milk products	0.94	1.29	0.13	0.23	0.45	0.61	0.33	0.49
Carcass meat	0.49	0.64	0.09	0.18	0.40	0.48	0.35	0.48
Poultry	0.78	0.98	0.18	0.34	0.40	0.54	0.22	0.29
Eggs	1.12	1.40	0.17	0.27	0.29	0.36	0.11	0.15
Meat products	0.72	0.97	0.23	0.37	0.78	0.96	0.53	0.70
Bread	0.06	0.11	0.022	0.096	0.041	0.08	0.036	0.078
Miscellaneous cereals	0.59	1.26	0.073	0.28	0.16	0.23	0.09	0.18
Oils & fats	3.51	4.64	0.34	0.45	1.38	1.98	0.37	0.71

ICES 6. This is the sum of the non-dioxin like PCBs congeners 28, 52, 101, 138, 153, and 180∑ 14. This is the sum of the non-dioxin like PCBs congeners 18, 28, 31, 47, 49, 51, 99, 101, 128, 138, 153, 170 and 180.

Table 8: Dietary exposure to non-dioxin-like PCBs 1982–2001								
	Estimated dietary exposure (ng WHO-TEQ/kg bodyweight/day)							
	1982		1992		1997		2001	
	ICES 6	∑14	ICES 6	∑14	ICES 6	∑14	ICES 6	∑14
Average	6.2	9.5	1.4	3.4	4.2	5.7	3.8	5.2
High level	11	17	2.4	5.5	8.5	11.2	8.8	12

ICES 6. This is the sum of the non-dioxin like PCBs congeners 28, 52, 101, 138, 153,and 180∑ 14. This is the sum of the non-dioxin like PCBs congeners 18, 28, 31, 47, 49, 51, 99, 101, 128, 138, 153, 170 and 180.

5.6.3 Exposure from human milk

In 1993, estimated dietary intakes of dioxins and dioxin-like PCBs by breastfed infants were approximately 170 pg I-TEQ per kilogram of body weight per day at age of 2 months falling to 39 pg I-TEQ per kilogram of body weight per day at 10 months. The exposure that breastfed babies receive is determined by the body burden of their mothers which, in turn, is determined by the mother's exposure. There are indications that exposures to dioxins peaked in the early/mid 1960s and have decreased since. This trend is expected to continue and therefore the levels in human milk are expected to fall but the Food Standards Agency are unable to predict with any confidence when body burdens will decrease to a level at which the exposure of breastfed babies will be below the Tolerable daily intake (TDI). The TDI is an estimate of the amount of a contaminant that can be ingested/consumed every day over a lifetime without causing appreciable risk to health.

Recently, the UK carried out pilot studies to explore alternative methods for the recruitment, collection, storage and management of an archive of breast milk samples (the SUREmilk study). The purpose of a human milk archive would be to enable the sequential measurement of environmental pollutants such as dioxins, both to monitor trends and to obtain estimates of exposure of breastfed infants to these chemicals. A limited number of analyses of concentrations of dioxins and dioxin-like PCBs were carried out as part of this study. The data may not be directly be comparable to those reported previously or representative of the UK population but they indicate that concentrations are less than half of those in human milk sampled in 1993/4. The report of the study may be found at:

http://www.food.gov.uk/multimedia/pdfs/suremilkmain.pdf

Although the intakes of breast-fed babies exceeds the TDI for dioxins and dioxin-like PCBs, the Committee on Toxicity of Chemicals in food, consumer products and the environment (COT) has advised that there is no need to alter UK Government advice that breast-feeding should continue to be encouraged on the basis of convincing evidence of the benefits of human milk to the overall health and development of the infant. A statement on the toxicological evaluation of chemical analyses carried out in the UK as part of a pilot study for a human milk archive by the (COT) may be found at:

http://www.food.gov.uk/multimedia/pdfs/cotsuremilk.pdf

5.6.4 Exposure to HCB in food

Data from the Pesticide Safety Directorate showed that levels of HCB in food in the past decade have declined and are almost below detectable levels for some food groups, therefore continued monitoring of HCB in food is not considered a priority. Details of pesticide residue monitoring results for food and animal products over the last 5 years may be found at:

www.pesticides.gov.uk/prc.asp?id=974

5.6.5 Occupational exposure to dioxins, PCBs and HCB

Health and Safety legislation lays down a series of requirements on employers which will apply to situations at work where exposure to PCBs and dioxins may occur. This includes the Control of Major Accident Hazard Regulations 1999 (COMAH) and the Control of Substances Hazardous to Health Regulations (COSHH) 2002 (as amended).

There is no specific occupational exposure limit set for dioxins but the 17 biologically active dioxin congeners are listed in Schedule 1 of the COSHH Regulations 2002 (as amended). Schedule 1 includes a list of substances and processes to which the definition of carcinogen relates and therefore there is a requirement for employers to reduce exposure to these dioxins to as low as is reasonably practicable. Health and Safety Executive (HSE) has also issued a Chemical Hazard Alert Notice (CHAN) for dioxins, CHAN 27:

(http://www.hse.gov.uk/pubns/chan27.htm)

and specific guidance on how to reduce exposure to dioxins in the aluminium recycling industry:

http://www.hse.gov.uk/pubns/indg377.pdf

and is working with the recycling industry to bring about improved controls in order to reduce dioxin exposure.

There is a specific exposure limit set for PCBs in the workplace for air. Employers must ensure that the concentration of PCBs in workplace air, averaged over an 8-hour period, does not exceed the Workplace Exposure Limit (WEL) of 0.1 mg/m^3.

There is no occupational exposure limit for HCB. HCB is classified in the European Union as a Category 2 carcinogen. This means that it is regarded as a potential human carcinogen and if it is present in the workplace either intentionally or as a process by-product the employer has an obligation under the COSHH Regulations 2002 (as amended) to reduce exposures to as low as is reasonably practicable.

5.7 Evaluation of the effectiveness of the current legislation on unintentionally produced dioxins, PCBs and HCB

5.7.1 Current legislation dioxins, PCBs and HCB

The UK's legislation on unintentionally produced POPs is delivered through a combination of action at the national, European Union and international level. In the UK, control measures via legislation and abatement technologies have led to a significant reduction in dioxin and PCB emissions. These measures include a combination of pollution control equipment or substitute process technologies. For major industrial sources these measures are listed in this section of the NIP. Full details of existing Community legislation on dioxins and PCBs are outlined in Annex 4A and 4B. Annex 5A and Annex 5B outline the controls applied in the UK for all of the source categories in the UK, including the application of Best Available Techniques and Best Environmental Practices as required by the Stockholm Convention.

5.7.2 Control on industrial processes

5.7.2.1 Integrated Pollution Prevention and Control Directive (IPPC)

Unintentionally produced persistent organic pollutants, including dioxins and dioxin-like PCBs, are covered under several instruments in Community legislation that have an impact, either directly or indirectly, on the reduction of releases of these substances. The main release control measures are set out in Integrated Pollution Prevention and Control Directive (Directive 96/61/EC) which will be fully in force by 2007.

The IPPC Directive lays down the legal framework for the control of releases of dioxins and dioxin-like PCBs from industrial installations. Installations covered by Annex I of the Directive are required to obtain a permit from the Member States' authorities. The permits must be based on the concept of best available techniques (BAT) and must include emission limit values for certain pollutants such as dioxins. In the UK, emission limit values are not always included for processes that do not release dioxins. The Directive also has provisions relating to monitoring and enforcement, public participation and exchange of information.

In the UK the enforcement authorities are the Environment Agencies and Local Authorities. In England and Wales, the Environment Agency regulates industrial processes such as municipal waste incinerators, cement works, chemical manufacturing plants, oil refineries and steel works; Local Authorities regulate some combustion/incineration and metal processes and crematoria. The Scottish Environment Protection Agency (SEPA) regulates releases in Scotland. Industrial and Radiochemical Inspectorate is the regulator in Northern Ireland.

Previously the Implementation of the Pollution Prevention Control Directive (the predecessor to IPPC Directive) resulted in significant reductions in dioxins emissions, particularly from municipal solid waste (MSW) incineration plants. Although reductions have been achieved for sinter plants, there remain significant emissions from this sector owing to more large gas volumes emitted than to high concentrations.

Local Authorities have played a significant role in achieving reductions in emissions. For example, emissions of dioxins from crematoria have dropped from 18g I-TEQ 1990 to 10.5g in 2004. These and other reductions in sectors regulated by Local Authorities have resulted from the implementation of Defra Technical Guidance notes.

5.7.2.2 Other key legislation for dioxins, PCBs and HCB

Directive 2000/76/EC on Waste Incineration regulates all waste incineration facilities and introduced a strict emission limit for dioxins of 0.1 nanogram I-TEQ per cubic metre of gaseous releases. This has led to further reductions in dioxins emissions from these sources in the UK.

The European Pollutant Emission Register (EPER), a Community-wide inventory of the principal emissions and responsible sources, was established by Commission Decision 2000/479/EC. The register includes unintentionally produced POPs, with the exception of PCBs. A Regulation for a more comprehensive Pollutant Release and Transfer Register including PCBs has recently been finalised (E-PRTR Regulation No 166/2006).

5.7.2.3 Controls on open agricultural burning

Since May 2006 agricultural waste has been included in national waste management controls. A transitional exemption is in operation until May 2007 which farmers can use to burn agricultural waste. However, it will be an offence for a farmer to dispose of agricultural waste in a manner likely to cause pollution of the environment or harm to human health. The unregulated open burning of agricultural waste will no longer be allowed after May 2007, with the exception of the open burning of small quantities of plant tissue which will continue to be allowed under a waste management licensing exemption, subject to certain conditions.

5.7.2.4 Marketing and use controls

Controls on the marketing and use of certain chemicals found to be contaminated with dioxins have been put in place. These include PCB-containing oils, the herbicide trichlorophenoxyacetic acid (2, 4, 5-T) and the wood preservative pentachlorophenol (PCP).

5.7.2.5 Controls on vehicular emissions

The use of lead in petrol required the addition of 1, 2-dichloroethane scavengers which contributed to emissions of dioxins in vehicular exhaust fumes. The removal of lead from petrol and general move to unleaded petrol is estimated to have led to an 85% reduction in dioxins emissions.

5.7.2.6 Controls on diffuse sources

Industrial sources are now tightly regulated, however some diffuse sources of dioxin, PCB and HCB releases continue to make a significant contribution to emissions and may require further consideration. There is legislation restricting the lighting of domestic garden waste bonfires and open burning on domestic premises. Section 33 of the Environment Protection Act 1990 (as amended by the Waste Management Regulations 2006 (England and Wales) provides that a person disposes of controlled waste in a manner likely to cause pollution of the environment or harm to human health commits an offence.

5.7.2.7 Controls on hexachlorobenzene

Emissions of HCB from secondary aluminium smelting resulted from the use of hexachloroethane (HCE) tablets as a degassing agent. Regulations now prevent the use of HCE in the non-ferrous metal industry except for research or analysis. Since, 1999 very little secondary aluminium is melted using HCE in the UK. HCB is not approved as an active substance in pesticide products in the EU.

5.7.2.8 Food legislation on dioxins and dioxin-like polychlorinated biphenyls

Regulation (EC) 466/2001 on setting maximum levels for certain contaminants in food as amended by Regulation (EC) 2375/2001 established maximum acceptable levels for dioxins in food. Limits are set in meat, fish, milk and milk products, hen eggs and egg products, animal fats, vegetable oil and fish oil. Total TEQ limits for these commodities for dioxins plus dioxin-like PCBs were introduced by Regulation (EC) 199/2006 are expected to be introduced in 2006 to bring dioxin-like PCBs into the Regulation. Directive 2002/69/EC sets conditions to ensure that samples are representative and that analysis is carried out to an acceptable standard. Recommendation 2002/201 establishes action levels at which an investigation should be considered, if possible to identify and eliminate any significant local dioxin sources. Recommendation 2004/705 provides for EU-wide monitoring of dioxins and PCBs in a range of foods produced in each Member State and data from this exercise, together with data from other national surveys, will inform a review of the possible reduction of limits in 2007.

5.7.2.9 Controls on dioxins and polychlorinated biphenyls in animal feed

Measures to help protect consumers from carryover from animal feed into meat, milk and eggs are also in place. Maximum permitted levels for dioxins have been made under the scope of the undesirable substances in feed Directive (2002/32/EC) on undesirable substances in animal feed as regards dioxins and dioxin-like PCBs and implemented in the UK by the Feeding Stuffs Regulations. Directive 2006/13/EC will set new statutory limits that will include dioxin-like PCBs for the first time, this is due to be transposed into national legislation towards the end of 2006.

As with food, Member States are monitoring the background levels of dioxins and PCBs in feed (Commission Recommendation of 11 October 2004/704/EC) to help gain a better understanding of background levels and how these are changing as actions are taken to control the presence of these substances in the environment. The FSA is currently performing such monitoring in the UK for 2005/6 which covers approximately 160 samples from a wide range of feed products. The results will be available later in the year. Data from this exercise, together with data from other sources, will inform a review of the maximum permitted limits in 2008.

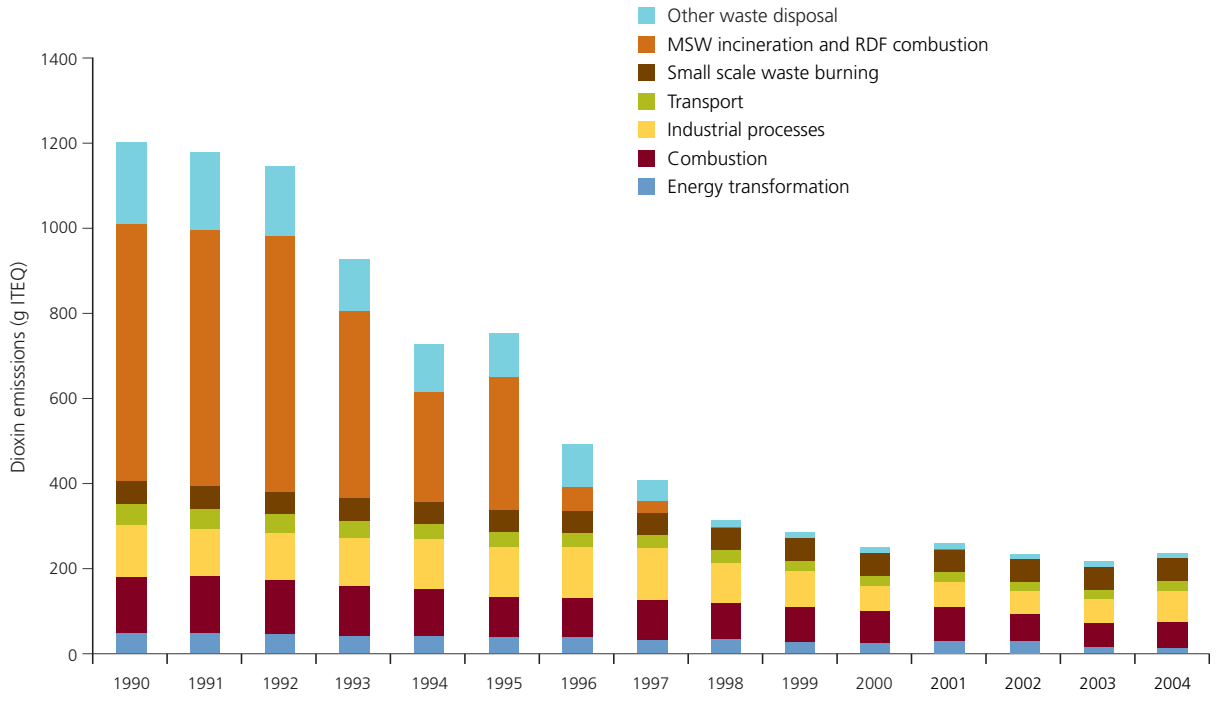
5.8 Effectiveness evaluation of current legislation on emissions to air

Without exception, monitoring surveys in the UK have demonstrated a decline in emissions of dioxin, PCBs and HCB. Figures 8–10 below show environmental trends for dioxins, PCBs and HCB between 1990–2004 and serve to demonstrate the effectiveness of the current legislative process (see Annex 6A–C for data on time series).

5.8.1 Trends for dioxins emissions to air

The UK National Atmospheric Emissions Inventory records give the estimated percent contribution from each source category to the total release of dioxins to air per year. Figure 8 illustrates overall trends in releases of dioxins by source sector. Releases of dioxins to air have reduced significantly since 1990. Atmospheric releases were estimated at 1036 grams I-TEQ/year in 1993 compared to 348 grams I-TEQ/year in 2004, this represents a 70% decline. These trends show that previously significant sources have now been abated. However, with decreasing releases from industrial sources, unregulated diffuse dioxin sources now constitute a significant share of total emissions in the UK.

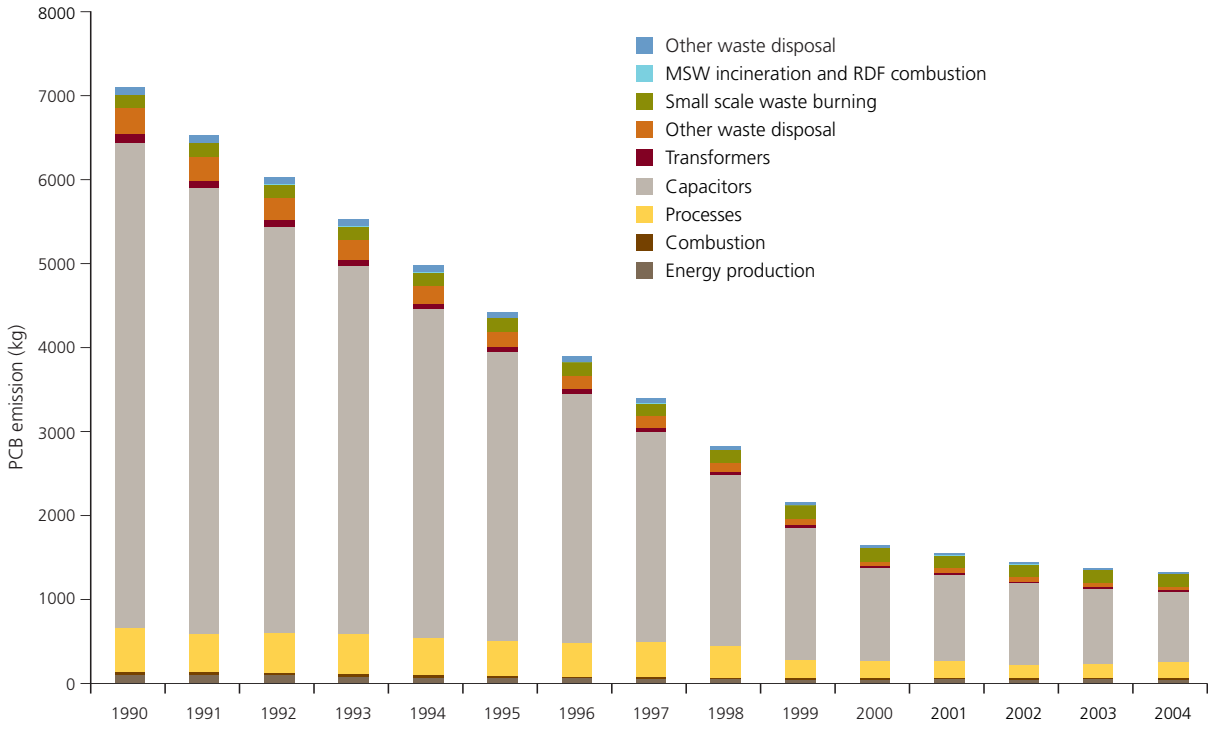
Figure 8: Time series of dioxins emissions to air (grams I-TEQ)



5.8.2 Trends for PCBs emissions to air

Figure 9 shows estimated emissions of PCBs into the environment have decreased steadily for the last decade. In 2004 estimated releases were at 1330 kg/year, this represents a 76% decline since 1993. The largest contribution to emissions are releases from equipment and products which were produced before 1986 when all new uses of PCBs were regulated. Equipment containing PCBs is disposed of by environmentally sound waste disposal methods. This has greatly contributed to a significant reduction in emissions.

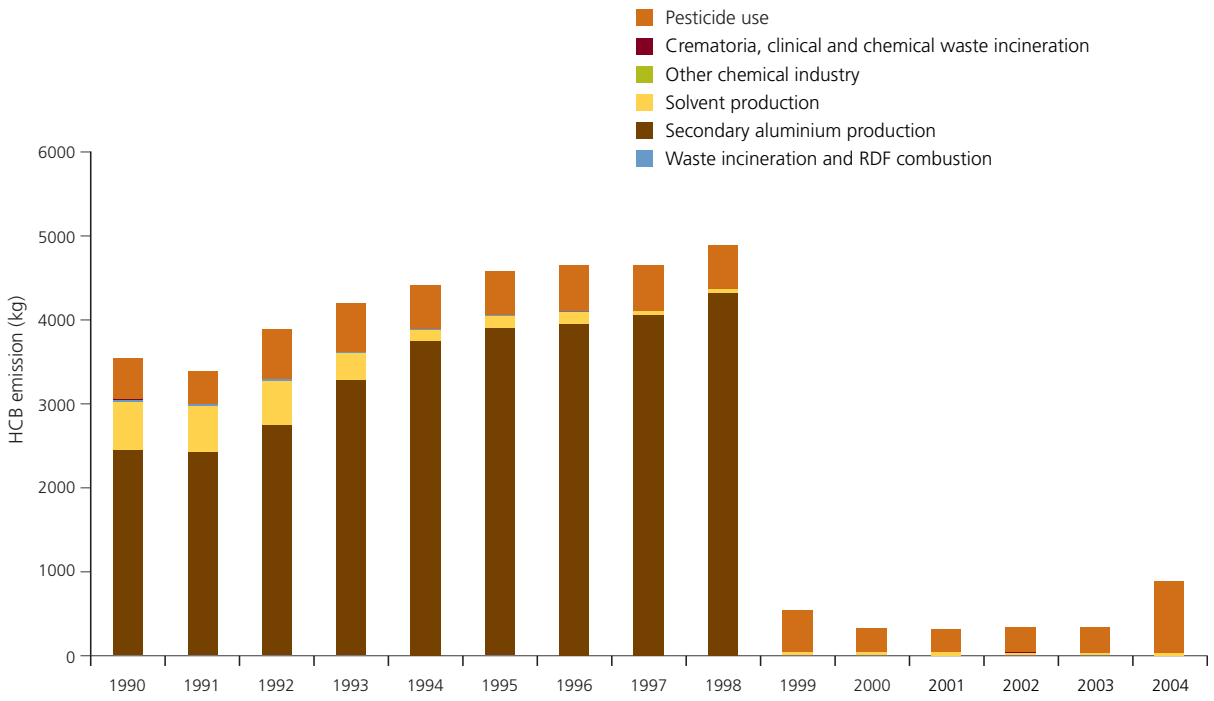
Figure 9: Time series of PCBs emissions to air (kg)



5.8.3 Trends for HCB emissions to air

Figure 10 shows HCB emissions to air. Emissions from pesticide application currently account for virtually all of the UK HCB emissions which occur as a contaminant in some pesticide formulations and from chlorinated solvent production. In 1993 emissions for HCB were estimated at 4169 kg, in 2004 emissions were 79% lower. For 2004 these two sources are estimated to account for 97% and 2.9% respectively, of the total HCB emissions. This represents a change in the relative contributions to the total for 1993 where the same sectors contributed approximately 35% and 45% respectively. This change is a direct result of the reduced emissions from the production of chlorinated solvents (National Atmospheric Emissions Inventory 2004). The sudden decline in emissions of HCB after 1998 is due the introduction of controls on use of hexachloroethane (HCE) as a degassing agent. The increase in 2004 is due to increased use of chlorothalonil in which HCB may be present as an impurity.

Figure 10: Time series of HCB emissions to air (kg)



Section 6

Strategies and measures to further reduce unintentional production of dioxins, PCBs and HCB

The Government's continuing goal is to protect human health and the environment from the risks posed by dioxins, PCBs and HCB and to reduce the total releases derived from anthropogenic sources of each of them. Over the past 15 years the Government has taken steps to identify, quantify and manage the major sources of dioxins, PCBs and HCB listed in the Stockholm Convention. Previous major sources such as waste incinerators and industrial processes have now been controlled via legislation and abatement techniques and continue to be closely regulated.

Current emissions are now dominated by a wide range of smaller diffuse sources. Inventory data for these diffuse sources have a high level of uncertainty due to a lack of activity data, the varying conditions and the uncontrolled nature of the emissions. Further work to reduce the present uncertainty by accurately quantifying emissions from diffuse sources is therefore necessary to provide a more accurate understanding of their contribution the to UK inventory and to inform the consideration of any additional control measures that may be necessary to address them.

The best evidence we have at present suggests that the most pressing task is to improve our knowledge of uncertainties in activity statistics and emission factors on bonfires, small scale burning and accidental fires. The Government will also consider the need for increased public awareness of the current regulatory regime on burning of domestic and garden waste and how to reduce emissions of dioxins, PCBs and HCB from household activities that might lead to their formation.

While our knowledge base on emissions to air has greatly improved over the past 10 years, there remain significant gaps in our understanding on releases to land and water. Improvement and updating of inventories for releases to land and water will allow the UK to develop a more comprehensive multi-media inventory for dioxins, PCBs and HCB.

Defra will continue to secure reductions in emissions from processes and activities regulated by Local Authorities. Defra, Welsh Assembly Government and Scottish Executive statutory guidance was issued in 2004 and 2005 to reduce emissions of dioxins from certain metals processes and from a proportion of crematoria which are regulated by Local Authorities.

6.1 Improvement of source inventories

The following key activities will be taken forward:

(a) Update UK source inventories of dioxins, PCBs and HCB emissions to land and water

The main focus over the last decade has been on regulating emissions to air which reflects the greater knowledge available concerning the processes from which dioxins formation is likely and because emissions to air are the main contributory factor to human exposure. However, there is a need for the UK to improve information on emissions to land and water for all three substances.

Various approaches will be taken to update the previous estimates of emissions of dioxins, PCBs and HCB to land and water. Additional research will:

(a) review key dioxin, PCBs and HCB sources of releases to land and water and draw up a comprehensive list for the UK;

(b) review and update existing emission factors for land and water to reflect improved knowledge and sector developments;

(c) outline a methodology for collection of additional information on land and water releases;

(d) estimate releases of HCB to land and water from residues, HCB-contaminated products/substrates, combustion and disposal of HCB-contaminated wastes.

(b) Improvement of source inventories for dioxin, PCBs and HCB emissions to air

The UK has comprehensive inventories for the emissions of these three substances to air. However, source inventories for emissions to air could be improved further by addressing knowledge gaps within the National Atmospheric Emissions Inventory and identifying sectors where new information is available. Some activities to be carried out include:

(i) Improvement of inventory for diffuse sources

A review of the current source inventories for dioxin and dioxin-like PCBs for air, soil and water (Defra 2006) identified small scale waste combustion, burning of agricultural waste and accidental fires as contributing significantly to the overall uncertainty associated with calculating UK air emissions. Document may be found at:

http://www.defra.gov.uk/science/project_data/DocumentLibrary/CB01073/CB01073_3413_FRP.pdf

The uncertainty is associated with both the activity levels (product produced in tonnes or litres per year) and emission factors (amount of dioxins released per kg/material processed/time). There is difficulty in obtaining robust information on the frequency of activity, for example, numbers of garden bonfires or the disparate nature of fuel that can be used, therefore the emission factors carry high uncertainty.

Future work will focus on reducing inventory uncertainty through research aimed at improving activity data estimates and through practical orientated approaches such as working with Local Authorities to help establish trends in bonfire/fire numbers to identify the frequency and type of material used as fuel.

(ii) Review of the hexachlorobenzene inventory

The UK already reports emissions of HCB to air from a number of sectors (NAEI 2004). A review of the inventory has indicated that areas where further work could be focused to improve the HCB emission inventory include:

(a) Sectors of relevance to the UK where emissions of HCB are likely to occur but are not included in current estimates, for example, transport sources.

(b) Sectors where emission factors used in the UK are significantly different to more recent estimates. In such instances, the UK emission factors will be revised and updated to bring them into line with the more recent published information for example, HCB contamination of the pesticide chlorothalonil indicates a need to update the NAEI emission factors for the agricultural sector.

(iii) Development of a multimedia emissions inventory for dioxins, PCBs and HCB

The completion of the above work will contribute towards the production of a multimedia inventory including all three substances to air, land and water.

In developing a multimedia inventory the UK will consider the initiatives underway at national and EU level concerning the improvement of emissions inventories to ensure consistency in the policy approach with other cross Government initiatives. An example is the European Pollutant Emissions Register (EPER) reporting and the development of Pollutant Release and Transfer Registers (PRTRs). EPER covers European-wide registers of industrial emissions into air and water and PRTRs extend the EPER mainly in terms inclusion of more substances to report, additional coverage of releases to land, off-site transfers of waste and releases from diffuse sources, public participation and annual instead of triennial reporting.

6.2 Strategies to reduce emissions of dioxins, PCBs and HCB emissions to air

While our knowledge base on emissions to air have greatly improved over the past 10 years, there remain some gaps in data to allow accurate estimates of dioxins and PCBs emissions for some UK industrial sectors. In addition, there remains little data available for many of the diffuses emission sources. Future work will aim to address these data gaps:

(i) Reducing emissions of dioxins and PCBs from industrial sources regulated by the Environment Agency and the Scottish Environment Protection Agency (SEPA)

The Environment Agency (EA) and SEPA collates information relating to emissions of dioxins and PCBs from EA regulated industrial sources for England and Wales and SEPA regulated sources in Scotland. The EA is currently reviewing releases of dioxins and PCBs and are developing a Dioxins Pollution Reduction Programme. Preliminary findings from this work has shown that dioxin releases from EA regulated processes are dominated by releases from a small number of sinter plants, which are part of the UK iron and steel industry. The Agency

has since worked closely with the steel industry to identify solutions to further reduce emissions. Work includes a test on the option of urea addition as a practical and economic technique to reduce dioxin releases. The results of this trial are due to be submitted to the Environment Agency by the end 2006. If the trial is successful it is envisaged that urea addition will be installed at all UK sinter plants by no later than the end of 2007, though alternative options for dioxin release reduction may be explored.

The EA Dioxins Pollution Reduction Programme identified two other sources as having the potential for finding further emissions reductions, the non-ferrous metal sector and electric arc furnaces. The Pollution Reduction Programme action plan proposes that the non-ferrous metal sector and the operators of the arc furnaces should evaluate the feasibility and costs of reducing dioxin releases.

These planned measures will deliver a further reduction in dioxin releases. In addition, Best Available Techniques for dioxin and PCB-emitting industries will be kept under review.

SEPA is currently reviewing the releases of dioxins from regulated industrial sources and is carrying out an evaluation of opportunities that exist to make further reductions of emissions. Further work within this review programme will include:

(a) the development of a Pollution Reduction Programme (PRP) on for dioxin emissions. The purpose of the PRP will be to further identify SEPA regulated sources of dioxin emissions within Part A and Part B installations as listed in the PPC (Scotland) Regulations 2000 and and take further action;

(b) a review of the potential means for the further reduction of the dioxin release from these sources;

(c) contribution towards the development and delivery of the UK Dioxin Action Plan and UK compliance with the Stockholm Convention.

(ii) Reducing dioxins, PCBs and HCB emissions from diffuse sources

The disparate nature of diffuse sources makes it harder to reduce emissions by conventional regulatory means alone and alternative approaches were proposed in the recent review. The document may be found at:

http://www.defra.gov.uk/science/project_data/DocumentLibrary/CB01073/CB01073_3413_FRP.pdf

One such approach is that the UK develops an educational awareness campaign to inform the public on how to minimise dioxin emissions from domestic sources.

The purpose for such a campaign would be to disseminate best practice on disposal and management of household waste, coal fires and bonfires and in particular practices that result in formation of dioxins and PCBs. The target audience could include the public, regulatory bodies, industry and Local Authorities.

This will complement ongoing work to implement Defra's UK Waste Strategy. The Waste Strategy aims to minimise the amount of waste produced, encourages recycling and the environmentally sound disposal of waste. Defra is currently consulting on the Waste Strategy which may be found at:

http://defraweb/environment/waste/strategy/review/index.htm

6.3 Strategies to reduce exposure to dioxins, PCBs and HCB via food

The Food Standards Agency already carries out significant activities to monitor the levels of dioxins, dioxin-like PCBs and HCB in food and animal feedstuffs. Much of this work is carried out in conjunction with on-going initiatives at European Community levels. Future work will continue to focus on this area with the following activities being key:

(i) Setting maximum permitted levels in food and animal feed

On the basis of data provided by EU Member States since dioxin limits for food were introduced in 2002, the European Commission Expert Committee on Dioxins will review the limits for dioxins and dioxin-like PCBs in food which were revised in 2005 with the aim of setting lower limits in 2008. The UK will participate fully in these discussions and is regularly submitting data from its food survey programmes.

The latest regulation (EC Regulation 199/2006) which came into force in 2006 includes a requirement for producers of fish oil for human consumption to investigate processes for reducing levels of PCBs with a view to a significant reduction in total WHO-TEQ by 2008.

Limits on the maximum permissible concentrations of dioxins in food will exclude from the market those products with the highest levels. This may only have a direct influence on the exposure of the small number of people that may have eaten such products, however the presence of the limits and the associated care taken in selecting raw materials or sourcing of supplies is expected to have a more widespread effect in gradually reducing levels in food. Limits on levels of dioxins in animal feed will have a similar effect.

(ii) Monitoring of food and animal feed

Since 2002, the European Commission have set out a schedule for monitoring dioxin levels in food across the EU. EC Recommendation 2004/75 will be amended in 2006 to widen the range of foods to be tested and extend the scope to new Member States. The UK has been participating fully in this programme and is currently testing about 250 samples of a wide variety of foods. In addition, the UK continues to conduct targeted surveys of particular food groups including fish, eggs and offal. Together with the results generated for the EU monitoring programme, the UK will be reporting on 450 sets of results from other surveys during 2006-2007. These will inform the negotiations referred to above. Results are regularly published on the FSA website at www.food.gov.uk The FSA is undertaking similar work for

animal feed. Data for around 150 feed products was obtained in 2004 and results can be obtained from (www.food.gov.uk). This exercise will be repeated in 2006.

(iii) Actions to protect consumers

Occasionally a result from the food monitoring programmes indicates that a regulatory limit might have been exceeded. In such cases, FSA will inform the relevant enforcement authority and/or the retailer to ensure that affected food does not remain on the market.

In support of the regulatory limits set by the European Commission separate Action Levels for dioxins and dioxin-like PCBs are agreed by member States. These are below the legal limits but results above the Action Levels may indicate a specific problem and will therefore prompt an investigation with the aim of reducing the dioxin levels if at all possible.

Where a result is below a regulatory limit but exposure calculations indicate a possible exceedence of the dioxin tolerable daily intake (TDI), advice may be given to consumers (all consumers or specific groups) to limit their consumption of the food in question. The Food Standards Agency's advice on fish consumption for instance balances the benefits of fish with the risk that may arise from exposure to contaminants and the levels of dioxins in fish is explicitly taken into account when deriving this advice.

(iv) Research programme on dietary intakes

As noted in the section on trends, Total Diet Studies are conducted periodically. These have been used to assess overall consumer exposure to dioxins and dioxin-like PCBs and to identify specific food types that make the greatest contributions to dietary exposure. As dietary exposure to dioxins has fallen significantly and knowledge of dioxin distribution in the food chain has increased, Total Diet Studies will continue but at less frequent intervals. Recent work has focussed on investigating the dioxin levels and the sources of variation that occur in specific food types known to contribute most to exposure.

(v) Food chain pathway, mechanisms and livestock uptake

FSA carries out research to improve the understanding of the mechanisms by which dioxins and PCBs enter and pass through the food chain. Two projects were completed in 2005. The first studied the rate and distribution of dioxin and PCB uptake by animals from their feed. The second looked at the effects of deposition of contaminated sediment on pasture as a result of flooding, notably on the levels of dioxins and PCBs in milk (Report C01037, from FSA Library). The FSA continue to review pathway exposure and modelling and will be carrying out further work.

6.4 Implementation schedule for measures to reduce unintentionally produced POPs

The following section summarises the identified actions and measures to be taken together with an implementation schedule:

Table 9: Implementation schedule for unintentionally produced POPs		
Improvement of UK Source Inventories		
Activity	**Actors**	**Timing**
Update source inventories of dioxin, PCB and HCB emissions to land and water	Defra	2007–2009
Improvement of inventory for diffuse sources including reducing uncertainty of estimates	Defra and Scottish Executive	2007–2009
Review of HCB inventory	Defra	2007–2009
Scottish Review of Source inventories	Scottish Environment Protection Agency	2007–2009
Review of emission factors for the non-ferrous metal sector	Environment Agency	2009–2011
Development of multimedia emissions inventory for dioxins, PCBs and HC	Defra	2009–2012
Reduction of emissions of dioxins, PCBs and HCB to air		
Activity	**Actors**	**Timing**
Reduction of dioxin emissions from UK sinter plants	Environment Agency	2007–2009
Public awareness campaign aimed at reducing emissions from diffuse sources: domestic burning of household or garden waste.	Defra Scottish Executive DoE NI	2009–2010
Exposure Reduction Strategies		
Activity	**Actors**	**Timing**
Review of permitted levels in food and animal feed	FSA and European Community	2008
Monitoring of food and animal feed	FSA	On-going
Consumer advice and actions on exceedences of regulatory limits	FSA	On-going
Research programme on dietary intakes including POPs	FSA	On-going
Research on the development of UK and regional models on persistent organic pollutants in all media	Defra	2006–2009
Monitoring of persistent organic pollutants in the environment		
Activity	**Actors**	**Timing**
TOMPS Monitoring network (Air)	Defra	On-going

6.5 Indicator of progress and review of the Dioxins Action Plan

Evaluation of the success of the UK Dioxins Action Plan is crucial to the successful implementation of the Stockholm Convention. It is necessary to ensure mechanisms for monitoring the success of the Convention are in place at the national, regional and global level.

In order to continue to assess the impact of UK policy on dioxins and PCBs and the effectiveness of current legislation Defra will continue to support the air monitoring programme. Data from this environmental monitoring will provide information on trends in contamination and will be used to help inform and further support policy development on dioxins and PCBs. Defra is currently extending the monitoring programme to include the monitoring of additional POPs considered under the Stockholm Convention and UNECE POPs Protocol. In addition, Defra is currently funding work to develop and use UK and regional models to track and predict movement and ultimate fate of releases of POPs into the environment.

Section 7

Reduction or elimination of releases from stockpiles and wastes

Article 6 of the Stockholm Convention requires that appropriate strategies should be developed to identify stockpiles and wastes consisting of or containing or contaminated with POP substances. Stockpiles identified by these strategies should be managed in a safe, efficient and environmentally sound manner.

The Stockholm Convention defines which stockpiles are deemed as waste and requires that they are handled, collected and transported in an environmentally sound manner. The Convention requires wastes to be disposed of in such a way that the POPs content is destroyed or irreversibly transformed. However, waste can be otherwise disposed of in an environmentally sound manner when destruction irreversible transformation does not represent the environmentally preferable option, or where the POP content is low. The Stockholm Convention and the Basel Convention are working together to agree low POP content levels for the 12 banned substances.

Regulation (EC) 850/2004 on POPs contains provisions that go beyond those required by the Stockholm Convention. Under Article 7, the Regulation requires that waste consisting of, containing or contaminated by POPs shall be disposed of or recovered in such a way as to ensure that the POPs content is destroyed or irreversibly transformed by physico-chemical treatment, incineration on land or use as secondary fuel.

Council Regulation (EC) No 1195/2006 adopted low POPs concentration limit values for annex IV of the POPs Regulation. Values for low POP content limits (concentration limits) in annex IV of the Regulation provide the trigger level above which all POPs in wastes have to be destroyed or irreversibly transformed. Derogations from this requirement are allowed, in Article 7(4)(b), where destruction or irreversible transformation is not the environmentally preferable option. The wastes for which this exemption may apply to, and the maximum concentration limits up to which the exemption can apply, are listed in annex V. At the time of writing the National Implementation Plan Annex V values were in draft form and subject to change. However, the derogations are only to be used by Member States in exceptional cases. It is current UK Government policy that no waste should be exported from the UK for disposal.

In addition, those dealing with waste consisting of, or containing or contaminated with POPs will be subject to the other waste controls, as appropriate, such as duty of care and controls for hazardous waste.

The concentration limits in the POPs regulation are listed in Table 10 below:

Table 10: Persistent organic pollutants concentration limits in waste
Annex IV – Low POPs concentration limits

Substance	Concentration Limit
Dioxins/Furans	15 µg/kg
PCBs	50 mg/kg
Other Persistent organic pollutants[4]	50 mg/kg

Section 8

Other obligations of the Stockholm Convention

The principal obligations of the Convention require that Parties adopt and implement measures aimed at reducing or eliminating the release of POPs into the environment. This section will consider a range of other obligations listed in the Convention and what the UK is doing to implement them.

8.1 Information exchange, awareness and education

Article 10 includes obligations for Parties to facilitate 'Public information, awareness and education' on POPs. Specifically, it requires that "each Party shall, within its capabilities promote and facilitate inter alia training of workers, scientists and educators, policy and decision makers". In the UK it is standard practice when developing decision making on environmental policy to consult stakeholders and make information publicly available through a range of media including publications of consultations documents, research reports and the internet.

Making information about the environment publicly available is essential in achieving sustainable development. By providing access to environmental information the public is able to take decisions in the full knowledge of the likely environmental implications and to participate more effectively in decision-making processes that affect the environment. Openness also promotes transparent decision-making and greater public accountability of how authorities undertake their duties and responsibilities in the UK.

Since 1992, the public has had a statutory right of access to environmental information held by public authorities and certain other bodies. This stems from the European Community Directive 90/313/EEC on the freedom of access to information on the environment. In 2003, the 1990 Directive was replaced by EC Directive 2003/4/EC on public access to environmental information, which takes account of advances in technology, reflects international developments in access rights and also learns from the experience of the earlier regime.

The Defra website www.defra.gov.uk contains a wide range of information on what the Government is doing to protect the environment in a range of areas such as chemicals, air quality, soil and contamination and water quality, including news on national, EU and international chemicals policy, Government position statements, advisory committee papers and reports, and developments in research.

The National Air Quality Information Archive is the UK's national archive of air quality information and reports, including detailed air quality monitoring data and statistics, plus major sections on local air quality management and air quality research. This may be found at:

www.airquality.co.uk/archive/index.php

Information on emissions of persistent organic pollutants is also included in the UK's National Atmospheric Emissions Inventory, which compiles estimates of emissions from UK sources such as cars, lorries, power stations and industrial plant. This may be found at:

www.naei.org.uk

The Environment Agency's pollution inventory is an annual record of pollution in England and Wales from activities that it regulates. One of its main objectives is to provide the public with easily accessible information about pollution from industrial and other sources in their local area and nationally. It records pollution that is released into air, discharged into rivers or the sewerage network, or is transferred off site as waste. This feeds in to the Agency's *"Spotlight on Business Environmental Performance Report"* which highlights the areas of success and failure in achieving pollution reductions. It also feeds into the National Atmospheric Emissions Inventory and the European Pollutant Emission Register. The pollution inventory home page can be found at:

http://www.environment-agency.gov.uk/

Likewise, the Scottish Environment Protection Agency provides a wide variety of environmental information in reports and on its website, which also contains an education homepage:

www.sepa.org.uk/education/air.htm

For some persistent organic pollutants, such as dioxins, the major route of human exposure is through the diet. It is therefore important that the public has access to information on food. In the UK this information is provided by the Foods Standards Agency which, along with every other public authority, has a legal duty under Section 19 of the Freedom of Information Act 2000 to adopt and maintain a scheme which relates to the publication of information and to have the scheme approved by the Information Commissioner, to publish information in accordance with that scheme, and to review the scheme from time to time. The Agency's publication scheme brings together in one place the many differing types of information that are issued by the Agency in the discharge of its public functions and it categories the information type and provides details on how to obtain it.

The Agency produces a wide range of publications for the public and the food industry, many of which are available free of charge and some of which can be downloaded from its website:

www.foodstandards.gov.uk

In addition, Defra will provide and exchange information with Parties to Convention via the Convention Secretariat.

8.2 Knowledge Transfer Network on Persistent Organic Pollutants

Owing to health concerns, growing public interest and the environmental impacts of POPs, the Natural Environment Research Council (NERC) is funding a Knowledge Transfer Network on POPs chaired by the University of Birmingham. The Network provides a platform for training, education and information exchange on POPs. A key objective is to train the next generation of scientists to give them the skills required to address the impact of POPs on the environment.

The membership of the Network's Steering Committee is drawn from a wide range of stakeholders, in recognition of the need for integration of and close co-operation between stakeholders. Members include national, local, and regional authorities, the public, industry, and academia.

Defra, the Environment Agency, the Food Standards Agency and LGC Promochem provide funds to support a training fund administered by the NERC POPs network. The training fund is open to applications for financial support towards meeting costs of training activities from UK based early-stage researchers (PhD students and postdoctoral researchers within the 1st two years of appointment). Activities supported include: attendance at national and international conferences at which the applicant is presenting their research, travel to training workshops organised by the network, and visits to other laboratories academic or industrial in the UK and overseas where the applicant will gain access to training facilities not available to them at their host institution. Since its launch in January 2005, the network training fund has contributed towards financing a number of early stage postdoctoral researchers and students to aid their research on POPs.

8.3 Research, development and monitoring

Article 11 requires that Parties facilitate and encourage research, development and monitoring of POPs on their sources, releases, transport levels and trends and effects in humans and environment and support international obligations aimed at research, data collection and monitoring.

The UK Government continues to support a substantial amount of scientific research to underpin policy development on POPs. Government funded monitoring is commissioned and carried out by a range of organisations for a variety of purposes. These include compliance monitoring for international, European and national legislation, trend monitoring and campaigns in particular media or for particular chemicals including POPs. Details about past and on-going research can be found in Annex 7 and information on science in Defra can be found at the following website:

http://www.defra.gov.uk/science/default.htm

A number of other Government Departments and agencies, including Department of Health (e.g. Environmental Health, Air Pollution), Environment Agency (e.g. Air Quality, Human Health Effects, Diffuse Pollution), Food Standards Agency (e.g. chemical contaminants in food) and the Scotland and Northern Ireland Forum for Environmental Research, have significant research portfolios on chemicals including POPs and information on these can be found at the following:

www.doh.gov.uk/research/index.htm

www.environment-agency.gov.uk/science/scienceprojects

www.foodstandards.gov.uk/multimedia/pdfs/research.pdf

www.sniffer.org.uk

Defra has supported air monitoring for different pollutants over the years including POPs. Environmental monitoring and modelling of air pollution is essential to provide reliable information on air quality and to satisfy statutory requirements.

In the next two years Defra will be taking forward further work to develop and use UK and regional models, to support the review of national and international policies and proposals on Persistent organic pollutants. The immediate policy context will be multimedia fate modelling to support development and negotiation of international instruments to control POPs, involving consideration of restrictions on POPs already covered by the United Nations Economic Commission for Europe (UNECE) POPs Protocol and Stockholm Convention, as well as new candidate POPs for inclusion. In order to validate such models it is essential that predictions are compared to available monitoring data such as that from TOMPS monitoring network or that monitoring/measurement exercises are designed to provide test data.

This work will complement Defra's Air Quality Strategy which aims to improve air quality and reduce human exposure to all air pollutants including Persistent organic pollutants. Defra has issued a consultation on the review of Air Quality Strategy. The consultation may be found at:

http://defraweb/corporate/consult/airqualstrat-review/index.htm

Details on mandatory monitoring of food and animal feed are set out in section 6 on the NIP.

8.4 New and emerging issues

Article 8 of the Stockholm Convention sets out process and criteria by which new POPs are processed, assessed and listed in the Annexes of the Convention. The UK Government will continue to respond to new and emerging issues addressing both requirements under the Stockholm Convention and the UNECE POPs Protocol.

The UK continues to participate in international assessments of POPs and plays an active role to input into the work of technical committees under both the Stockholm Convention and the UNECE POPs Protocol to assess substances that meet the criteria of a POP. The UK, in partnership with the European Community and its Member States has nominated six substances to be added to the Stockholm Convention (Chlordecone, Hexabromobiphenyl, Pentachlorobenzene, Short Chain Chlorinated Paraffins and Octabromodiphenyl ether) and seven substances (Hexachlorobutadiene, Octabromodiphenyl ether, Pentachlorobenzene, Polychlorinated naphthalenes, Short Chain Chlorinated Paraffins, Pentabromodiphenyl and Perfluorooctane Sulphonate to be added to the UNECE POPs Protocol.

In addition the UK continues to survey the environment and food for new POPs substances. Brominated dioxins/furans and brominated biphenyls have been detected and measured in Total Diet Survey and in fish and shellfish. This work is restricted by the availability of suitable analytical standards as well as by a shortage of toxicological data on which to base any interpretation of the results. However, FSA intends to publish work it has carried out and hope to stimulate further work in these areas. Study may be found at:

http://www.food.gov.uk/multimedia/pdfs/fsis0406.pdf

The Total Diet Studies on brominated flame retardants (BFR) and poly-brominated biphenyls (PBB) may be found at:

http://www.food.gov.uk/science/surveillance/fsisbranch2006/fsis1006

Work on perfluorooctane sulphonate (PFOS) and perfluorooctanoic acid (PFOA) in food may be found at:

http://www.food.gov.uk/science/surveillance/fsisbranch2006/fsis1106

8.5 Effectiveness evaluation

Article 16 requires that Parties in accordance to their technical and financial capabilities and using existing monitoring programmes and mechanisms (where possible) cooperate on a regional basis, when appropriate and contribute to a global monitoring programme for the Convention. In addition, Parties shall periodically evaluate the effectiveness of the Convention, beginning fours after coming into force (i.e. 2008).

The UK already has an extensive monitoring programme in food, animal feed and air for dioxins, and dioxin-like PCBs and has recently submitted information gained from existing POP monitoring programme in food and air to the Secretariat. The UK will continue to maintain liaison and collaboration with the Convention Secretariat in contributing towards a global monitoring plan and consideration of inclusion of new POPs in future research and monitoring programmes.

8.6 Provision of technical assistance

Article 12 requires Parties to recognise that rendering timely and appropriate technical assistance in response to requests from developing country Parties and Parties with economies in transition essential to the successful implementation of the Convention. Provision of technical assistance includes taking into account the particular needs of developing countries and countries with economies in transition to develop and strengthen their capacity to implement their obligations under the Convention. Much of the UK's regional and bilateral development assistance is focused on helping developing countries to mainstream sound management of chemicals including POPs in poverty reduction strategies and development assistance. The principle routes for providing assistance to developing countries and countries with economies in transition are listed below:

(i) The Global Environment Facility (GEF)

The Global Environment Facility was created in 1991 to channel multilateral funds into projects that create global environmental benefits, initiated by people in developing countries. It brings together 166 member Governments, leading development institutions, the scientific community and a wide spectrum of private sector and non-Governmental organisations. It has allocated US$4 billion in grants and an additional US $12.4 billion in co-financing from other sources to support more than 1000 projects in 140 countries. These projects are implemented by the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP) and the World Bank. More information on the GEF can be found at:

www.gefweb.org

In 2002 persistent organic pollutants became a GEF focal area with US$250 million available for new persistent organic pollutants projects, providing financial and technical assistance to countries in meeting their Stockholm convention obligations. The UK has contributed over £200 million to the GEF since it was established and its fourth largest donor.

(ii) UK Contributions to the Stockholm Convention

The UK contributed £100k per year to the POPs Club which was established under the United Nations Environment Programme (UNEP) to support the development of what is now the Stockholm Convention. Since the Convention entered into force in May 2004 the UK has an obligation to make annual assessed contributions to support the activities of the Secretariat and participation of developing countries. In 2006 the UK assessed contribution was US $380,000.

(iii) Sustainable Development Dialogues

UK's regional and bilateral development assistance is focused on Asia, South America and Africa. The main objective of Sustainable Development Dialogues is to ensure that the environmental dimensions of development are integrated into national policies in order to meet both national priorities and international commitments.

Defra has established a WSSD implementation fund (WIF) with the objective of accelerating implementation of WSSD commitments through initiatives in the following areas:

1. Establishing high level sustainable development dialogues with rapidly developing countries (India, China, Brazil, South Africa and Mexico);
2. Using and promoting multi-stakeholder partnerships as a means of implementation;
3. Identifying opportunities to accelerate delivery of WSSD commitments on which Defra leads.

Under the WIF funds have been set aside to support chemicals management activities with key priority partners. At this stage plans are being developed to work specifically with China, Mexico and South Africa on activities in support of implementing the Strategic Approach to International Chemicals Management.

8.7 Reporting obligations under the Stockholm Convention

Under Article 15 Parties are required to report periodically on the measures taken and on their effectiveness in meeting the objectives of the Convention. Reporting will include:

(a) data on the total quantities of production, import and export of the chemicals listed in Annexes A and B;

(b) a list of countries from which it has imported and exported each of these.

The format and frequency of reporting was decided by the first Conference of the Parties in May 2005. The format of the national reports may be viewed on the Convention website. The purpose of reporting is to assess progress towards meeting obligations under the Convention. In the UK chemicals in Annex A and B have been banned for many years, therefore the reporting will focus on measures taken to reduce unintentional releases. The UK's international reporting requirements and a schedule for the next 5 years to 2011 are outlined in Table 11 below:

Table 11: The UK's reporting requirements 2007–2011

Report	Date for submission to Convention Secretariat	Presentation at COP
National Implementation Plan	17 April 2007	COP3 May 2007
First National Report	January 2007	COP3 May 2007
Report on progress in elimination of PCBs (and every 5 years)	December 2008	COP4 May 2009
Second National Report (and every 4 years)	January 2011	COP5 May 2009
Report on Review of Dioxin Action Plan	April 2011	COP5 May 2011

8.7.1 Review process for reporting

The review process on reporting for the NIP will be tied in with the review of the UK Dioxin Action Plan. The reporting will be against the range of measures identified in the Dioxin Action Plan, by April 2011 and every five years thereafter. Reporting on elimination of PCBs will be in December 2008 and every five years thereafter.

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Annex 1

The UK Dioxin Strategy Group

A Dioxins Strategy Group was established to inform the development of the UK Dioxins Action Plan. The establishment of such a Group was widely supported by respondents to the consultation paper Dioxins and dioxin-like polychlorinated biphenyls in the UK environment.

The purpose of the Dioxins Strategy Group was to provide a dialogue platform to inform Government on further measures that could be taken in order to continue reducing the release of dioxins and dioxin-like polychlorinated biphenyls into the environment. The Group appraised the results of the Government's scientific research programmes to underpin policy development on dioxins and dioxin-like PCBs and will input into the identification of areas for future action to be included in the Dioxins Action Plan.

The group met three times to develop the Dioxin Action Plan as part of the development of the UK National Implementation Plan.

Membership

The group had 12 members, drawn from industry, academia, non-governmental groups and consumer groups. The broad membership of the group ensures that a diverse range of views were represented.

The following organisations were represented:

Corus
Solid Fuel Association
Non-Ferrous Alliance
Sea Fish Industry Authority
Environmental Services Association
Women's Environmental Network
World Wildlife Fund (WWF)
University of Birmingham
University of Lancaster
University of Newcastle
PD Consulting
AEA Technology

Annex 2

Glossary of Terms and Units used

BAT	Best Available Techniques
BFR	Brominated Flame Retardants
Bioaccumulation	The uptake of substances from the environment, and their concentration and retention by organisms, e.g. in fatty tissues
CHAN 27	Chemical Hazard Alert Notice for dioxins issued by HSE
COMAH	Control of Major Accident Hazard Regulations 1999
COSHH	Control of Substances Hazardous to Health Regulations
COT	Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment
Defra	Department for Environment, Food and Rural Affairs
DDT	The chemical name for DDT is 1, 1, 1-trichloro-2, 2-bis (4-chlorophenyl)ethane. The term DDT generally refers to para'-DDT. However the compound's structure permits several different isomeric forms including ortho para-DDT and meta para-DDT. Technical DDT consists of predominantly of para para-DDT and smaller amounts of compounds such as ortho para-DDT, para para – DDT and ortho para DDE
DFID	Department for International development
Dioxin-like PCBs	PCB congener which has toxicity similar to the most toxic dioxin congener (2, 3, 7, 8-tetrachlorodibenzo-p-dioxin) and which is assigned a TEF value
EPER	EPER is the European Pollutant Emission Register, the first European-wide register of industrial emissions into air and water, which was established by a Commission Decision of 17 July 2000. The EPER Decision is based on Article 15(3) of Council Directive 96/61/EC concerning integrated pollution prevention and control

Annex 2

E-PRTR	E-PRTR is the European Pollutant Release and Transfer Register, which will succeed the EPER. It is based on Regulation (EC) No 166/2006 and is intended to fully implement the obligations of the UN-ECE PRTR Protocol, which was signed in May 2003 by 36 countries and the European Community
Fg	femtogram (10^{-15} g)
FSA	Food Standards Agency
GEF	Global Environment Facility
HCB	Hexachlorobenzene
HCE	Hexachloroethane
HMIP	Her Majesty's Inspectorate of Pollution
HPA	Health Protection Agency
HPV	High production volume, the OECD defines an HPV chemical as one that is produced in or imported into any single country in quantities of 1,000 tonnes per year or more.
HSE	Health and Safety Executive
HMRC	Her Majesty's Revenue and Customs
IPPC	Integrated Pollution prevention and Control – integrated approach to controlling pollution from industrial sources across England and Wales
I-TEQ	International Toxic Equivalent Concentration
mg/m^{-3}	milligrams per metre cubed
MSW	Municipal Solid Waste
NAEI	National Atmospheric Emissions Inventory
NERC	Natural Environment Research Council
ng	nanogram (10^{-9} g)

ng/l	nanogram per litre
NIP	National Implementation Plan
OECD	Organisation for Economic Cooperation & Development (OECD)
PAH	polycylic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxins (also known as 'dioxins')
PCCD/F	mixture of congeners of PCDD and PCDF (referred to collectively as 'dioxins' in this NIP
PCDF	polychlorinated dibenzofurans (also known as furans)
PCP	pentachlorophenol
PFOS	perfluorooctane sulphonate
pg	picogram (10^{-12} g)
PIC	Prior Informed Consent
PRP	Pollution Reduction Programme
POPs	Persistent Organic Pollutants
PSD	Pesticide Safety Directorate
SAICM	Strategic Approach to International Chemical Management
SEERAD	Scottish Executive Environment and Rural Affairs Department
SEPA	Scottish Environment Protection Agency
Risk Assessment	The determination of emission pathways and rates of movement of a substance and its transformation or degradation in order to estimate the concentration/doses to which people or parts of the environment may be exposed

Annex 2

TDI	tolerable daily intake
TDS	Total Diet Surveys
TEF	toxic equivalency factor
TEQ	toxic equivalent concentration
TOMPs	Toxic Organic Micro-Pollutants
Toxicity	harmfulness to living organisms. The capacity of a substance to cause toxic effects to organisms or their progeny
Toxicology	properties pertaining to the scientific study of the chemistry effects, and treatment of poisonous substances
UKSHS	United Kingdom Soil and Herbage Survey
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
WHO	World Health Organisation
WSSD	World Summit on Sustainable Development

Annex 3A

TEQ Schemes for dioxins and furans

Congener	I-TEQ (1990)	WHO-TEQ(1997/8)		
		Humans/Mammals	Fish	Birds
Dioxins				
2,3,7,8-TCDD	1	1	1	1
1,2,3,7,8-PeCDD	0.5	1	1	1
1,2,3,4,7,8-HxCDD	0.1	0.1	0.5	0.05
1,2,3,6,7,8-HxCDD	0.1	0.1	0.01	0.01
1,2,3,7,8,9-HxCDD	0.1	0.1	0.01	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.01	0.001	<0.001
OCDD	0.001	0.0001	–	–
Furans				
2,3,7,8-TCDF	0.1	0.1	0.05	1
1,2,3,7,8-PeCDF	0.05	0.05	0.05	0.1
2,3,4,7,8-PeCDF	0.5	0.5	0.5	1
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1	0.1
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1	0.1
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1	0.1
2,3,4,6,7,8-HxCDF	0.1	0.1	0.1	0.1
1,2,3,4,6,7,8-1HpCDF	0.01	0.01	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.01	0.01	0.01	0.01
OCDF	0.001	0.0001	0.0001	0.0001

Van den Berg et al. (1998). Toxic Equivalency Factors for PCBs, PCDDs and PCDFs for Humans and Wildlife. Environmental Health Perspectives, 106, 12

Annex 3B

TEQ Schemes for dioxin-like PCBs

Congener	Ahlborg et al (1993)	WHO-TEQ(1997/8)		
		Humans/Mammals	Fish	Birds
Non-ortho PCBs				
3,4,4′,5-TCB (81)		0.0001	0.0005	0.1
3,3′,4,4′-TCB (77)	0.0005	0.0001	0.0001	0.05
3,3′,4,4′,5PeCB (126)	0.1	0.1	0.005	0.1
3,3′,4,4′,5,5′-HxCB(169)	0.01	0.01	0.00005	0.001
Mono-ortho				
2,3,3′,4,4′-PeCB (105)	0.0001	0.0001	<0.000005	0.0001
2,3,4,4′,5-PeCB (114)	0.0005	0.0005	<0.000005	0.0001
2,3′,4,4′,5-PeCB (118)	0.0001	0.0001	<0.000005	0.00001
2′,3,4,4′,5-PeCB (123)	0.0001	0.0001	<0.000005	0.00001
2,3,3′,4,4′,5-HxCB (156)	0.0005	0.0005	<0.000005	0.0001
2,3,3′,4,4′,5′-HxCB (157)	0.0005	0.0005	<0.000005	0.0001
2,3′,4,4′,5,5′-HxCB (167)	0.00001	0.00001	<0.000005	0.00001
2,3,3′,4,4′,5,5′-HpCB (189)	0.0001	0.0001	<0.000005	0.00001
Di-ortho				
2,2′,3,3′,4,4′,5-HpCB (170)	0.0001	0		
2,2′,3,4,4′,5,5′-HpCB (180)	0.00001	0		

1 From Ahlborg UG et al TEFs for dioxin-like PCB – Report on a WHO-ECEH and IPCS Consultation December 1993.

Annex 4A

Key Community Legislation and Policies related to EU's Obligations under the Stockholm Convention

(adapted from the draft Community Implementation plan August 2006)

Legislative instruments

The main legal instrument for implementing the Stockholm Convention and the UNECE Protocol in the EU is the Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC[1]. This Regulation entered into force 20 May 2004 and as a regulation it is directly applicable in all Member States, including those which are not yet Parties to the Convention or the Protocol. Council Regulation (EC) No 1195/2006 adopts low POPs concentration limit values for annex IV of the POPs Regulation.

The Regulation bans production, placing on the market and use of the 13 intentionally produced POP substances listed in the Convention and the Protocol. General and specific exemptions to these prohibitions are limited to a minimum. All remaining stockpiles for which no use is permitted shall be managed as hazardous waste. Stockpiles greater than 50kg meant for permitted uses shall be notified to the competent authority and managed in a safe, efficient and environmentally sound manner.

The Regulation obliges Member States to draw up and maintain comprehensive release inventories for dioxins, furans, PCBs and polyaromatic hydrocarbons (PAH) and to communicate their national action plans on measures to minimise total releases of these substances to the Commission and to the other Member States. The action plan shall also include measures to promote the development of substitute or modified materials, products and processes to prevent the formation and releases of POPs. Producers and holders of waste are obliged to undertake measures to avoid contamination of waste with POP substances. The control measures on waste follow closely those of the Stockholm Convention and provide more details in some aspects. Low POPs concentrations limits were adopted through Council Regulation No 1195/2006. Waste with POPs content above these limits waste must generally be disposed or recovered such that the POP content is destroyed or irreversibly transformed. Maximum POP concentration limits for those wastes, which are managed in an environmentally preferable way instead of being destroyed or irreversibly transformed, are in the process of being adopted. The Regulation also contains certain general provisions related to the implementation of the Convention.

1 OJ L 229, 29.6.2004, p.5.

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Another important Community instrument is Regulation (EC) No 304/2003 of the European Parliament and of the Council[2] which implements the obligations of the Rotterdam Convention for the application of the Prior Informed Consent (PIC) procedure for certain hazardous chemicals and pesticides in international trade. It includes the prohibition of export of the 10 POP substances currently listed in the Stockholm Convention, in accordance with the provisions therein.

A third core legal instrument is the Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCBs/PCTs)[3]. This Directive aims at disposing completely of PCBs and equipment containing PCBs as soon as possible, and for big equipment before the end of 2010. It also sets the requirements for an environmentally sound disposal of PCBs.

Concerning the obligation to prevent marketing and use of new POP-like chemicals, Council Directive 67/548/EEC[4] (new substances), Council Directive 91/414/EEC[5] (plant protection products) and Directive 98/8/EC (biocidal products) of the European Parliament and of the Council[6] are of particular importance. However, production of new substances with POP characteristics cannot be prevented by any of these Directives. This is to be covered by the future REACH Regulation (COM(2003) 644 final) which is currently in the co-decision procedure (see the European Parliament's legislative observatory.

With regard to unintentionally produced POPs, there are several instruments in Community legislation that have an impact, either directly or indirectly, on the reduction of releases of these substances (see Annex [I]). The main release control measures are set out in Directive 96/61/EC (the IPPC Directive)[7], which covers the major industrial stationary sources of by-product POPs. The European pollutant emission register (EPER), a Community-wide inventory of the principal emissions and responsible sources, was established by Commission Decision 2000/479/EC[8] and it covers other unintentionally produced POPs than PCBs. The list of pollutants to be registered will be expanded to cover also PCBs in the new Regulation on more comprehensive Pollutant Release and Transfer Register proposed by the Commission (COM(2004) 634 final, see also the state of play of the legislative proposal). The Regulation is in the process of adoption in the first reading and it is assumed to be published and entering into force in the first quarter of 2006.

2 OJ L 63, 6.3.2003, p.1.

3 OJ L 243, 24.9.1996, p.31.

4 OJ P 196, 16.8.1967, p.1. Directive as last amended by Commission Directive 2001/59/EC (OJ L 225, 21.8.2001, p.1).

5 OJ L 242, 19.8.1991, p.1. Directive as last amended by Commission Directive 2003/5/EC (OJ L 8, 14.1.2003, p.7).

6 OJ L 123, 24.4.1998, p.1.

7 OJ L 257, 10.10.1996, p.26.

8 OJ L 192, 28.7.2000, p.36.

Concerning obligations on POPs waste, also Council Directive 2006/12/EC http://europa.eu.int/eurlex/lex/LexUriServ/site/en/oj/2006/l_114/l_11420060427en00090021.pdf)[9] of 17 May 2006 on waste is of relevance. These measures apply to all substances or objects which the holder discards of or is obliged to discard of in pursuance of the national provisions in force in the Member States. Hence obsolete pesticides are considered as wastes. Member States must prohibit the uncontrolled discarding, discharge and disposal of waste. They shall promote the prevention, recycling and conversion of wastes with a view to their reuse.

The measures provide for cooperation between the Member States with a view to setting up an integrated, adequate network of disposal installations (taking account of the best technology) which would enable the Community itself to dispose of its wastes and the Member States individually to work towards that aim. That network would have to enable waste to be disposed of in one of the closest appropriate installations that guaranteed a high level of environmental protection.

Member States shall ensure that all holders of wastes shall hand them over to a private or public waste collector or to an undertaking carrying out recovery or disposal operations, or else shall themselves conduct the disposal in compliance with the requirements of the Directive. Companies or establishments treating, storing or disposing of waste for another party must obtain a permit from the competent authority which concerns, in particular, the types and quantities of waste to be treated, the general technical requirements and the safety precautions to be taken, the disposal site and treatment method. The competent authorities may routinely check compliance with those permit conditions. The same monitoring by the competent authority is reserved for transport, collection, storage, disposal or treatment companies working on their own account or for third parties.

The cost of disposal of waste must be borne by its holder, who will hand over his waste to a collector or company and/or else by earlier holders or by the producer who has generated the waste in accordance with the "polluter pays" principle.

The competent authorities appointed by the Member States in order to implement the current measures are required to draw up at least one management plan governing, in particular, the types, quantities and origins of the wastes to be recovered or disposed of, the general technical requirements, all of the special arrangements concerning specific wastes, and the appropriate locations and installations for the disposal.

9 OJ L 194, 25.7.1975, p.39. Directive as last amended by Commission Decision 96/350/EC (OJ L 135, 6.6.1996, p.32).

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CouncilDirective91/689/EEChttp://europa.eu.int/eurlex/en/consleg/pdf/1991/en_1991L0689_do_001.pdf[10] of 12 December 1991 on hazardous waste (amended by Directive 94/31/EC) covers wastes considered as hazardous which are featuring on the list drawn up on the basis of the categories, constituents and properties set out in the Annexes to the Directive. Member States ensure that hazardous waste is recorded and identified; and that when hazardous waste is moved it is accompanied by an identification form (consignment note) they also ensure that different categories of hazardous waste are not mixed and that hazardous waste is not mixed with non-hazardous waste, or other substances or materials save where the mixing is authorised by permit necessary measures have been taken to safeguard human health and the environment. Mixed waste must be separated where technically and economically feasible.

Establishments or undertakings which carry out disposal operations or operations which may lead to recovery and producers of hazardous waste are subject to periodic inspections.

Inspections on transport and collection operations cover in particular the origin and destination of the waste. Transporters, producers, establishments and undertakings keep a record of their activities and make this information available to the competent authorities designated by each State.

The competent authorities publish plans for the management of hazardous waste and the Commission evaluates these plans.

Among other relevant waste legislation is Council Directive 75/439/EEC[11] http://europa.eu.int/eur-lex/en/consleg/pdf/1975/en_1975L0439_do_001.pdf of 16 June 1975 (as amended by Directive 81/101/EEC) on the disposal of waste oil. In December 2005 the Commission proposed the repeal of the Directive by integrating the obligation to collect mineral waste oils into the Waste Framework Directive. The specific provisions on PCBs included in this Directive are covered by the PCB/PCT Directive.

Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment[12] (last amended by Directive 2003/108/EC) stipulates that Member States are to minimise the disposal of waste electrical and electronic equipment (WEEE) as unsorted municipal waste and are to set up separate collection systems for WEEE. Producers of electrical and electronic equipment must apply the best available treatment, recovery and recycling techniques. Such treatment is to include the removal of fluids, including PCB containing capacitors, and selective treatment in accordance with Annex II to the Directive. Waste treatment and storage must be in conformity with Annex III to the Directive, which amongst others requires appropriate containers for storage of PCBs/PCT containing capacitors.

10 OJ L 377, 31.12.1991, p. 20. Directive as last amended by Council Directive 94/31/EC (OJ L 168, 2.7.1994, p. 28).

11 OJ L 194, 25.7.1975, p. 23

12 OJ L 37, 13.2.2003, p. 24.

Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicle[13] (last amended by Decision 2005/63/EC) includes provisions on the collection of all end-of-life vehicles. Member States must set up collection systems for end-of-life vehicles and for waste used parts. They must also ensure that all vehicles are transferred to authorised treatment facilities. The storage and treatment of end-of-life vehicles is also subject to strict control, in accordance with the requirements of Directive 75/442/EEC and those of Annex I to the Directive. This includes appropriate containers for storage of PCB/PCT containing condensers. Establishments or undertakings carrying out treatment operations must strip end-of-life vehicles before treatment and recover all environmentally hazardous components.

The Waste Incineration Directive (Directive 2000/76/EC[14]), which covers all waste incineration facilities, deals with a very important source of by-product POPs. In addition, the Directive on Large Combustion Plants (Directive 2001/80/EC[15]) is relevant from the POPs emissions point of view.

Causing also significant pollution of ambient air, PAHs is the only POP subject to air quality target or limit values in the Community legislation. The recently adopted fourth daughter directive under the Ambient Air Quality Framework Directive 96/62/EC (Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air[16]) lays down an air quality target value for benzo[a]pyrene as a marker for PAHs.

With regard to the prevention of accidental releases of dangerous substances, Council Directive 96/82/EC[17] on the control of major-accident hazards, the so-called Seveso II Directive, is an important piece of Community legislation.

Regarding the releases of POPs to waters, Council Directive 76/464/EEC[18] on pollution caused by discharges of certain dangerous substances has some relevance. However, Emission Limit Values (ELVs) have not been set for other POPs than aldrin, dieldrin, endrin, HCB (Council Directive 1988/347/EEC), DDT (Council Directive 1986/280/EEC)[19] and HCH (Council Directive 1984/491/EEC). Directive 76/464/EEC is now integrated in the Water Framework Directive (Directive 2000/60/EC)[20] and some of the listed and candidate POPs are included in the lists of priority substances to be subject to community-wide environmental quality standards and emission controls.

13 OJ L 269, 21.10.2000, p. 34. Directive as amended by Commission Decision 2002/525/EC (OJ L 170, 29.6.2002, p. 81).

14 OJ L 332, 28.12.2000, p.91.

15 OJ L 309, 27.11.2001, p.1.

16 OJ L 023, 26.1.2005, p.3.

17 OJ L 10, 14.1.1997, p.13. Directive as last amended by Commission Decision 98/433/EC (OJ L 192, 8.7.1998, p.19).

18 OJ L 129, 18.5.1976, p.23. Directive as last amended by Directive 2000/60/EC of the European Parliament and of the Council (OJ L 327, 22.12.2000, p.1).

19 OJ L 158, 25.6.1988, p.35.

20 OJ L 327, 22.12.2000, p.1.

Transboundary shipments of waste are covered by Council Regulation (EEC) No 259/93 on the supervision and control of shipments of waste within, into and out of the Community[21]. This Regulation is the main instrument to transpose the Basel Convention into Community legislation. Movements of waste consisting of, containing or contaminated with POP substances are also covered by that Regulation. The type of control depends on the classification of the waste, the destination of the waste and whether it is destined for disposal or recovery. The Regulation prohibits the export of all waste for disposal outside the Community. It does not prohibit imports for disposal, but Member States have the ability to impose more restrictive controls if they wish. Hazardous wastes may be traded between OECD countries for recovery or recycling, but may not be sent to non-OECD countries. The controls for such shipments depend on whether the waste is classified as hazardous, e.g. lead acid batteries, or highly hazardous, e.g. asbestos. A revised Waste Shipment Regulation has been adopted (Regulation No 1013/2006) and will apply from 12 July 2007.

Strategies, policies and programmes

The European Union strategy for sustainable development adopted in 2001 is based on the Communication from the Commission (COM(2001) 264 final) and the Presidency conclusions from the Gothenburg European Council, 15 and 16 June 2001. The strategy addresses, among other things, threats to public health and lists as headline objectives food and chemical safety. One of the concrete actions mentioned in the strategy is to improve capacity to monitor and control health impacts of certain substances, including dioxins, in food and the environment, especially their effects on children. This Strategy is currently under review by the Commission appointed in autumn 2004.

The main current strategy document on the Community's environmental policy is the 6th Environment Action Programme for years 2000–2010[22] adopted in 2002. The Programme is focusing on certain key areas of concern, environment and health being one of them. This Programme contains also several objectives and actions related to POPs.

The 6th Environment Action Programme aims at a high level of quality of life and social well being for citizens by providing an environment where the level of pollution does not give rise to harmful effects on human health and the environment. Related to chemicals, it aims to achieve within one generation (2020) that chemicals are only produced and used in ways that do not lead to a significant negative impact on health and the environment. Moreover, chemicals that are dangerous should be substituted by safer chemicals or safer alternative technologies not entailing the use of chemicals, with the aim of reducing risks to man and the environment. Impacts of pesticides on human health and the environment should be reduced and pesticides in use which are persistent or bio-accumulative or toxic or have other properties of concern should be substituted by less dangerous ones where possible.

21 OJ L 30, 6.2.1993, p.1. Regulation as last amended by Commission Regulation (EC) No 2557/2001 (OJ L 349, 31.12.2001, p.1).

22 Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002. OJ L 242, 10.9.2002.

One of the actions of the 6th EAP is to develop and implement seven thematic strategies: Soil protection; Protection and conservation of the marine environment; Sustainable use of pesticides; Air pollution; Urban environment; Sustainable use and management of resources; Waste prevention and recycling. Especially the four first mentioned strategies are of relevance to the work on elimination of POP pollution. So far two of the thematic strategies, the Air Pollution[23] and the Marine Strategies[24], are published. The Air Pollution Strategy does not directly deal with air pollution caused by POPs but the proposed measures are likely to reduce also the emissions of by-product POPs. The proposed Marine Strategy Directive is also address toxic contamination caused by pollutants such as POPs.

In 2001 the Commission adopted a Communication on a Community Strategy for Dioxins, Furans and Polychlorinated Biphenyls (COM(2001) 593 final)) as a response to a number of serious feed and food contamination incidents. This strategy aims to assess the current state of the environment and the ecosystem, to reduce human exposure to dioxins and PCBs in the short-term, to maintain human exposure at safe levels in the medium to long term and to reduce environmental effects from dioxins and PCBs. No legislative changes are proposed in the strategy, but several other measures, including proper enforcement of the current Community legislation (in particular the PCB disposal Directive and the IPPC Directive), are proposed. As such the strategy forms a Community-wide action plan to reduce and eliminate releases of these POPs.

The measures to reduce human exposure in the short term include legislation setting limit values for the presence of dioxins, furans and dioxin-like PCBs in feed and food. In order to avoid new releases and address already existing contamination in the environment the Strategy proposes measures to identify sources, control emissions and control the quality of the environment. The Strategy also highlights the need for research, communication to the public and the establishment of a common methodology for continuous monitoring. A review of the actions relating to the environment proposed in the Strategy will be made in the new context of the implementation of the POPs Regulation.

In June 2004 the Commission launched an Environment and Health Action Plan presenting an integrated approach involving closer coordination between the health, environment and research areas. Its added value is the development of a system for integrated information on environment and health to render the assessment of the environmental impact on human health more efficient. To this end, it also proposes to develop a coordinated approach to human biomonitoring between the Member States. These initiatives will result in better knowledge on human exposure to environmental stressors, including POPs.

23 COM(2005) 446 final

24 COM(2005) 505 final

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In 2001, the European Commission adopted a White Paper setting out the strategy for a future Community Policy for Chemicals[25]. The main objective of the new Chemical Strategy is to ensure a high level of protection for human health and the environment, while ensuring the efficient functioning of the internal market and stimulating innovation and competitiveness in the chemical industry. The Strategy pays special attention on substances of concern which include persistent, bioaccumulating and toxic substances (PBT) and very persistent and very bioaccumulating substances (vPvB). The latter group of substances covers also POPs.

The White Paper was followed-up in 2003 by a Commission proposal for a new EU regulatory framework for chemicals[26]. The proposed Regulation is currently subject to the legislative co-decision procedure in the Council and the European Parliament. Under the proposed new system called REACH (Registration, Evaluation and Authorisation of Chemicals), companies that manufacture or import more than one tonne of a chemical substance per year would be required to register it in a central database. Substances of very high concern (including PBT and vPvB substances) would require authorisations for particular uses from the Commission. REACH would furthermore give greater responsibility to industry to manage the risks from chemicals and to provide safety information on the substances. This information would be passed down the chain of production. The REACH Regulation aims at increasing knowledge of the properties of chemicals and of the exposure and to improve the risk management of chemicals. It will also contribute to identification and control of substances exhibiting characteristics of POPs.

In 2001 the European Commission adopted a Strategy on Integrating the Environment into EC Economic and Development Cooperation. The Environment integration strategy outlines how, in the overall context of poverty reduction, EC economic and development co-operation can best assist developing country partners to respond to the environmental challenges they are facing. This includes supporting specific environmental initiatives, and integrating the environment into all existing instruments and programs. At the policy level, this means exploiting synergies between poverty reduction and the environment. Improved policy coherence with fields such as trade, agriculture, fisheries and transport and energy is critically important. At an operational level, improved dialogue with partner countries during the programming of country and regional assistance provides opportunities to integrate environmental considerations into development co-operation. A special emphasis is given to the strengthening of institutional capacities of partner countries, in order to facilitate their participation in multilateral fora dealing with the environment and to implement Multilateral Environmental Agreements (MEAs). As an example, the recently adopted Communication from the Commission on EU Strategy for Africa (Towards a Euro-African pact to accelerate Africa's development)[27] lists the support for the sound management of chemicals, by building capacity to manage risk, by protecting human health and environment and by implementing the international chemicals conventions, among its actions.

25 COM(2001) 88 final

26 COM(2003) 644 final

27 COM(2005) 489 final, 12.10.2005

Financial instruments

The European Union provides significant amount of funding to environmental projects and programmes, both within the EU, in neighbouring countries and in the developing countries. There are several financial instruments and programmes that can be relevant also for POP related projects. All these instruments are described in a recently published Handbook for Environmental Project Funding.

Launched in 1992, LIFE (The Financial Instrument for the Environment) is the main financial instrument for the Community environment policy. LIFE co-finances environmental initiatives in the European Union and certain third countries bordering on the Mediterranean and the Baltic Sea, and in those EU candidate countries that have decided to participate. The third phase of the LIFE programme ran for a five year period (2000–2004). Its budget was to EUR 640 million. In September 2004 with the publication of Regulation (EC) No 1682/2004, LIFE III was extended for a further two years (2005 and 2006), with an additional budget of EUR 317 million. In the same context, the European Commission adopted a proposal for a new phase of LIFE, to be known as LIFE+, for the period 2007–2013. This proposes a budget of EUR 2 190 million for the seven year period, and a simplified structure for the programme involving two components:

- LIFE+ implementation and governance (75 to 80 percent of the budget)
- LIFE+ information and communication (20 to 25 percent of the budget).

The thematic priorities of the programme support the priorities of the Sixth Environmental Action Programme, one of them being environment and health. In total, between 1992 and 2004, the LIFE programme spent EUR 1.36 billion on 2478 projects covering 40 countries and territories. The total estimated cost of projects to which LIFE contributed financially represents a huge environmental investment in Europe and neighbouring states. Between 1992 and 2004 the total estimated cost of projects supported by LIFE was EUR 3.6 billion. LIFE therefore provided around 38 percent of the total investment, stimulating additional investment in excess of EUR 2 billion up to the end of 2004. LIFE programme has co-financed projects relevant for the POPs pollution control, both within the EU and in the neighbouring countries.

In future, the projects in third countries are, however, not to be financed through LIFE but other funds. The candidate and acceding countries have specific financial programmes. The PHARE programme is one of the three pre-accession instruments financed by the European Communities to assist the candidate countries of Central and Eastern Europe in their preparations for joining the European Union. In 2000–2006, PHARE is providing some €11 billion of co-financing for institution building support through "twinning" and technical assistance and for investment support to help candidate countries in their efforts: 1. To strengthen their public administrations and institutions to function effectively inside the Union; 2. To promote convergence with the European Community's extensive legislation and reduce the need for transition periods; 3. To promote economic and social cohesion. For the period covered by the next Financial Perspectives (2007–2013), pre accession assistance will be streamlined under the future Instrument for Pre accession Assistance IPA, which will replace the Phare, ISPA and other specific instruments.

The TACIS Programme provides grant-financed technical assistance to 12 countries of Eastern Europe and Central Asia and mainly aims at enhancing the transition process in these countries. SMAP (the Short and Medium-term Priority Environmental Action Programme is a framework programme of action for the protection of the Mediterranean environment, within the context of the Euro-Mediterranean Partnership.

The EU Development Cooperation is based on partnership with developing countries and nationally-owned strategies developed in Country Strategy Papers (CSPs) and Regional Strategy Papers (RSPs). Thus, EC funding for the environment usually takes place within this context, i.e. assistance is given to those countries and regions that have prioritised and requested such assistance within their CSPs/RSPs. Funding for the environment can also be allocated under multi-regional instruments, for example for the African, Caribbean and Pacific (ACP) countries. The Environment and Forests budget line is a thematic financial instrument designed to assist developing countries in their efforts to integrate environment into their development processes. Environment projects in third countries that relate to research are financed under the Research budget of the EC.

Research and Development

The EU promotes research programmes, funds joint projects and is working to ensure the most efficient use of resources across Europe. The Joint Research Centre (JRC) was set up as part of the European Commission when the EU was founded in 1958. The JRC's task was to provide independent scientific advice and technical support to the Commission and other EU institutions when drafting and implementing policy. Today, particularly relevant for the POPs implementation are activities of the Institute for Environment and Sustainability, the Institute for Prospective Technological Studies (in particular of the European IPPC Bureau) and the Institute for Health and Consumer Protection.

In the 1980s, the EU took on a broader responsibility for stimulating and coordinating scientific research in its member states. Environment has been one of the main themes in the EU research activities. To carry out this task, the EU has set up a series of 'framework programmes'. Lasting about four years, each is updated to reflect the constantly changing nature of scientific and technological research and the Union's evolving priorities. The current framework programme, the sixth, runs from 2002 until 2006 and has a budget of €17.5 billion over the full period. Priority fields food safety (€685 million) and sustainable development (€2.12 billion) are most closely related to the POPs. The Commission has already adopted a proposal for a new EU programme for Research for years 2007–2013 in April 2005. This 7th framework programme is proposed to have a double budget compared with the 6th framework programme, rising to €67.8 billion over the period 2007–2013. The theme 'Environment' would be given a budget of €2.24 billions.

The European Environment Agency was established in 1990 to collect, prepare and disseminate timely, targeted, relevant and reliable information on the state and trends of the environment at European level. The founding regulation of EEA stipulates that it is open to countries that do not belong to the European Union but share its concern for the environment. Iceland, Liechtenstein and Norway have been members from the start, and 12 out of 13 candidate countries have joined in 2002, making the EEA the first EU body to welcome these countries as members. The Agency also co-operates actively with other relevant bodies and international organisations.

Annex 4B

Existing Community legislation on polychlorinated dibenzo-p-dioxins (PCDD), polychlorinated dibenzofurans (PCDF) and polychlorinated biphenyls (PCB)

(adapted from the Community National Implementation Plan August 2006)

Waste incineration

– Council Directive 89/429/EEC of 21 June 1989 on the reduction of air pollution from existing municipal waste incineration plants

- Operating conditions specified for air emissions (PCDD/PCDF)

– Council Directive 89/369/EEC of 8 June 1989 on the prevention of air pollution from new municipal waste incineration plants

- Operating conditions specified for air emissions (PCDD/PCDF)

– Council Directive 94/67/EC of 16 December 1994 on the incineration of hazardous waste

Limit value for air emissions: 0.1 ng I-TEQ/m^3

– Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste

- Limit value for air emissions: 0.1 ng I-TEQ/m^3
- Limit value for discharges of waste water from the cleaning of exhaust gases: 0.3 mg/l
- The new waste incineration directive 2000/76/EC on the incineration of waste will become applicable to both new and existing plants on 28 December 2005. Then all old Directives (89/369/EEC, 89/429/EEC and 94/67/EC) will be repealed
- It applies to incineration of almost all types of waste in incineration plants as well as co-incineration plants

http://europa.eu.int/comm/environment/wasteinc/index.htm

Existing Community legislation on polychlorinated dibenzo-p-dioxins (PCDD), polychlorinated dibenzofurans (PCDF) and polychlorinated biphenyls (PCB)

Waste

– Council Directive 91/689/EEC of 12 December 1991 on hazardous waste

- PCDD/PCDF and PCBs are classified as hazardous waste. The Member States must ensure that sites where such waste is discharged are identified and recorded. They must also ensure that different categories of hazardous waste are not mixed and that hazardous waste is not mixed with non-hazardous waste. The competent authorities must publish plans for the management of hazardous waste and these plans are being evaluated by the Commission

http://europa.eu.int/comm/environment/waste/hazardous_index.htm

– Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)

- Member States shall take the necessary measures to ensure that used PCBs are disposed of and equipment containing PCBs are decontaminated or disposed of as soon as possible. Decontamination and/or disposal shall be effected at the latest by the end of 2010. Member States shall ensure that inventories are compiled of equipment with PCB volumes of more than 5 dm, and shall send summaries of such inventories to the Commission.

http://europa.eu.int/comm/environment/waste/pcbs/index.htm

– Council Regulation (EEC) No 259/93 on the supervision and control of shipments of waste within, into and out of the European Community

- The Regulation sets strict control procedures for the shipment of PCB-containing waste to avoid illegal dumping

- Applies to wastes that contain, consists of or are contaminated by PCDD/PCDF, and PCB at a concentration level of 50 mg/kg or more

http://europa.eu.int/comm/environment/waste/shipments/index.htm

– Council Directive 75/439/EEC of 16 June 1975 on the disposal of waste oils

- Maximum limit of 50 ppm PCB content of regenerated oil or oil used as fuel

http://europa.eu.int/comm/environment/waste/oil_index.htm

– Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE)

- PCB containing capacitors in accordance with Council Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) have to be removed from any separately collected WEEE

http://europa.eu.int/comm/environment/waste/weee_index.htm

Integrated Pollution Prevention and Control

– Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control

- Installations covered by Annex I of the Directive are required to obtain a permit from the Member States' authorities. The permits must be based on the concept of best available techniques (BAT) and must include emission limit values for certain pollutants such as dioxins

http://europa.eu.int/comm/environment/ippc/index.htm

– Commission Decision 2000/479/EC of 17 July 2000 on the implementation of a European pollutant emission register (EPER) according to Article 15 of Council Directive 96/61/EC

- Data on the principal industrial emissions to the air are collected and published every three years. EPER will be replaced by PRTR

http://europa.eu.int/comm/environment/ippc/eper/index.htm

Water

– Council Directive 80/68/EEC of 17 December 1979 on the protection of groundwater against pollution caused by certain dangerous substances

– Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community

- Establishes the framework for laying down emission limit values and environmental quality standards at EU level

http://europa.eu.int/comm/environment/water/water-dangersub/76_464.htm

– Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

Major Accident Hazards

– Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances

- The Directive aims firstly at the prevention of major-accident hazards involving dangerous substances and secondly, as accidents do continue to occur, at the limitation of the consequences of such accidents

http://europa.eu.int/comm/environment/seveso/index.htm

Feed and food

– Commission Regulation (EC) No 199/2006 of 3 February 2006 amending Commission Regulation (EC) No 466/2001 setting maximum levels for certain contaminants in foodstuffs as regards dioxins and dioxin-like PCBs The Regulation establishes maximum levels for PCDD/PCDF and PCDD/PCDF plus dioxin-like PCBs for meat and meat products, fish and fishery products, milk and milk products, hen eggs and egg products, and oils and fats

– Council Regulation (EC) No 2375/2001 of 29 November 2001 amending Commission Regulation (EC) No 466/2001 setting maximum levels for certain contaminants in foodstuffs

- The Regulation establishes maximum levels for PCDD/PCDF for meat and meat products, fish and fishery products, milk and milk products, hen eggs and egg products, and oils and fats

– Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on undesirable substances in animal feed, as amended by Commission Directive 2003/57/EC of 17 June 2003

- The Directive establishes maximum levels for dioxins in feed materials of plant origin, minerals, binders, animal fat, and other products of animal origin, fish oil, fish meal, and compound feedingstuffs, including fish feed

– Recommendation 2002/201/EC of 4 March 2002 on the reduction of the presence of dioxins, furans and PCBs in feedingstuffs and foodstuffs

- The Recommendation establishes action levels for foodstuffs, feed materials and feedingstuffs

– Commission Recommendation 2002/201/EC on the monitoring of background levels of dioxins and dioxin-like PCBs in foodstuffs and feedingstuffs

- Under the Recommendation, the Member States, in proportion to their production, use and consumption of feed materials, feedingstuffs and foodstuffs, are to carry out random monitoring of the presence of dioxins and dioxin-like PCBs in feed materials, feedingstuffs and foodstuffs, including fish and fishery products

http://europa.eu.int/comm/food/food/chemicalsafety/contaminants/legisl_en.htm

Annex 5A

The current UK requirements for Stockholm Convention Annex C Part II source categories

Source category	Sector profile and controls
Waste incinerators	The requirements of the Waste Incineration Directive (the "WID") are implemented through the existing Pollution Prevention and Control Regulations (PPC) applies to virtually all incineration plant that burn waste from 28 December 2005. Some plants are excluded from WID because they burn wastes that are specifically excluded form the WID, nevertheless these plants may still fall within the terms of the PPC Regulations. Plants falling within the terms of the PPC Regulations are required to use Best Available Techniques (BAT). Note: the PPC Regulations implement the Integrated Pollution Prevention and Control Directive (the "IPPC Directive"). Guidance on the WID: "Guidance on Directive 2000/76/EC on the Incineration of Waste" is available from the Defra website. Technical guidance is also available from the Environment Agency. Under PPC and the Waste Incineration Directive, existing Part A2-plants are required to comply with dioxin limits and controls by August 2005. See LA-IPPC Sector Guidance (SG) Note SG9 A2 Roadstone Coating, Mineral and Other Processes that Burn Recovered Fuel Oil. Under Part B, Small waste oil burners currently have no dioxin limit, but controls include the control of waste source and adequate combustion.
Cement kilns burning hazardous waste	This sector is regulated under the PPC regime and is required to use BAT. The cement production sector is included in Section 3.1 of schedule I to the PPC regulations. Existing plants were required to comply by 31 August 2001. In the UK there are 11 cement/lime kilns (out of a total of 22) which burn waste (co-incineration). These plants are required to comply with the WID from 28 December 2005. Guidance on the WID: "Guidance on Directive 2000/76/EC on the Incineration of Waste" is available from the Defra website. Technical guidance including the "substitute Fuels Protocol" (issued in April 2005) is also available from the Environment Agency.
Production of pulp using elemental chlorine	There are 8 pulp production plants in the UK none of which use elemental chlorine. The PPC Guidance (IPPC S6.01, 2000) states that elemental chlorine should not be used in pulp production no such facilities are planned. Technical guidance is also available from the Environment Agency.
Secondary copper production	The only secondary copper production works in the UK ceased its smelting/refining operation in 2000 and, as far as can be determined, there are no plans for secondary copper works in the UK.

Annex 5A

Source category	Sector profile and controls
Sinter plants in the iron and steel industry	In 2000, there were 4 integrated iron and steel works operating in the UK, producing about 78% of the total 16.3 Mte UK crude steel production in 1999. Iron and steel making operations at Llanwern ceased in early 2001. This sector is regulated under PPC and is required to use BAT. Technical guidance is also available from the Environment Agency.
Secondary aluminium production	In the UK there are currently 2 master alloy producers, 8 re-melt plants and 16 refiners, plus an additional 30 small producers which predominantly use sloping hearth furnaces to produce low grade re-melt from scraps. Over the past 6 or so years around 20 facilities have closed, including some major producers. This sector is regulated under the PPC regime, with master alloy producers and refiners coming under IPPC A1 or A2 and re-melt plant coming under IPPC A1. The smaller additional producers are controlled as Part B processes under LAPC and will be Part B processes under LAPPC. Producers regulated under the latter are subject to conditions aimed at eliminating emissions of dioxins – see Process Guidance (PG) Note 2/06a (04) *Processes Melting and Producing Aluminium and its Alloys.* Technical guidance is also available from the Environment Agency.
Secondary zinc production	In the UK there is 1 secondary zinc production facility. The sector is regulated under the PPC regime and required to apply BAT. Producers regulated under Part B are subject to conditions aimed at eliminating emissions of dioxins – see PG Note 2/07 (04) *Zinc and Zinc Alloy Processes.* Technical guidance is also available from the Environment Agency.

- Integrated Pollution Prevention and Control (IPPC), covers installations known as A(1) installations, which are regulated by the Environment Agency;
- Local authority Integrated Pollution Prevention and Control (LA-IPPC) covers installations known as A(2) installations, which are regulated by local authorities; and
- Local authority Pollution Prevention and Control (LAPPC), covers installations known as Part B installations, also regulated by local authorities.

All three systems require the operators of certain industrial and other installations to obtain a permit to operate. Once an operator has submitted a permit application, the regulator then decides whether to issue a permit. If one is issued, it will include conditions aimed at reducing and preventing pollution to acceptable levels. A(1) installations are generally perceived to have a greater to potential to pollute the environment than an A(2) installation, and Part B installations would have the least potential to pollute.

SG denotes:

The Sector guidance (SG) notes are issued by the Secretary of State for Environment, Food and Rural Affairs under regulation 37 of the Pollution Prevention and Control (England and Wales) Regulations 2000 Regulations (as amended). They form statutory guidance on what constitute the Best Available Techniques for LA-IPPC installations (also known as A2 installations) for each of the main sectors regulated.

PG denotes:

The Process Guidance (PG) notes are issued by the Secretary of State for Environment, Food and Rural Affairs under regulation 37 of the Pollution Prevention and Control (England and Wales) 2000 Regulations (as amended). They form statutory guidance on what constitute the Best Available Techniques (BAT) for LAPPC installations (also known as Part B installations) for each of the processes regulated.

Annex 5B

The current UK requirements for Stockholm Convention Annex C Part III source categories

The Convention also requires the promotion, in accordance with its action plan, of the use of BAT and BEP for new and existing sources within source categories such as those within Part III of Annex C.

Source category	Sector profile and controls
Open burning of waste	In 2000 the total number of outdoor fires in the UK was estimated to have been 348,200. However, this covers a wide range of source categories other than waste, including derelict buildings, road vehicles, ships and boats, standing crop, woods, etc. **Bonfires** are regulated under the Environmental Protection Act (EPA) 1990, Section 79 on statutory nuisance. Under this, a notice can be served on the owner/occupier of a site to remove the nuisance (usually smoke, odour, dust, etc.) by the relevant local authority. In addition, Smoke Control Orders under the Clean Air Act 1956 (superseded by the Clean Air Act 1993, Section 20) designate areas as smokeless zones in which it is an offence for anyone to burn unauthorised fuels unless using exempt appliances. Sections 1 and 2 of the Clean Air Act 1993 can be used to control smoke from bonfires that take place accidentally, maliciously or otherwise on trade premises. Application of such legislation relies on a bonfire being reported as a nuisance. Section 33 of the Environment Protection Act 1990 (as amended by the Waste Management Regulations 2006 (England and Wales) provides that a person who keeps, treats or disposes of controlled waste in a manner likely to cause pollution of the environment or harm to human health commits an offence of illegal waste disposal. A person who commits the offence "in relation to household waste from a domestic property within the curtilage of the dwelling" is liable on summary conviction to a fine and/or a prison sentence. **Landfill sites** – under Section 33 of EPA 1990 all waste treatment, disposal or keeping requires a licence, and is implemented under the waste Management Licensing regulations under which all site licences are issued. In the UK no landfill site licences permit the open burning of the landfill. **Crop stubble burning** – the Crop residues (Burning) Regulations (1993) prohibit the burning of specified crop residues.
Thermal processes in the metallurgical industry not mentioned in Annex C Part II	**Electric Arc Furnaces** – in addition to integrated works, around one-fifth of UK steel output in produced via the EAF route. In 2001, there were a total of 16 EAFs in the UK with a capacity of 7 Te/yr or more, with a range of 7 to 165 Te/yr. Controls are as for sintering in table 11. **Primary copper production** – there is no longer any primary copper production in the UK. **Primary aluminium production/Soederberg process** – primary aluminium production takes place at 3 sites in the UK, all using pre-baked anodes. There is no production using the Soederberg Process. Under LA-IPPC, for Part A2-installations, SG3 – A2 Ferrous Foundries Sector and SG4 – A2 Activities in the Non ferrous Metals Sector contains measures to prevent the formation of dioxins. Section continued next page.

Annex 5B

Source category	Sector profile and controls
Thermal processes in the metallurgical industry not mentioned in Annex C Part II (continued)	For Part B-installations all the LAPPC metals PG Notes contain conditions aimed at eliminating dioxin emissions, see: PG2/01 (04) – Furnaces for the Extraction of Non-Ferrous Metal from Scrap PG2/02 (04) – Hot Dip Galvanizing Processes PG2/03 (04) – Electrical, Crucible and Reverberatory Furnaces PG2/04 (04) – Iron, Steel and Non-Ferrous Metal Foundry Processes PG2/05 (04) – Hot and Cold Blast Cupolas, and Rotary Furnaces PG2/06a (04) – Processes Melting and Producing Aluminium and its Alloys PG2/06b (04) – Processes Melting and Producing Magnesium and its Alloys PG2/07 (04) – Zinc and Zinc Alloy Processes PG2/08 (04) – Copper and Copper Alloy Processes PG2/09 (04) – Metal Decontamination Processes
Residential combustion sources	In the UK solid fuel energy consumption in 2004 was approximately: coal 1,903,209 tonnes; coke 174,000 tonnes; and other manufactured fuels 496,162 tonnes. The clean Air Act (1993) is the main piece of legislation controlling emissions from residential boilers and stoves. Smoke Control Orders an be served under the Act designating smoke control areas where the burning of fuel is restricted to authorised (smokeless) fuels, which excludes wastes. The Heating Equipment Testing and Approval Scheme undertakes testing on behalf of British Standards for compliance with domestic heating appliance standards. The following standards are similar to EN 303-5 which is required by the UNECE POPs Protocol but which tends to apply to larger boilers and pressure systems: EN 12340 for room heaters EN 12809 for independent solid fuel boilers up to 50 kW typical to UK homes EN 13229 for indoor open fires The standards are voluntary and appliances that do not comply may be placed on the market. The Building Regulations (England and Wales) 2000 imply that all new buildings should use appliances that meet these standards, whilst the Scottish Building Regulations are prescriptive. The UK has established a domestic energy efficiency programme including the Energy Efficiency Best Practice Programme, Home Energy Efficiency Scheme and various activities by the Energy Saving Trust.

Source category	Sector profile and controls
Fossil fuel fired utility and industrial boilers	In the UK, for plants greater than 50MW, Chief Inspector's Guidance Note (CIGN) S31.01 currently applies. It details that increasing the overall thermal efficiency of the process generally reduces releases of all pollutants per unit of output, and that particulate matter emissions vary with the fuel burned but should be reduced by good combustion control before abatement by electrostatic precipitators or filters. Guidance is provided on BAT for dioxin reduction in CIGN S2 1.01 which includes additive injections, with a reference made to the controls applied at municipal waste incinerators. The Large Combustion Plant Directive 2000/80/EC (LCPD) primarily aims to reduce emissions of SO^2, NO^X and particulate matter. The Directive applies to plants of 50 MW and over. There are two approaches to meeting this commitment for existing processes, either by applying specified emission limit values (ELVs) or by ensuring that existing plant are subject to a national emission reduction plan (National Plan) by 1 January 2008. Plants over 50MW in this sector will be regulated under Part A of the Pollution Prevention and Control (PPC) Regulations, which are the UK's translation of the IPPC Directive 96/61/EC on Integrated Pollution Prevention and Control. A general requirement of the PPC Regulations is the use of BAT. All relevant new installations in the UK are already covered by PPC and all existing installations will be covered by 2007. The "Combustion Plant (Industrial)" sector is included in Section 1.1 of Schedule I to the PPC Regulations, which outlines the types of the activities covered. Existing plants in this sector are required to comply by 31st March 2006. BREF notes for this sector are currently being drafted. Plants with a capacity of 20–50 MW are covered under Part B of the PPC regulations. The following PG Notes apply which are primarily aimed at controlling SO^2, NO^X and particulate matter emissions: PG 1/3, Boilers and Furnaces, 20–50 MW Net Rated Thermal Input PG 1/4 Gas Turbines 20–50 MW Net Rated Thermal Input and PG1/5 Compression Ignition Engines, 20 50 MW Net Rated Thermal Input Plants that co-fire with waste are covered by PPC regulations: – under part B if over 0.4MW, but less than 3MW – under Part B if over 3 MW, but part of another Part B activity – otherwise under Part A if over 3 MW Plants under 20MW not part of a PPC covered installation or co-firing with waste are regulated under the Environmental Protection Act (EPA) 1990 Section 79 on Statutory Nuisance. Under this a notice can be served on the owner/occupier of a site to remove the nuisance by the relevant local authority. If an area is designated as a "smokeless zone" by a Smoke Control Order under the Clean Air Act 1956 (superseded by the Clean Air Act 1993, section 20) it is an offence for anyone to burn unauthorised fuels in these areas unless using exempt appliances (this law was mainly introduced to stop wood and bituminous coal-burning in fireplaces). In addition, plant between 50kW and 300kW are covered by BS EN 303-5 the British Standard for Biomass Boilers.

Annex 5B

Source category	Sector profile and controls
Firing installations for wood and other biomass fuels	**Wood burning** – In the UK the majority of industrial wood combustion is associated with furniture factories and saw mills and is usually burned onsite to provide heating and steam and to avoid the costs of off site disposal to landfill. Control on the combustion of fuel manufactured from or comprising of solid waste depends on the size of the plant – 3 MW and over is covered by IPC/IPPC or LAPPC; 0.4 to 3 MW by LAPC/LAPPC; and under 0.4 MW by the Clean Air Act (1993) and CEN 303-5 for those of 50–300 kW. **Biomass burning** – a recent development in the UK is the use of renewable biomass fuels. In 2001 there were 6 projects operational and a further 6 planned, with a total declared net capacity of approximately 150 MW. The main fuels are wood, energy crops, straw burning and poultry litter. Control on combustion of biofuels also depends on plant size – 50 MW or over is covered by IPC/IPPC; 20 to 50 MW by LAPC/LAPPC; and under 20 MW by the Clean Air Act. LAPPC does not contain dioxin limits. It relies on particulate and Carbon Monoxide (CO) limits for post-95 plant; whilst older plant have no CO limit. The CO limit is an indicator of good combustion and is currently being considered for older plant. The Waste Incineration Directive (Directive 2000/76/EC) applies to all treated wood combustion processes using wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coatings, and which includes in particular such wood waste originating from construction and demolition waste. This applied to new plants from 2002 and existing plants from 2005 and will set stringent emission limit values and monitoring requirements.
Specific chemical production processes esp. of chlorophenols and chloranil	This industrial sector is controlled under PPC so required to use BAT.
Crematoria	There are 243 crematoria in the UK, 193 of which are owned or operated by local authorities. Current regulation of this sector is under LAPC and will be regulated under the PPC regime (Section 5.1, Part B of Schedule I to the PPC regulations). PG Note 5/2(04) for Crematoria was published in September 2004 and supersedes PG5/2(95) issued in August 1995. The Best Available Techniques cited in PG 5/2(04) to control emissions of dioxins from existing crematoria include good combustion and low particulate matter emissions to minimise the emission of 'dioxins and furans'. At new processes, dioxin arrestment is required. The compliance deadline was from from 1st October 2006. The Waste Incineration Directive does not apply as human bodies are not waste.

Source category	Sector profile and controls
Motor vehicles particularly those burning leaded fuel	This sector includes cars, HGVs and off road vehicles. The UK has over 40 producers of vehicles and 7000 suppliers of components. There are a number of relevant EU directives applying to vehicles: **Passenger vehicles** – Directive 98/69/EC relating to measures to be taken against air pollution by emissions from motor vehicles **Heavy duty vehicles** – Directive 1999/96/EC relating to measures to be taken against the emission of gaseous and particulate pollutants from compression ignition engines for use in vehicles, and the emission of gaseous pollutants from positive ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles **Off-road vehicles** – Directive 97/68/EC relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines installed in off-road mobile machinery **Fuel parameters** – Directive 98/70/EC relating to the quality of petrol and diesel fuels as amended by Directive 2000/71/EC **Additives in fuels and lubricants** – leaded fuel is no longer in regular use in the UK and no halogenated additives are used. No halogenated additives are used in lubricants although some lubricant components, especially dispersants, have trace contamination of halogens **Other control measures** – in the UK performance checks are undertaken as part of the sales of vehicles, components to the vehicle assembly companies and after sales servicing by the motor companies. The annual MOT test includes emission test procedures to ensure effective operation of the control technologies, including diesel CATs and particulate traps. It also ensures that engines meet the limits in national legislation.
Destruction of animal carcasses	Approximately 40 installations are understood to be regulated under LAPPC. The animal carcass incineration sector is regulated under IPC and the PPC regime so operators are required to use BAT. Under LA-IPPC, for Part A2 Animal Carcase Incinerators, SG 10 A2 *Animal carcass incineration with capacity of less than 1 tonne per hour* was published in July 2005. Under LAPPC, for Part B Animal Carcase Incinerators, PG Note PG5/3(04) *Animal Carcass Incineration* was published in September 2004. **Renderers** The UK also has a number of meat and bone meal incinerators that deal with rendered animal waste rather than animal carcasses. They incinerate meat and bone meal, are subject to PPC and BAT and the Waste Incineration Directive includes dioxin limits. Any existing plant must comply by 28 December 2005.

Annex 5B

Source category	Sector profile and controls
Textile and leather dyeing (with chloranil) and finishing (with alkaline extraction)	In the UK a small number of processes in this sector are regulated under PPC, a larger number under LAPC and the largest proportion (about 80%) regulated by their Discharge Consents for releases to water and under EPA 1990 for Statutory Nuisance for air pollution. It is estimated that there are 80-100 small textile finishing works below the threshold for PPC regulation. **Chloranil** – in the past pigments and dyes produced from chloranil or using chloranil as a catalyst were found to have high dioxin contents (up to approximately 3000 ppb TEQ). Production of this "regular" chloranil has been phased out and low dioxin chloranil (<20 ppb TEQ) is the only form produced in Europe – achieved through manufacturing feedstock and process changes. **Alkaline extraction** – the term "alkaline extraction" is not used in the UK with respect to textile and leather finishing. However, UNEP define this as any use of an alkali or base in one or more of the production steps. For textiles this will include mercerising, printing and dyeing and for leathers the soaking and liming of hide. The requirement under PPC to use BAT should mean that the process regulated under this regime automatically meet the requirements of the Convention. However, it is likely that smaller processes not covered by PPC will not do so. It is estimated that around half to three quarters of the textile industry below the PPC threshold use alkali in their finishing processes, although in very small quantities, as it is usually the larger companies that carry out the more complex processes such as mercerisation, which use larger quantities of alkali. The small plants tend to process only small volumes of textiles each week, e.g. around 2–3 tonnes.
Shredder plants for end of life vehicles	In the UK there are about 40 shredders for end of life vehicles, although no shredder is dedicated to vehicles. There is currently spare capacity in the UK so an increase in this number is not expected, particularly with the End of Life Vehicle Directive requiring the take back of cars by manufacturers. There is no formal requirement in UK legislation for shredders to apply BAT to minimise dioxin emissions, unless an incinerator is used to dispose of non-metal components. In this case they are covered by IPC/PPC and required to use BAT. However the Directive 2000/53/EC on end of life vehicles sets the basic requirements for this type of plant, with all vehicles to be stored and treated in accordance with the Waste Directive 75/442/EEC and in compliance with the minimum technical requirements set out in Annex I of the Directive. As a general requirement, hazardous materials and components shall be removed and segregated in a selective way so as not to contaminate other shredder waste.
Smouldering of copper cables	There is no smouldering of copper cables in the UK, with the shift to mechanical stripping of coatings from cables rather than cable burning.
Waste oil refineries	There are no waste oil refineries in the UK.

Annex 6A

UK emissions of dioxins for 2004 by UN/ECE source category (g I-TEQ/year)

Sector	Units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Contribution from source categor to total dioxin and furans emissions in 2004 (%)
Combustion in Energy Production																	
Public Electricity and Heat Production	grams TEQ	35	35	32	27	26	25	24	19	20	15	17	18	16	1.8	1.5	0.5%
Petroleum refining	grams TEQ	12	13	13	14	14	14	14	14	13	11	9.1	10.0	12	12	11	3.7%
Manufacture of Solid Fuels and Other Energy Industries	grams TEQ	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.02	0.0%
Combustion in Industry																	
Iron and Steell	grams TEQ	44	42	41	42	43	43	44	45	44	39	29	32	25	29	30	10.5%
Non-ferrous Metals	grams TEQ	40	35	35	37	40	41	42	42	23	18	13	12	11	8.8	5.9	2.1%
Other Industrial Combustion[1]	grams TEQ	79	80	80	77	78	73	72	70	68	64	58	63	54	54	81	28.6%
Transport Fuel Use																	
Road Transport; Passenger cars	grams TEQ	27	24	21	18	15	12	9.8	7.9	6.0	4.2	2.6	2.5	2.4	2.3	2.2	0.8%
Road Transport; Light duty vehicles	grams TEQ	2.2	1.9	1.7	1.4	1.2	1.0	0.8	0.7	0.5	0.3	0.2	0.2	0.2	0.2	0.2	0.1%
Road transport; Heavy duty vehicles	grams TEQ	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1%
Road Transport; Mopeds & Motorcycles	grams TEQ	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.02%
Railways	grams TEQ	2.6	2.6	2.6	2.4	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.2	3.2	3.4	1.2%
National Navigation	grams TEQ	0.3	0.5	0.5	0.7	0.8	0.9	0.7	0.5	0.4	0.3	0.2	0.1	0.2	0.2	1.1	0.4%
Other mobile sources and machinery	grams TEQ	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.2%
Combustion in Commercial and Residential Use																	
Commercial and Institutional fuel combustion	grams TEQ	46	44	39	32	27	18	20	24	16	16	14	14	9.0	6.8	2.9	1.0%
Residential fuel combustion	grams TEQ	16	17	15	16	13	9.8	10.2	9.1	8.8	8.9	7.1	7.9	6.7	4.8	5.0	1.8%

1 Other industrial combustion – includes fuel combustion in industries other than iron and steel and non-ferrous metal production which are quoted separately and includes cement and lime production, ceramic, brick and refractory manufacture and industrial off road vehicle use.

Sector	Units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Contribution from source categor to total dioxin and furans emissions in 2004 (%)
Household and gardening machinery	grams TEQ	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1%
Agricultural Fuel combustion	grams TEQ	7.2	7.2	7.2	7.3	7.3	7.3	7.3	7.1	7.1	7.2	6.8	6.8	6.8	6.8	7.0	2.4%
Off-road Vehicles and Other Machinery	grams TEQ	6.1	6.1	6.1	6.1	6.1	6.1	6.2	6.3	6.1	6.0	5.8	5.7	5.7	5.7	5.5	1.9%
Fugitive Emissions from Fuel Manufacture																	
Solid fuel transformation	grams TEQ	3.7	3.2	2.6	2.2	1.9	1.6	1.5	1.5	0.9	0.9	0.9	0.8	0.8	1.2	0.6	0.2%
Production Processes																	
Glass and Asphalt production	grams TEQ	1.3	1.2	1.3	1.3	1.4	1.4	1.2	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	0.4%
Chemical production	grams TEQ	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0%
metal production	grams TEQ	27	24	24	25	25	26	24	26	23	20	13	13	14	12	11	3.9%
Wood impregnation	grams TEQ	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.0	0.0	0.0	0.0	0.0	0.0	0.0000%
Agriculture																	
Field burning of agricultural wastes	grams TEQ	57	49	36	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Waste																	
Solid waste disposal on land	grams TEQ	1.2	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.8	0.7	0.6	0.5	0.5	0.4	0.00	0.0%
Small scale waste burning	grams TEQ	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	18.2%
MSW Incineration and Refuse Derived Fuel combustion	grams TEQ	602	602	602	439	256	310	57	28	2.6	1.1	1.3	0.9	1.1	0.6	0.4	0.1%
Other Waste disposal[2]	grams TEQ	167	167	160	155	145	137	132	82	50	48	47	47	47	48	46	16.2%
Vehicle Fires	grams TEQ	5.3	6.7	7.4	7.1	6.4	6.5	6.9	6.7	7.1	8.5	8.9	9.6	9.5	8.7	8.7	3.1%

Sector	Units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Contribution from source categor to total dioxin and furans emissions in 2004 (%)
Other Sources																	
Bonfire Night	grams TEQ	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	2.4%
Total	grams TEQ	1243	1222	1190	973	771	797	536	453	360	334	299	308	285	266	285	100.0%
International Navigation	grams TEQ	9.0	8.7	9.1	9.0	8.5	9.1	9.9	11.1	12.1	8.7	7.7	8.6	7.2	6.9	7.9	
Accidental and natural fires	grams TEQ	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	

2 Other Waste includes agricultural waste burning, chemical incineration, activated carbon regeneration, sewage sludge incineration, clinical waste incineration, crematoria, foot and mouth pyres and animal carcass incineration.

Annex 6B

UK emissions of PCBs to air by UN/ECE source category (kg) (2003)*

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2003%
Combustion in Energy Production															
Public electricity and heat production	91	90	84	71	59	56	51	43	45	39	43	47	44	48	3.5
Manufacture of solid fuels and other energy industries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Combustion in Industry															
Iron and steel	30	29	28	28	29	29	31	31	31	29	26	24	21	25	1.8
Cement and lime production and other industrial combustion	9	9	9	9	8	8	7	7	6	6	4	5	5	4	0.3
Combustion in Commercial & Residential Use															
Commercial and institutional fuel combustion	2	2	2	2	1	1	1	1	1	1	0	0	0	0	0.02
Residential fuel combustion	22	24	22	23	20	15	15	13	13	13	11	12	10	7	0.5
Agricultural fuel combustion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Fugitive Emissions from Fuel Manufacture															
Solid fuel transformation	12	11	10	9	9	9	9	9	9	9	9	8	6	6	0.4
Production Processes															
Metal production	496	423	441	459	426	395	375	398	347	193	188	170	141	141	10.2
Emissions from PCB use	6228	5724	5219	4715	4211	3706	3202	2697	2193	1688	1184	1114	1045	975	70.8
Agriculture															
Field burning of agricultural wastes	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Waste															
Solid waste disposal on land	164	164	163	162	160	158	158	154	154	154	154	154	154	154	11.2
Waste incineration	72	72	70	71	64	60	52	43	34	26	18	17	16	15	1.1
Refuse derived fuel manufacture and combustion	10	10	10	10	9	8	7	6	5	4	3	2	2	2	0.1
Total	7138	6559	6058	5559	4996	4447	3908	3403	2836	2161	1640	1554	1444	1376	100

*Data for 2004 being calculated at the time of writing of the report.

Annex 6C

UK HCB emissions to air by UN/ECE source category (kg) (2003)*

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2003%
Combustion in Energy Production															
Public electricity and heat production	0	0	0	0	1	1	1	1	1	1	1	1	2	2	0.5
Combustion in Industry															
Non-ferrous metal processes	2435	2404	2732	3265	3720	3881	3925	4029	4292	0	0	0	0	0	0
Combustion in Commercial & Residential use															
Commercial and institutional fuel combustion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Production Processes															
Chemical production	596	576	545	325	145	149	147	50	48	46	43	39	34	28	9.4
Agriculture															
Pesticide use	482	380	580	577	509	518	547	542	515	486	280	273	271	271	89.9
Waste															
Waste Incineration	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0.2
Total	3515	3361	3858	4169	4376	4549	4621	4621	4856	534	325	314	307	302	100

*Data for 2004 being calculated at the time of writing of the report.

Annex 7

UK Government funded research on persistent organic pollutants

Area of research/ project title	Funding Dept.	Start/End date	Contractor	References
Environmental exposure				
Polychlorinated biphenyls, dioxins and furans in the Pontypool environment	Welsh Office	1990/94	University of East Anglia	PCBs, dioxins and furans in the Pontypool Environment – the Panteg monitoring project: 4th report (April 93) 5th report (Jan 94) 6th Report (April 94)
Study of PCBs and dioxins in human adipose tissue from inhabitants of 5 areas of Wales	Welsh Office	1990/94	Lancaster University	Duarte-Davidson et al (1994) PCBs and other organochlorines in human tissue samples from the welsh population: adipose Env Poll 84 p69–77
A review of dioxin emissions in the UK	HMIP	1994/95	Environmental Resources management	Research report no: DOE/HMIP/RR/95/004
Risk assessment of dioxin releases from municipal waste incineration processes	HMIP	1995/96	Environmental Resources management	DOE Reference: HMIP/CPR2/41/1/181
Dioxin inputs to the environment: a review of temporal trend data	DETR	1995/96	Lancaster University	DoE Reference: EPG/1/5/53
Monitoring of dioxins and furans in the environmental media	HMIP	1995	AEA Technology	Report No: AEAT/18380031/REMA-152
Regulation of dioxin releases from the Runcorn operations of ICI and EVC	Env. Agency	1996/97	Environment Agency	Environment Agency Information report (Jan 97)
Measurement of dioxins in sewage sludge and milk	DTI	1996/98	Laboratory of the Government Chemist (LGC)	Project in the Government Chemist Programme 1996/01
Monitoring of hazardous air pollutants	DETR; NAW; SE; DOE-NI	1996/99	AEA Technology and Lancaster University	Toxic Organic Micro-pollutant Monitoring 1996 to 1999 (Sept 99) AEAT-4970
A review of dioxin releases to land and water in the UK	EA	1997	AEA Technology	ISBN I 873160 40 2
A study of dioxins and trace metals in soil around 4 municipal waste incinerators in Hampshire	EA	1997	AEA Technology Environment	Agency Report HO-7/97-160-C-AZLM

UK Government funded research on persistent organic pollutants

Area of research/ project title	Funding Dept.	Start/End date	Contractor	References
Environmental exposure				
PCBs in building sealants	DETR	1997	Building Research Establishment	PCBs in building sealants: CR 168/97
Polychlorinated biphenyls in building sealants: A review of health effects and exposure to	DETR	1997/99	Institute of Environment and Health, Leicester	IEH Report, Feb 99
Releases of PCBs to the UK environment	DETR	1997/99	ETSU	Report no AEAT-2731
Compilation of EU dioxin exposure and health data	EU DGXI; DETR	1998/99	AEA Technology	Published on EC website at: http://europa.eu.int/comm/environment/dioxin/index.htm
Dioxins and PCB releases from Industrial sources	EA	1998/2000	PD Consulting	
Dioxins in the UK: Preparation of UK position paper on dioxins	DETR	1998/2000	PD Consulting	
Chemical contaminants in human milk: A pilot study towards establishing an archive of samples from the UK	MAFF; DH; HSE; DETR	2005	University of Leeds	Complete 2005
UK soil survey	EA/Defra	2000-2006	University of Liverpool	
Dietary exposure				
Survey of dioxins and PCBs in background foods	MAFF	1994/98	Central Science Laboratory, York	0FSIS 71 (July 95) Dioxins in food – UK dietary intakes; FSIS 105 (June 97) Dioxins and PCBs in food and human milk; FSIS 89 (May 96) PCB in food – UK dietary intakes; FSIS 88 (May96) Dioxins in human milk; FSIS 106 (June 97) Dioxins and PCBs in fish oil dietary supplements and licensed medicines
Dioxins in PVC food packaging	MAFF	1994/95	AEA Technology	FSIS 59 (April 95) dioxins in PVC food packaging

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Area of research/ project title	Funding Dept.	Start/End date	Contractor	References
Environmental exposure				
Dietary uptake, distribution and depletion of dioxins in cattle	MAFF	1994/95	Institute for Animal Health, Crompton	Thorpe et al (1999) Residue depletion study of PCDDs and PCDFs in dosed beef cattle. Organohalogen Compounds 43 405–408
Mass balance and distribution studies of PCBs in grazing animals	MAFF	1994/98	University of Lancaster	Sweetman, A J et al (1999) Modelling the fate and behaviour of lipophilic organic contaminants in lactating dairy cows. Environ. Pollut. 104: pp261–270 Thomas, G O et al (1998) Development and validation of methods for the trace determination of PCBs in biological matrices. Chemosphere 36: pp2447–2459 Thomas, G O et al (1998) Air-pasture transfer of PCBs. Environ. Sci. Technol. 32: pp936–942 Thomas, G O et al (1998) Further studies of the air-pasture transfer of PCBs. Environ. Pollut. 102: pp119–128 Thomas, G O et al (1999) Derivation and field testing of air-milk and feed-milk transfer factors for PCBs. Environ. Sci. Technol. 32: pp3522–3528 Thomas, G O et al (1999) Metabolism and body-burden of polychlorinated biphenyls in lactating dairy cows. Chemosphere 39: pp1533–1544. Thomas, G O et al (1999) Input-output balance of PCBs in a long-term study of lactating dairy cows. Environ Sci Technol 33: pp104–112
Survey of dioxins and PCBs in retail cows' milk	MAFF	1995/97	Central Science Laboratory, York	FSIS 136 (Dec 97) Dioxins and PCBs in retail cows milk in England
Survey of dioxins, furans and PCBs in edible marine fish and fish products	MAFF	1995/97	Central Science Laboratory, York	FSIS 184 (Aug 99) Dioxins and PCBs in UK and imported marine fish
Survey of dioxins and PCBs in farmed trout in England and Wales	MAFF	1995/97	Central Science Laboratory, York	FSIS 145 (March 98) Dioxins and PCBs in farmed trout in England and Wales
Survey of PCBs in paper and board packaging	MAFF	1996/98	Central Science Laboratory, York	FSIS 174 (April 99) Survey of Retail Paper and Board Food Packaging Materials for PCBs
Investigation of effects of cooking and other processing on the nature and levels of dioxin residues in beef tissues	MAFF	1996/97	Central Science Laboratory, York	Thorpe et al (1999) The effects of cooking by various methods on concentrations of PCDDs and PCDFs in bovine meat. Organhalogen compounds 44 p 237–240

Area of research/ project title	Funding Dept.	Start/End date	Contractor	References
Environmental exposure				
Generic model of human terrestrial food chain exposure to persistent organics: application to dioxins, furans and PCBs	MAFF	1996/99	University of Lancaster	Report FS2192: Generic Model of Human Terrestrial Foodchain Exposure to Persistent Organics: Application to PCDD/Fs and PCBs
Survey of dioxins and PCBs in shellfish	MAFF	1997/99	Central Science Laboratory, York	FSIS 03/06 (Feb 2006) (Published in combination with *Congener-specific analysis of dioxins and PCBs in wild and farmed fish* – see below)
Survey of dioxins and PCBs in fats and oils for food production	MAFF	1997/99	Central Science Laboratory, York	Summary report: (August 2003) Dioxins and polychlorinated bi-phenyls (PCBs) in fats and oils used in food production: 1998 samples
Survey of dioxins and PCBs in infant formulae	MAFF/FSA	1997/20003	Central Science Laboratory, York;	Eurofins/GfA mbH, Münster, Germany; Leatherhead International FSIS 49/04 (March 2004) Dioxins and dioxin-like PCBs in infant formulae)
Dioxins and PCBs in 1997 Total Diet Study samples	MAFF	1998/99	Central Science Laboratory, York	FSIS 04/00 (Sep 2000) Dioxins and PCBs in the UK Diet: 1997 Total Diet Study Samples
Development of a mechanistic understanding and model of the air-herbage transfer of persistent semi-volatile organic contaminants (SOCs)	MAFF/FSA	1998/2001	Lancaster University	Lee et al (1998) Measurement and Modeling of the Diurnal Cycling of Atmospheric PCBs and PAHs. Env. Sci. Technol. Vol 32, pp 2172–79. Halsall et al (1999) Temperature dependence of PCBs in the UK atmosphere. Atmospheric Environment Vol 33, pp 541–52. Lee et al (2000) Short-Term Temperature-Dependent Air-Surface Exchange and Atmospheric Concentrations of Polychlorinated Naphthalenes and organic Pesticides. Env. Sci. Technol. Vol. 34, pp 393–98. Lee & Jones (1999) Gas-Particle Partitioning of Atmospheric PCDD/Fs: Measurements and Observations on Modeling. Env. Sci. Technol. Vol. 33, pp 3596–04. Lohman et al (2000) A Comparative Study of the Gas-Particle of PCDD/Fs, PCBs and PAHs. Env. Sci. Technol. Vol.34, pp 4943–51. Lane et al (2000) Gas/Particle Partition Measurements of PAH at Hazelrigg, UK. Polycyclic Aromatic Compounds. Vol 20, pp 225–34. Section continued next page.

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Area of research/ project title	Funding Dept.	Start/End date	Contractor	References
Environmental exposure				
Development of a mechanistic understanding and model of the air-herbage transfer of persistent semi-volatile organic contaminants (SOCs)				Peters et al (2000) A comparison of high Volume and Diffusion Denuder Samplers for Measuring Semivolatile Organic Compounds in the Atmosphere. Env. Sci. Technol. Vol 34, pp 5001–06 Thomas et al (1998) Air-Pasture Transfer of PCBs. Environ. Sci. Technol. Vol. 32, pp936–42. Thomas et al (1998) Further Studies of t he air-pasture transfer of polychlorinated biphenyls. Env. Pollut. Vol. 102, pp119–128. Smith & Jones (2000) Particles and vegetation: implications for the transfer of particle-bound organic contaminants to vegetation. Sci. Tot. Environ. Vol. 246, pp 207–36. Smith et al (2001) Behavior of Sewage Sludge-Derived PAHs on Pasture. Env. Sci. Technol. Vol. 35, pp 2141–50. Smith et al (2001) Seasonal and Species Differences in the Air-Pasture Transfer of PAHs. Env. Sci. Technol. Vol. 35, pp 2156–65. Hung et al (2001) Grass-Air Exchange of Polychlorinated Biphenyls. Env. Sci. Technol. Vol. 35, pp 4066–73. Thomas et al (2002) Polychlorinated dibenzo-p-dioxins and furans (PCDD/F) uptake by pasture. Env. Sci. Technol. 2372–78. Barber et al (2002) An investigation into the importance of the stomatal pathway in the exchange of PCBs between air and plants. Env. Sci. Technol. Vol. 36, pp 4282–87
Simple methods to reduce potential transfer of organic chemical residues from sewage sludge amended soils to food crops	FSA	1999/ 02	Imperial College Project Report	C01001: Simple Methods to Reduce Potential Transfer of Organic Chemical Residues from Sludge Amended Soils to Food Crops. (PCBs were included in this investigation.)
Dioxins and PCBs in foods from farms in the vicinity of pyres used to control the 2001 foot and mouth outbreak	FSA	2001/02	Central Science Laboratory, York	Four reports: Dioxins and dioxin-like polychlorinated biphenyls in foods from farms close to pyres (July 2001); same title (August 2001); same title (Sep 2001); same title (Jan 2002)

UK Government funded research on persistent organic pollutants

Area of research/ project title	Funding Dept.	Start/End date	Contractor	References
Environmental exposure				
Transfer and uptake of organic contaminants into meat and eggs of chickens, sheep and pigs	FSA	2001/03	University of East Anglia	Project Report C01020: Transfer and uptake of organic contaminants into meat and eggs of chickens, sheep and pigs
Dioxins and PCBs in fish oil dietary supplements	FSA	2002/03	Central Science Laboratory, York	FSIS 26/02 (June 2002) Dioxins and dioxin-like PCBs in fish oil dietary supplements
Dioxins and PCBs in 2001 Total Diet Study samples	FSA	2002/03	Central Science Laboratory, York	FSIS 38/03 (July 2003) Dioxins and dioxin-like PCBs in the UK Diet: 2001 Total Diet Study Samples
Dioxins and PCBs in baby foods	FSA	2003/04	Central Science Laboratory, York; Ventress Technical Limited	FSIS 60/04 (July 2004) Dioxins and dioxin-like PCBs in baby foods
Dioxins and PCBs in food – EU monitoring	FSA	2003/04	Eurofins / GfA mbH, Münster, Germany; Casella GMSS	Summary report (June 2004) Dioxins and dioxin-like PCBs in foods – EU monitoring 2003
Congener-specific analysis of dioxins and PCBs in wild and farmed fish	FSA	2003/05	Central Science Laboratory, York	FSIS 03/06 (Feb 2006) Dioxins and dioxin-like PCBs in farmed & wild fish and shellfish
Survey of dioxins and polychlorinated biphenyls (PCBs) in processed fish and fish products	FSA	2005/06	Central Science Laboratory, York; Ventress Technical Limited	FSIS 07/06 Dioxins and dioxin-like PCBs in processed fish and fish products
Survey of dioxins and polychlorinated biphenyls (PCBs) in offal	FSA	2005/06	Central Science Laboratory, York; Ventress Technical Limited	FSIS 15/06 (July 2006) Dioxins and dioxin-like PCBs in foods – EU monitoring 2005
Analysis of dioxins and PCBs in representative food samples from the UK, as specified in the EU Recommended Monitoring Programme	FSA	2005/06	Central Science Laboratory, York	Results for 2005 samples: FSIS 16/06 (July 2006) Dioxins and dioxin-like PCBs in foods – EU monitoring 2005

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Area of research/ project title	Funding Dept.	Start/End date	Contractor	References
Environmental exposure				
Study of the effect of dioxins and PCBs in river sediment, deposited on pasture by flooding, on concentrations in cows' milk	MAFF/FSA	1998/2004	Central Science Laboratory, York	CSL Report FD 04/15: The effects of river flooding on dioxin and PCB levels in pastureland soil, grass and cows' milk. Lake, I. et al. (2005) Effects of River flooding on PCDD/F and PCB Levels in Cows' Milk, Soil and Grass. Env. Sci. Technol. 39, pp 9033–38 Dowding, A. et al. (Aug 2006) The effects of river flooding on the congener patterns of dioxins in soil, herbage, and cows' milk from floodprone farms. Paper presented at 26th International Symposium on Halogenated Persistent Organic Pollutants, 21–25 August 2006, Oslo, Norway
Measuring the bioavailability of human dietary intake of dioxin-like compounds	MAFF/ FSA	1998/2000	Birmingham University	Project Report C01010: Measuring the bioavailability of human dietary intake of dioxin-like compounds. Harrad et al (2003) Human dietary Intake and Excretion of Dioxin-Like Compounds. J. Environ. Monit. Vol 5, pp 224–228. Harrad et al (2006) Chiral Signatures of PCB#s 95 and 149 in Indoor Air, Grass, Duplicate Diets and Human Faeces. Chemosphere Vol. 63, pp 1368–76
Survey of dioxins and PCBs in cows' milk from farms in the Bolsover area	MAFF	1990/97	Central Science Laboratory, York	FSIS 75 (Nov 95) Dioxins and PCBs in cows milk from the Bolsover area; FSIS 124 (Aug 97) same title; FSIS 134 (Nov 97) Oct 97; FSIS 143 (March 98) collected in Oct and Nov 1997
Survey of background levels of dioxins and furans in cow's milk from Northern Ireland	MAFF	1995/97	Central Science Laboratory	FSIS 120 (Aug 1997) Dioxins in Cows' Milk from Northern Ireland

Area of research/ project title	Funding Dept.	Start/End date	Contractor	References
Test Methods				
Pilot assessment of the feasibility of using a commercially available immunoassay for the screening of dioxins in food	MAFF	1993/1997	Central Science Laboratory, York	FSIS 100 (Jan 97) Dioxins and PCBs in cows milk from farms close to industrial sites; FSIS 107 (June 97) same title; FSIS 123 (Aug 97) 1996 survey results; FSIS 133 (Nov 97) Rotherham 1997; FSIS 135 (Nov 97) Huddersfield 1997
Interlaboratory method performance of assessment of measurement of PCDDs and PCDFs in sewage sludge.	MAFF	1995/98	Central Science Laboratory, York	MAFF R&D and Surveillance Reports No 453: Pilot assessment of applicability of commercial immunoassay kits to screening for dioxins in food extracts
Evaluation for immunochemical methods for PCBs in fish oil	DETR;MAFF	1996	Central Science Laboratory, York	FD 94/207: Inter-laboratory Method Performance Assessment of Measurement of PCDDs and PCDFs in Sewage Sludge. Part 1. Study Conduct and Results (+ appendices)
Development and evaluation of methodology based on digestion and solid phase extraction for the isolation of dioxins and PCBs from liquid milk	MAFF	1996/97	Laboratory of the Government Chemist	
Selective extraction of PCBs from both aqueous and oleaginous foodstuffs using recycling perfluorocarbon fluids.	MAFF	1996/97	Central Science Laboratory, York	FD 96/116: Development and evaluation of methodology based on digestion and solid phase extraction for the isolation of PCDDs, PCDFs and PCBs from liquid milk
A simple robust assay for dioxins in foods using a fluorescent liposome enhanced immunostrip.	MAFF	1996/97	Chimaeron	CSL Report FD 00/38: Rapid single step PCB extraction from liquid milk using perfluorocarbon fluids* * joint projects with a combined report
Rapid single step PCB extraction from liquid milk using perfluorocarbon fluids	MAFF	1997/98	IFR, York	

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Area of research/ project title	Funding Dept.	Start/End date	Contractor	References
Test Methods				
Hexachlorobenzene (HCB) in milk form individual farms from around industrial sites	MAFF	1998/99	Chimaeron Ltd, Central Science Laboratory, York	CSL Report FD 00/38: Rapid single step PCB extraction from liquid milk using perfluorocarbon fluids* * joint projects with a combined report
	MAFF	1995/96	Central Science Laboratory, Torry	FSIS 114 (June 1997) Hexachlorobenzene in cows' milk from farms close to industrial estates
Environmental Exposure				
Research Priorities for dioxins and polychlorinated biphenyls (PCBs)	Defra	2003	Lancaster University	A review of current knowledge on dioxins and dioxin-like PCBs, to support policy objectives: Prof. Kevin Jones and Andy Sweetman: University of Lancaster – 2003
Development of Cost Curves for Abatement of Dioxin Emissions to Air	Defra	2003	Entec UK Ltd	Entec Report (2003) Provided information on the likely costs and emissions reduction from measures to abate dioxins emissions
A Review of the current source inventories for dioxins and dioxin-like PCBs for air, soil and water with view to updating emission factors/estimates and inclusion of new sources	Defra	2006	Netcen	AEA Technology Environment: Review (2006): Martin Adams
Emissions of dioxins and dioxin-like PCBs from domestic sources	Defra	2006	Enviros	A report by Enviros Consulting Limited (2006). Review: Dr Mark Broomfield.
Regional and National Modelling of Persistent Organic Pollutants	Defra	2006–2008	Lancaster University	Prof. Kevin Jones: Lancaster University: Work in progress
Toxic Organic Micro-pollutants (TOMPs) air monitoring network (monitoring includes dioxins, PCBs and PAH)	Defrap	1991–Present	Lancaster University	Prof. Kevin Jones: Lancaster University: Ongoing monitoring programme, results published on a quarterly period on Defra air quality website
Compilation of UK PCB Inventory	EA	2005–ongoing	Netcen	Work in progress
Occupational exposure to dioxins at UK worksites	HSE	2004	University of Lancaster	Sweetman et al (2004) Annals of Occupational Hygiene vol 48 pages 425–437

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