National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

Ireland

November 2012

National Implementation Plan
for the Stockholm Convention on Persistent Organic Pollutants

Prepared by the Environmental Protection Agency, Ireland

This document does not purport to be and should not be considered a legal interpretation of the legislation referred to herein.

Although every effort has been made to ensure the accuracy of the material contained in this document, complete accuracy cannot be guaranteed. The Environmental Protection Agency does not accept any responsibility whatsoever for loss or damage occasioned, or claimed to have been occasioned, in part or in full as a consequence of any person acting or refraining from acting, as a result of a matter contained in this document.

FOREWORD

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty that commits governments to protect human health and the environment by restricting and, where feasible, eliminating the production and environmental releases of POPs. Exposure to POPs can lead to serious human health effects, including certain cancers and damage to the nervous and immune systems. POPs are substances that persist in the environment and can be transported across international boundaries far from their sources, even to regions where they have never been either produced or used. Given their long range transport potential, no Government acting in isolation can fully protect its citizens or environment from POPs.

The Stockholm Convention is an excellent example of the synergies that can be achieved towards attaining environmental goals for the common good through international cooperation. The Convention entered into force on 17 May 2004 and has now been ratified by 178 parties as of November 2012. The Convention originally listed 12 POPs but has since been expanded to 22 by agreement at the Conference of the Parties in 2009 and 2011. This National Implementation Plan addresses both the original and the additional POPs.

The Persistent Organic Pollutant Regulations 2010 (S.I. No. 235 of 2010) provide the legal basis to ensure the effective implementation of Ireland's obligations under the Stockholm Convention on Persistent Organic Pollutants. These Regulations designated the Environmental Protection Agency (EPA), given its specialised expertise, as the competent authority for the control of production, placing on the market and use of POPs in Ireland.

Ireland's National Implementation Plan under the Stockholm Convention has been finalised by the EPA following a comprehensive public consultation process. The plan takes into account the history of any production and use of POPs in Ireland, assesses the current situation and sets out future priority areas for action. There will also be ongoing environmental monitoring and enforcement activities as well as further work to improve data sets. Measures to further reduce releases of unintentional POPs and to increase public awareness are also described in the plan. It will be further updated as necessary to reflect the latest scientific understanding and decisions made by the Irish Government or by the Conference of the Parties, such as amendments to the Convention, including the addition of new substances and the adoption of guidance or best available techniques: such updates will of course involve public consultation. I commend the EPA and public authorities concerned for their role in advancing the elimination and restriction of POPs in Ireland.

The Irish Government is fully supportive of the aims and objectives of the Stockholm Convention and Ireland looks forward to continuing to work with our global partners to protect human health and the environment from POPs.

From a national perspective, I look forward to the full implementation of the measures contained in this plan and to the proactive engagement of all key stakeholders including members of the public to ensure its success.

Phil Hogan, T.D.
Minister for the Environment, Community and Local Government

Table of Contents

List of Tables

List of Figures

List of Appendices

Preparation of Ireland's National Implementation Plan on Persistent Organic Pollutants

Ireland's National Implementation Plan on Persistent Organic Pollutants (POPs) was prepared by the Environmental Protection Agency (EPA) (Project Team: Brian Quirke, Andy Fanning and Martin Doyle) in consultation with a number of public authorities, national stakeholders and the public.

The Project Team wishes to thank their colleagues throughout the EPA for their assistance in preparing this plan. The EPA wishes to similarly acknowledge the following organisations for their kind cooperation in developing Ireland's National Implementation Plan on POPs:

- Department of Environment, Community and Local Government
- Department of Agriculture, Food and the Marine
- Food Safety Authority of Ireland
- Health and Safety Authority
- Marine Institute
- Health Service Executive
- Revenue's Customs Service
- Irish Medicines Board
- County and City Managers' Association

The EPA also wishes to acknowledge everybody who made submissions and participated in the public consultation on the plan.

EXECUTIVE SUMMARY

Persistent organic pollutants (POPs) are a group of toxic chemicals that persist in the environment, bioaccumulate in the food chain and can be transported long distances mainly by air and water. Recognising the need to protect human health and the environment from exposure to POPs, a global treaty was negotiated and the Stockholm Convention on POPs was adopted in 2001 and entered into force in 2004. The Convention includes several requirements in the control of POPs including banning or restricting the production, use, import and export of POPs and measures to reduce and or eliminate their releases. Obligations regarding wastes containing POPs are also specified including the requirement to destroy or irreversibly transform the POP content of wastes. The POPs currently controlled under the Convention are listed in the table below.

POPs listed under the Stockholm Convention

Substance	Pesticide Use[1]	Industrial Use	Unintentional by-product
Aldrin	X		
Chlordane	X		
Dieldrin	X		
Endrin	X		
Heptachlor	X		
Mirex	X		
Toxaphene	X		
DDT	X		
Lindane (and Alpha and Beta hexachlorocyclohexane)	X		
Chlordecone	X		
Endosulfan	X		
Hexabromodiphenyl ether and heptabromodiphenyl ether		X	
Tetrabromodiphenyl ether and pentabromodiphenyl ether		X	
Hexabromobiphenyl		X	
Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride		X	
Pentachlorobenzene	X	X	X
Hexachlorobenzene	X	X	X
Polychlorinated biphenyls (PCBs)		X	X
Polychlorinated dibenzo-p-dioxins			X
Polychlorinated dibenzofurans			X

Ireland became a Party to the Stockholm Convention on 3rd November 2010 and is required to submit a National Implementation Plan on POPs in 2012. The plan includes an assessment

[1] Pesticide use when describing POPs applies to a number of different applications such as use in agricultural and forestry applications, and insecticide use in veterinary and human applications

of the current POPs situation in Ireland, describing how Ireland is meeting its obligations under the Stockholm Convention, and measures to manage and control POPs.

The plan also includes Ireland's Action Plan on unintentional POPs which details how Ireland intends to further reduce releases of unintentional POPs which may result from certain combustion and industrial activities. A Community Implementation Plan on POPs for the European Union was transmitted to the Stockholm Convention Secretariat in 2007. This plan is currently being updated following the addition of new substances to the Stockholm Convention in 2009.

This National Implementation Plan, similar to the Community Implementation Plan, is subject to periodic review and is required to be updated in response to the dynamic nature of the Convention, such as the listing of new chemicals and related management and control measures.

MULTILATERAL ENVIRONMENTAL AGREEMENTS AND LEGISLATION CONCERNING POPS

There are a number of multilateral environmental agreements and legislative measures that have direct and indirect control on POPs at international, European and national level. Related multilateral environmental agreements for which Ireland is a Party include:

- Stockholm Convention on Persistent Organic Pollutants;
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; and
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

Other, more general EU and national legislative controls include, *inter alia,* controls concerning food safety, pesticides, biocides, classification, labelling and packaging requirements and other chemicals related legislation. There are also specific requirements concerning prohibition on backyard burning of waste, strict emission limit values via Integrated Pollution Prevention Control (IPPC) licensing, legislation concerning environmental quality (e.g. Water Framework Directive) and stringent controls on the environmentally sound management of wastes containing POPs.

Regulation (EC) No 850/2004 on Persistent Organic Pollutants[2] (EU POPs Regulation) is the principal European legal instrument for implementing the Stockholm Convention on POPs in the EU.

[2] Regulation (EC) no 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollu tantsand amending Directive 79/117/EEC

National legislation[3] was introduced to give statutory effect to the EU POPs Regulation which sets out the legislative basis to comply with obligations of the Stockholm Convention. Under the national POPs regulations, the Environmental Protection Agency (EPA) is the competent authority for the purposes of the EU POPs Regulation and plays a key role in ensuring Ireland is meeting its obligations concerning POPs, including the prevention of environmental pollution. There are also a number of public authorities who have a key role including:

- Department of Environment, Community and Local Government
  Environmental policy and legislation concerning environmental protection including POPs regulations
- Department of Agriculture, Food and the Marine
  Regulatory control of pesticides and monitoring of pesticides in food and feed including POPs
- Food Safety Authority of Ireland
  Monitoring of POPs in food and foodstuff and related legislation
- Health and Safety Authority
  POPs subject to chemicals legislation
- Marine Institute
  Monitoring of POPs in shellfish and marine sediments
- Health Service Executive
  POPs and public health issues
- Revenue's Customs Service
  Control of POPs being imported
- Irish Medicines Board
  Regulatory control of POPs in medicinal products for human or veterinary use
- Local Authorities
  Monitoring, permitting, licensing or enforcement systems relating to POPs

[3] Persistent Organic Pollutant Regulations 2010 (Statutory Instrument No. 235 of 2010)

ASSESSMENT OF INTENTIONALLY PRODUCED POPS IN IRELAND

Intentionally produced POPs are substances manufactured for specific purposes. These include pesticides for use in, for example, agricultural, forestry applications or for human health and or veterinary applications. They also include chemicals specifically produced for various industrial purposes.

All of the POPs listed under the Convention are banned or restricted in Ireland and many substances have been banned for use for several years (e.g.: most POP pesticides have been banned for plant protection use since the 1980s and 1990s). Polychlorinated biphenyls (PCBs), industrial chemicals, commonly used in a variety of applications (e.g.: electrical transformers), have been banned in Ireland for use for a long time (since the 1980s) but due to the long life of associated equipment, they may still be present and are therefore subject to specific waste management requirements.

In more recent years 'new POPs' have been added to the Stockholm Convention which include additive flame retardants (certain polybrominated diphenyl ethers (PBDEs)) and surface active agents (PFOS). PBDEs have not been used for a number of years but may still be present in certain consumer and industrial products that have yet to reach the end of their useful life. As a result, PBDEs may still enter the waste phase. Such products include, for example, certain plastics from electrical and electronic equipment that were placed on the EU market before 2006. The EU POPs Regulation includes a threshold limit of 0.1% per POP PBDE for new articles when manufactured from recycled materials or materials from waste prepared for reuse. This exemption is provided without prejudice to the requirements of the Restriction of certain Hazardous Substances Directive.

PFOS is listed as a restricted POP in the Stockholm Convention and is still permitted for certain derogated uses where there are currently no safer alternatives. In Ireland the only known allowed use of this substance is in very limited quantities by the semi-conductor industry.

POP Pesticides

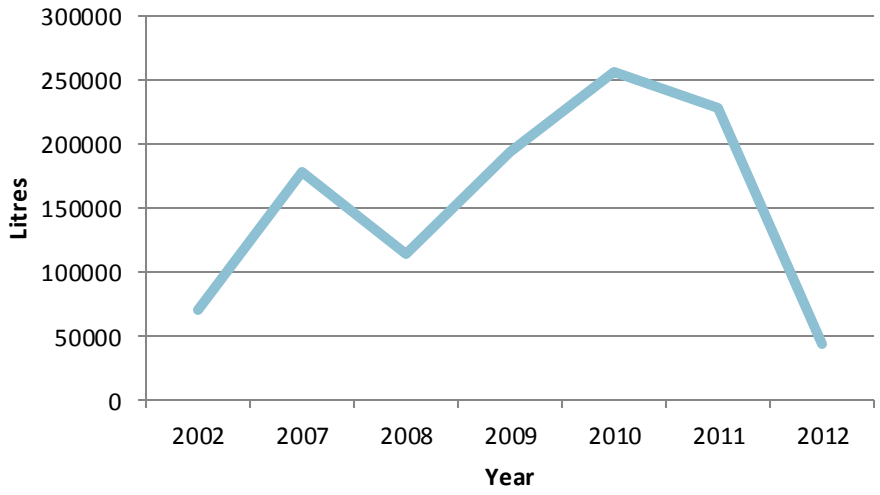
POP pesticides listed under the Stockholm Convention have been banned in Ireland for several years. Most have been banned for plant protection use since the 1980s and 1990s. As a result of past use and their potential presence in imported produce, pesticide residues are routinely monitored by the Department of Agriculture, Food and the Marine in food of plant and animal origin, and monitoring information to date indicates that their presence in food is generally not of concern. Limited environmental monitoring information of some

POP pesticides has indicated their presence at low concentration levels in water, air and soil as result of their past use and persistent nature.

Polychlorinated Biphenyls (PCBs)

PCBs were used in a wide range of industrial applications due to their thermal and electrical insulation properties. Despite being banned since the 1980s they are still being found in long life equipment such as electrical transformers and capacitors. In general monitoring data shows that relatively low levels of PCBs are being found in food and the Irish environment. There is some evidence of isolated cases where elevated levels have been found (e.g.: in the marine environment) which may be attributed to historical sources but the trend in concentration levels is downward. A pork contamination incident in Ireland in 2008 highlighted the risk that PCB contamination can potentially pose to the environment and public health as well as its economic impacts.

On-going disposal and decontamination of equipment containing PCBs is being carried out in line with waste legislative requirements. The graph below illustrates the trend in the volume of confirmed and suspected PCB holdings on the national PCB inventory over the last decade.



Trend in confirmed and suspect PCB holdings from 2002 to 2012

Targeted surveys and inspections by the EPA and local authorities coupled with increased awareness have contributed to the reducing inventory. Significant reductions in the quantity of suspected PCBs have been achieved through testing of suspected oil and subsequent confirmation that the oil is PCB free.

The EPA and local authorities are working actively with organisations listed on the national PCB inventory to ensure that Ireland meets it obligations concerning PCB disposal and or equipment decontamination.

Certain Polybrominated diphenyl ethers (PBDEs (Tetra, Penta, Hexa, Hepta BDEs))

PBDEs were used as flame retardants and have been banned for a number of years in the EU. They may still be present in certain longer life applications such as vehicles and electrical equipment that have yet to enter the waste stream. The fact that they may still be in various consumer products, presents a risk of releasing PBDEs into the environment upon becoming waste, if not managed appropriately.

Studies have been prepared at EU and national level to obtain a better understanding of the presence of PBDEs in various waste streams that will support measures to manage such waste streams appropriately. Relevant waste streams may include certain waste electrical and electronic (WEEE) plastics and certain flame retardant foams in end of life vehicles that were manufactured over a decade ago (BiPRO, 2011).

PBDEs have been monitored in various food groups and in general they have not been found in significant concentrations. The Food Safety Authority of Ireland (FSAI) has concluded recently that the Irish population's dietary exposure to PBDEs is similar to other EU countries (FSAI, 2010a). While low amounts were detected the levels observed do not raise concern for human health.

Hexabromobiphenyl

Hexabromobiphenyl belongs to a group of flame retardants known as polybrominated biphenyls which were used in several products including electronics. It was mainly used in the 1970s and there are no known uses in Ireland. There is limited data on the levels of contamination of hexabromobiphenyl in food and the environment however available monitoring information in food and product surveillance suggests that hexabromobiphenyl is not a significant concern in Ireland.

Perfluorooctane sulfonic acid and its derivatives (PFOS)

PFOS is an industrial chemical that has been used in several applications such as fire fighting foams and textiles such as carpets. Under the EU POPs Regulation, PFOS is still permitted for certain derogated uses. In Ireland this substance is used in very limited quantities by the semi-conductor industry.

The presence of PFOS in consumer products which have yet to enter the waste stream may present a risk in terms of release to the environment upon becoming waste, if not appropriately managed. Studies have been prepared at EU and national level to obtain a better understanding of the presence of PFOS in various waste streams which will support measures to manage such waste streams appropriately.

Based on very limited monitoring information, PFOS has not been found in significant concentrations in food and the Irish environment. PFOS is currently being proposed for inclusion in the list of priority hazardous substances that are subject to environmental quality standards under the EU Water Framework Directive.

ASSESSMENT OF UNINTENTIONALLY RELEASED POPS IN IRELAND

Unintentionally formed or released POPs are not specifically manufactured as commercial substances. Also referred to as unintentional by-products they may be formed inadvertently as a result of certain processes or activities (e.g.: certain combustion and chemical processes).

Ireland has produced inventories of estimated emissions of dioxins, furans, PCBs and hexachlorobenzene to air, land and water (EPA, 2012a, Creedon e*t al*, 2010). In order to illustrate the current releases of unintentional POPs for purposes of the National Implementation Plan and national reporting requirements under the Stockholm Convention, the releases of unintentional POPs have been mapped and reported under the main source categories established in the UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases (UNEP, 2005b). In the case of PCBs, the inventory includes unintentional releases from intentionally produced PCBs (e.g.: leaks from electrical transformers).

There is uncertainty with some of the inventory information particularly in relation to releases to land and water. Inventories have also yet to be established for pentachlorobenzene. The table overleaf details the estimated emissions of unintentional POPs to air, land and water in Ireland in 2010.

Estimated emissions of unintentional POPs in Ireland in 2010

SUBSTANCE	Air	Land	Water	Main Sources
Dioxins & Furans	16.10 g ITEQ[4]	29.2 g ITEQ[5]	0.524 g ITEQ	*Open burning, emissions from heat and power generation*
Polychlorinated Biphenyls	17.44 kg	124.74 kg	*No Data*	*Open burning, emissions from heat and power generation, PCB contaminated equipment*
Hexachlorobenzene[6]	<1.16 kg	<0.47 kg	<0.016 kg	*Impurity in Pesticide*
Pentachlorobenzene	*No Data*	*No Data*	*No Data*	*No Data (known sources include combustion such as open burning)*

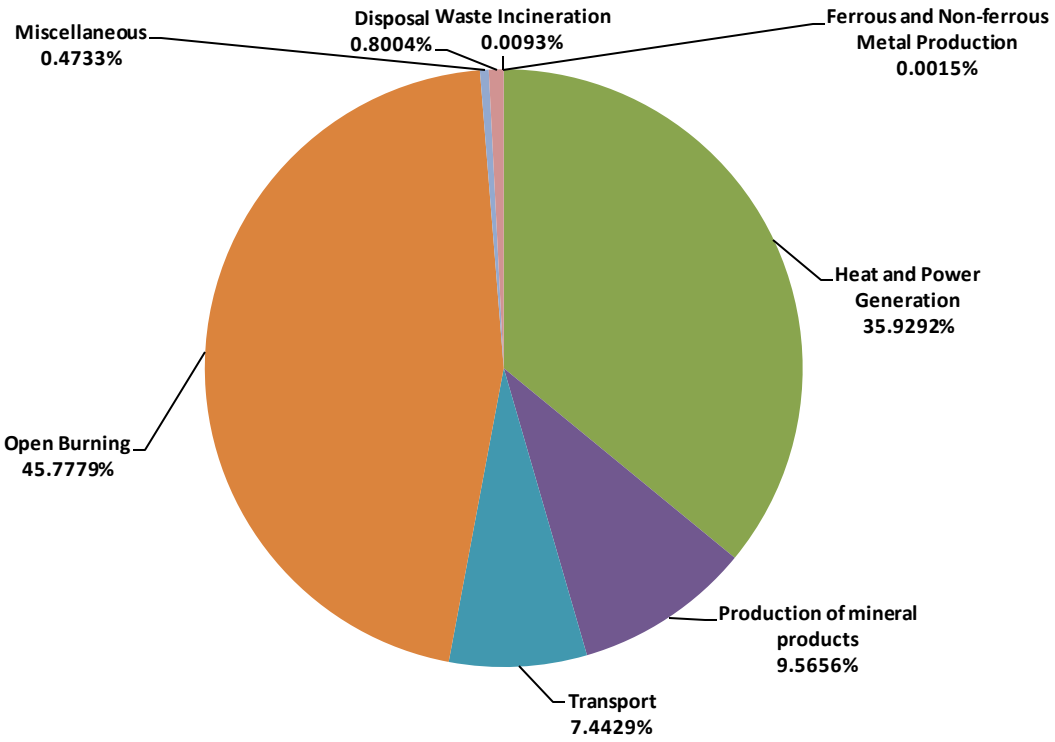
Dioxins & Furans

Dioxins and furans can be produced unintentionally due to incomplete combustion such as burning of waste and combustion from automobile fuel, peat, coal, and wood. As illustrated in the 1st figure overleaf it is estimated that the main sources of dioxin emissions to air in Ireland in 2010 include open burning processes (e.g.: accidental burning of vehicles and buildings, and backyard burning), and emissions from fuel being burned for heat and power generation (residential and commercial). Emissions from controlled waste incineration are comparatively low as a result of environmental protection controls through high temperature combustion, high standards of pollution abatement and strict dioxin emission limits. The 2nd figure overleaf shows the estimated contribution of dioxin emissions to air from open waste burning in 2010. Releases to land are mainly attributed to ash arising from various sources including those listed above (e.g.: controlled waste disposal of ash to landfill) and release estimates associated with composting and sewage sludge spreading. Estimated releases to water is attributed to the presence of dioxins in effluent from water and sewage sludge treatment.

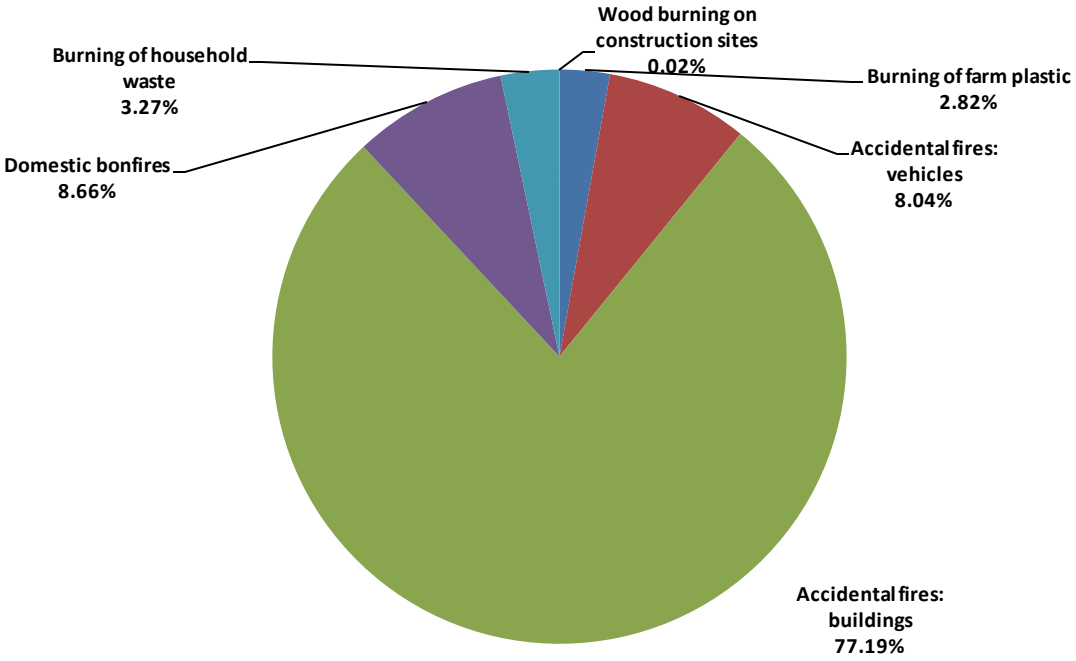
[4] ITEQ is a procedure that uses a scheme of weighting factors which expresses the toxicity of each individual PCDD and PCDF in terms of an equivalent amount of the congener 2,3,7,8-TCDD. This weighting factor, called a toxic equivalent factor (TEF), is multiplied by the concentration of the individual compounds in a mixture to give a 2,3,7,8-TCDD toxic equivalent, (TEQ) which is the sum of the products of concentrations of the individual congeners multiplied by their TEFs.

[5] 13.23 g is residual ash sent to controlled landfill

[6] This is a maximum figure as release is based on assumption of all imports of pesticide chlorothalonil being used multiplied by maximum allowable concentration of HCB contaminant in chlorothalonil under relevant legislation.



Percentage contribution of dioxin emissions to air in Ireland in 2010

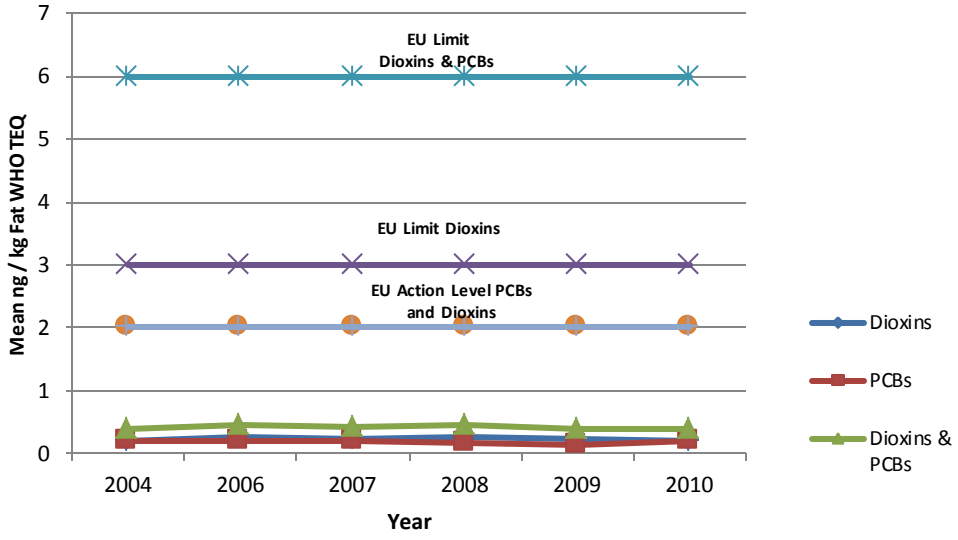


Percentage contribution of dioxin emissions to air from open waste burning in Ireland in 2010

Regarding dioxins found in food, it is estimated that 90% of human exposure to dioxins can result from the consumption of dioxin-contaminated food (FSAI, 2009). Dioxins can occur mainly in foodstuffs of animal origin with a high fat content as they can accumulate in fatty tissues including meat, fish, eggs and milk. The FSAI, in conjunction with several bodies, undertake regular monitoring of dioxins, furans and dioxin like PCBs in various food groups. Recent monitoring has indicated low levels of dioxin contamination and at concentrations below limits set out in food legislation. The FSAI has indicated that levels of dioxins in Irish food are relatively low compared with similar products from more industrialised countries in the EU (FSAI, 2010a).

There is limited information in relation to dioxin levels found in the Irish environment such as water and soil however the low levels being found under food monitoring programmes is an indicator of low level contamination in the environment.

The EPA undertakes annual monitoring of dioxin levels in the Irish environment based on dioxin levels in cows' milk (EPA, 2005-2011b). The graph below shows the level of dioxins and PCBs found in cows' milk fat in recent years and shows that levels are in compliance with EU regulatory limits.



Mean dioxins and PCB levels in cow's milk fat between 2004 and 2010

Dioxins, furans and dioxin-like PCBs are currently being proposed for inclusion in the list of priority hazardous substances that are subject to environmental quality standards under the EU Water Framework Directive.

Polychlorinated Biphenyls

As well as previously being intentionally produced for industrial applications, PCBs, like dioxins and furans, can be formed during fuel combustion processes, particularly where chlorinated petroleum-based materials are burned at low temperatures. They may also be released to soil, water or air at sites at which PCB contaminated oil is present in equipment or during their disposal until eventual destruction.

Similar to dioxins it is estimated that the main sources of PCB emissions to air in Ireland are considered to be from open burning processes and emissions from fuel being burned for heat and power generation. The main potential release of PCBs to land is from the leakage of PCBs in contaminated electrical equipment. There is a lack of accurate data in relation to PCB releases to water.

Some PCB compounds are monitored in food of animal origin, eggs, milk and honey under the Department of Agriculture, Food and the Marine residue monitoring programme. There has been little detection of PCBs in recent years however a PCB finding in a pork sample in 2008 triggered an investigation which confirmed the presence of dioxins in Irish pork. Available evidence suggested that the incident occurred as a result of PCB contaminated fuel being used in an oil-fired burner used to dry animal feed. The incomplete combustion of PCBs gives rise to chlorinated dioxins. The FSAI, as part of their dioxin monitoring program in food, also routinely tests for PCBs. Levels are found to be generally low with the exception of isolated findings. For example elevated PCBs were traced back to paint used in the lobby of an egg house in one isolated case.

PCBs have been monitored in the receiving environment including water, soil and air, and the concentrations have been found to be low. Some PCB compounds have been detected frequently in the marine environment. Their presence is considered to be attributed to historical diffuse sources in certain areas such as harbours and monitoring has indicated a downward trend in concentration levels.

Hexachlorobenzene

Hexachlorobenzene can also be produced unintentionally. For example, it can occur as an impurity in the pesticide chlorothalonil. It may also be produced unintentionally as a by-product in combustion activities.

Based on available information, a pesticide currently used for agricultural purposes is the main known source of hexachlorobenzene emissions to air, land and, to a lesser extent, water. Levels (e.g.: <1.16kg of emissions to air in 2010) are calculated based on imports and

the legal limit for hexachlorobenzene in the pesticide chlorothalonil. Further work is needed to improve estimates of releases of hexachlorobenzene from other potential sources such as certain combustion activities.

Monitoring programmes in other EU Member States has indicated the presence of hexachorobenzene in fireworks imported from outside the EU. Future investigations will be undertaken in Ireland by the EPA to determine if hexachlorobenzene is present in imported fireworks.

Hexachlorobenzene is monitored under the pesticide residue control programme. It has been monitored in receiving waters and the marine environment, as part of an assessment under the Water Framework Directive. In general hexachlorobenzene concentrations have been found to be low in Irish food and the environment.

Pentachlorobenzene

Pentachlorobenzene can be unintentionally formed whenever organic compounds are burned or exposed to high energy in presence of a chlorine source. Main sources of unintentional releases can be from combustion processes and in particular uncontrolled burning such as backyard burning. This substance was listed under the Stockholm Convention in 2009 and the EPA will be updating inventories to include estimated releases of pentachlorobenzene. This will be completed under the Action Plan on unintentional POPs.

Trend in estimated releases of unintentional POPs

Ireland's emission inventories demonstrate an overall decline in emissions of unintentional POPs over the last two decades. A number of measures to control emissions of unintentional POPs are in place (e.g.: emission limit values, prohibition of waste disposal by burning) and these are implemented through various policies, programmes, licensing and enforcement mechanisms. Controls are typically driven by EU and national legislation and policies. A significant reduction in emissions from industrial sources is due to regulation in addition to improvements in abatement technologies and the application of Best Available Technologies (BAT) in order to achieve stringent limits.

The table overleaf demonstrates the decline in unintentional POPs emissions to air based on data reported by the EPA under the Convention on Long-Range Transboundary Air Pollution. Emissions to air are currently the least uncertain media for which data is available.

Trend in estimated releases of unintentional POPs to air in Ireland

SUBSTANCE	1990	2010	% Reduction	Main contributing factors to trend
Dioxins & Furans	26.51 g ITEQ	16.10 g ITEQ	**39%**	*Closure of industry (e.g.: Irish Steel Plant). Banning of leaded petrol. Legislative controls (e.g.: controls on industrial emissions)*
Polychlorinated Biphenyls	68.03 kg	17.44 kg	**74%**	*Closure of Irish Steel Plant. Legislative factors (including PCB Directive)*
Hexachlorobenzene	40.24 kg	1.16 kg	**97%**	*Banning of hexachloroethane (HCE)-based cover gas use in secondary aluminium processing*
Pentachlorobenzene	*No Data*			

SUMMARY OF KEY EXISTING CONTROL AND MONITORING MEASURES

On the basis of the current assessment of the POPs situation in Ireland it can be concluded that Ireland is implementing actions to meet its obligations under the Stockholm Convention on POPs. It is the responsibility of importers, manufacturers, consumers and the general public to ensure that they comply with legislation concerning POPs. To help safeguard human health and the environment from POPs, Ireland has in place a number of key measures to control and monitor POPs. These include:

1. Continued implementation and enforcement of multilateral environmental agreements and legislation directly or indirectly related to POPs, where relevant.

Responsibility: All relevant authorities

2. Ensuring POPs that are subject to prohibition and or restriction under the EU POPs Regulation are not illegally imported and to ensure that POPs that are subject to prohibition or restriction at export under the Prior Informed Consent Regulation[7] are not illegally exported.

Responsibility: Environmental Protection Agency, Health and Safety Authority, Revenue's Customs Service, Department of Agriculture, Food and the Marine

[7] Regulation (EC) no 689/2008 of the European Parliament and of the Council of 17 June 2008 concerning the export and import of dangerous chemicals (Recast under Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals)

3. Routine monitoring and enforcement concerning POPs in food of plant origin, cereals and food of animal origin.

Responsibility: Department of Agriculture, Food and the Marine, Food Safety Authority of Ireland

4. Ensuring POPs are not placed on the market for use in medicinal products for human or veterinary use.

Responsibility: Irish Medicines Board

5. Monitoring of POPs in receiving waters under the Water Framework Directive, as required. Monitoring of air emissions from licenced industrial activities to check compliance with emission limits (e.g.: dioxin emissions).

Responsibility: Environmental Protection Agency, Local Authorities

6. Monitoring of POPs in seawater, sediment, shellfish and finfish as appropriate.

Responsibility: Marine Institute, Food Safety Authority of Ireland

7. Identifying and working actively with confirmed holdings of PCBs to ensure they are meeting obligations to dispose and or decontaminate equipment containing PCBs in an environmentally sound manner. Working actively with suspected holdings of PCBs to ensure that they confirm if equipment under their control is contaminated with PCBs. Routine surveys and inspections of sites confirmed or suspected of holding PCBs.

Responsibility: Environmental Protection Agency, Local Authorities, holders of confirmed/suspected PCBs

8. Updating and maintaining national PCB inventory.

Responsibility: Environmental Protection Agency

9. Monitoring of electrical and electronic products for polybrominated diphenyl ethers and hexabromobiphenyl to check compliance with the Restriction of certain Hazardous Substances Directive, and monitoring in packaging, as appropriate.

Responsibility: Environmental Protection Agency

10. Monitoring of POPs in various food groups and an assessment of dietary intake of POPs.

Responsibility: Food Safety Authority of Ireland in conjunction with various bodies including Department of Agriculture, Food and the Marine, Marine Institute, Environmental Protection Agency and Health Service Executive

11. Providing consumer advice on contamination of food, including information on POPs.

Responsibility: Food Safety Authority of Ireland

12. Reporting to the EU Commission on POPs issues, as required. Provision of information to the European Food Safety Authority.

Responsibility: Department of Environment, Community and Local Government, Environmental Protection Agency, Food Safety Authority of Ireland.

13. Engaging with industry regarding progress on the phase out of PFOS use in manufacturing process

Responsibility: Environmental Protection Agency, Industry Organisations

14. Contributing to EU and Stockholm Convention expert groups assessing new and candidate POPs and associated measures on monitoring and control. Candidate POPs such as hexabromocyclododecane are currently being assessed at international level that may in the future be listed under the Stockholm Convention and subsequently the EU POPs Regulation.

Responsibility: Department of Environment, Community and Local Government, Environmental Protection Agency

15. Developing public awareness campaigns in relation to unintentional emissions from domestic sources.

Responsibility: Environmental Protection Agency, Local Authorities and other bodies as appropriate.

16. Assisting developing countries in implementing their obligations under the Stockholm Convention by contributing to the Global Environment Facility.

Responsibility: Department of the Environment, Community & Local Government

PROPOSED FUTURE PRIORITY ACTIONS

The assessment of the current POPs situation has highlighted a number of challenges and priority target areas which require continued focus and additional actions. These include, for example:

Continued enforcement of legislation

Local authorities, with assistance from the EPA, will continue to identify equipment suspected of containing PCBs and enforce requirements concerning disposal of PCBs and PCB contaminated equipment.

Legislation concerning unauthorised use of waste oils for space heating and the prohibition of waste disposal by burning will continued to be enforced.

Regulation and control

The EPA, local authorities and other bodies as appropriate, will assess activities, where relevant, related to unintentional POP source categories, to facilitate the promotion and requirement of the use of Best Available Techniques (BAT) and Best Environmental Practice taking into consideration Stockholm Convention general guidance and guidelines. Regarding IPPC licenced operations related to such activities, such operations are required to operate to BAT and have associated monitoring requirements imposed as part of their licences.

Monitoring and surveillance

The EPA will assess current environmental monitoring programmes to determine the need for further monitoring of unintentional POPs. The EPA will carry out product surveillance where appropriate (e.g. investigate the potential presence of hexachlorobenzene in fireworks that are imported into Ireland). The EPA and other relevant bodies as appropriate will keep up to date on international biomonitoring programmes in relation to POPs to inform any future action in this area.

New and candidate POPs

The Department of Environment, Community and Local Government and the EPA will continue to contribute to EU and Stockholm Convention discussions regarding new and candidate POPs and implement, where appropriate, monitoring and control measures. Investigations and consultation on the implementation of appropriate mechanisms for effective screening, separation and handling of waste containing POP brominated flame retardants will be carried out which will involve input from various stakeholders.

Inventories and research

The EPA will undertake research to address data gaps with respect to unintentional POPs releases to air, land and water. The EPA will commission, with other co-funders, research related to small-scale burning and domestic waste disposal activities and the appropriateness of emission factors and releases of POPs into environmental media. The EPA will carry out projections of releases of unintentional POPs and update inventories to estimate releases of pentachlorobenzene.

Public awareness and guidance

Awareness will continue to be raised about the risks associated with stockpiles of old pesticides (which may include POP pesticides) on farms and associated disposal requirements as part of farm inspections carried out by the Department of Agriculture, Food and the Marine. The EPA, local authorities and other bodies as appropriate will continue to raise public awareness and guidance, where appropriate, regarding harmful POP emissions associated with domestic burning practices. The EPA will provide input and guidance to future national plans and programmes that may help to reduce or prevent unintentional POP releases.

POPs working group

A POPs working group will be established to monitor and evaluate Ireland's progress in implementing measures detailed in the National Implementation Plan and Action Plan on unintentional POPs.

Future priority target areas and actions to support existing work in relation to POPs are listed in the table overleaf.

Area	Priority Target Areas / New Initiatives	Responsibility
PCB holdings	Ongoing inspections and enforcement related activities concerning PCB holdings.	EPA, Local Authorities, Holders of confirmed or suspected PCBs
Waste Oils	Continued enforcement of the prohibition of unauthorised use of waste oils for space heating.	EPA, Local Authorities
Waste disposal by burning	Continued enforcement of the Waste Management (Prohibition Of Waste Disposal By Burning) Regulations 2009.	Local Authorities
Regulation and control	Assessment of activities, where appropriate, related to unintentional POP source categories to facilitate the promotion and requirement, where relevant, of the use of Best Available Techniques and Best Environmental Practice taking into consideration Stockholm Convention general guidance and guidelines.	EPA, Local Authorities, and other bodies as appropriate
Monitoring	Assessment of environmental monitoring programmes to determine the need for further POPs monitoring.	EPA, Marine Institute
	Keep up to date on international biomonitoring programmes in relation to POPs to inform any future action in this area.	EPA and other relevant bodies as appropriate
Product testing	Carry out testing of products as appropriate (e.g.: hexachlorobenzene in pesticides, hexabromobiphenyl in packaging).	EPA
POP Pesticides	Raise public awareness under existing farm inspection programmes regarding possible stockpiles of POP pesticides.	Department of Agriculture, Food and the Marine
Hexachlorobenzene	Assessment of certain pesticide use to determine the occurrence of hexachlorobenzene.	EPA, Department of Agriculture, Food and the Marine
	Investigations into fireworks used in Ireland to determine the occurrence of hexachlorobenzene in products.	EPA
New and candidate POPs	Investigations and consultation on the implementation of appropriate mechanisms, for effective screening, separation and handling of waste containing POP flame retardants and manage as POPs waste, where required.	EPA, Waste Electronic and Electrical (WEEE) Sector, End of Life Vehicle Sector, and other relevant bodies, as appropriate
Unintentional POP Inventories	Improvement of inventories of unintentional emissions to air, land and water.	EPA
	Completion of inventories for pentachlorobenzene releases to air, land and water.	EPA
	Completion of projections of releases of	EPA

Area	Priority Target Areas / New Initiatives	Responsibility
	unintentional POPs.	
Research and development	Research concerning the appropriateness of emission factors for estimating POP emissions from certain activities (e.g.: domestic peat burning).	EPA
	Research concerning POP releases to environmental media.	EPA
	Research related to small scale burning and domestic waste disposal activities (e.g.: backyard burning).	EPA
Reporting and communication	Reporting to the Stockholm Convention Secretariat and EU Commission on POPs issues, as required.	Department of Environment, Community and Local Government and EPA
	Report to the EU Commission and Stockholm Convention Secretariat on the phase out of PFOS use, where relevant.	Department of Environment, Community and Local Government, EPA, Industry Organisations
	Continue to cooperate in identifying suspected offences concerning POPs and exchange information concerning POPs, as appropriate.	EPA and public authorities concerned
Awareness and Guidance	Provide guidance or advice to public authorities concerned for implementation of POPs Regulations, as appropriate.	EPA
	Provide input and guidance to future national plans and programmes that may help to reduce or prevent unintentional POP releases.	EPA
	Public awareness regarding harmful emissions from domestic burning practices and other guidance, as appropriate.	EPA and Local Authorities
Review of implementation of actions on POPs	A POPs working group to monitor and evaluate progress in implementing measures in the National Implementation Plan and Action Plan on unintentional POPs.	Coordinated by EPA with representation from various bodies

SECTION 1

1. Introduction

1.1 Background and Purpose

Persistent Organic Pollutants (POPs) are organic chemical substances that are characterised by a particular combination of physical and chemical properties such that, once released into the environment, they remain intact for long periods of time and are toxic to both humans and wildlife. They can accumulate in the fatty tissue of living organisms including humans, and are found at higher concentrations at higher levels in the food chain. They can also be transported over long distances throughout the environment as a result of natural processes involving soil, water and, most notably, air and can be found far away from where they are released. POPs are defined by the following key characteristics:

- They are highly toxic;
- They are persistent, lasting for years or even decades;
- They can travel long distances through environmental transport, mainly air and water; and
- They accumulate in fatty tissue.

The Stockholm Convention on POPs is a global treaty aimed to protect human health and the environment from POPs. The Convention requires Parties[8] to take measures to eliminate or reduce the release of POPs into the environment.

For a substance to be classified as a POP, it must undergo an assessment in order to determine that it is persistent, bioaccumulative, toxic and can undergo long-range environmental transport. If they are subsequently classified as POPs, they are then listed under the different annexes of the Stockholm Convention:

- Annex A (Elimination);
- Annex B (Restriction) ; and
- Annex C (Unintentional Production).

To date there have been 22 substances or groups of substances that have been listed under the Annexes of the Stockholm Convention and these can be divided into three main categories; pesticides, industrial chemicals, and unintentional POPs. Table 1 lists the POP

[8] Countries or signatories that have ratified the Stockholm Convention

substances currently listed under the Convention. A description of each POP as described under the Stockholm Convention is provided in Appendix II.

Table 1 - POPs listed under the Stockholm Convention

Substance	Pesticide Use[9]	Industrial Use	Unintentional by-product
Aldrin	X		
Chlordane	X		
Dieldrin	X		
Endrin	X		
Heptachlor	X		
Mirex	X		
Toxaphene	X		
DDT	X		
Lindane (and Alpha and Beta hexachlorocyclohexane)	X		
Chlordecone	X		
Endosulfan	X		
Hexabromodiphenyl ether and heptabromodiphenyl ether		X	
Tetrabromodiphenyl ether and pentabromodiphenyl ether		X	
Hexabromobiphenyl		X	
Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride		X	
Pentachlorobenzene	X	X	X
Hexachlorobenzene	X	X	X
Polychlorinated biphenyls (PCBs)		X	X
Polychlorinated dibenzo-p-dioxins			X
Polychlorinated dibenzofurans			X

The Stockholm Convention entered into force on 17th May 2004 and is administered by the United Nations Environment Programme (UNEP). Substances that are listed under the Convention are subject to a ban or severe restriction on production, import, export and use. Measures are also required to eliminate or reduce releases from stockpiles and for the environmental sound disposal of waste containing POPs. For POPs that are formed and released unintentionally as a result of chemical and thermal processes, there are requirements to reduce, minimise and, where feasible, eliminate their release. These substances include dioxins and furans (polychlorinated dibenzo-p-dioxin (PCDD) and dibenzofurans (PCDF)), PCBs (polychlorinated biphenyls), hexachlorobenzene and pentachlorobenzene.

The Republic of Ireland (Ireland) became a Party to the Convention on 3rd November 2010 and consequently has a number of obligations including the requirement to develop, consult

[9] Pesticide use when describing POPs applies to a number of different applications such as use in agricultural and forestry applications, and insecticide use in veterinary and human applications

with the public and relevant bodies, and endeavour to implement a plan for the implementation of its obligations under the Stockholm Convention within 2 years of becoming a Party. The Convention also requires Parties to develop an Action Plan which sets out strategies to meet obligations in relation to POPs that have been formed and released unintentionally. This National Implementation Plan encompasses Ireland's Action Plan on unintentional POPs.

The plan will be submitted to the Stockholm Secretariat prior to 3rd November 2012 and will be reviewed thereafter and updated in accordance with decisions taken by the Conferences of the Parties to the Stockholm Convention, such as the listing of new POPs.

The National Implementation Plan is required to be considered and integrated into national sustainable development strategies. A Framework for Sustainable Development for Ireland was recently published in 2012 (DECLG, 2012). It states that, as a member of the EU, Ireland will continue to engage proactively with the various international chemical regimes to ensure that hazardous substances that have been identified as being of global concern can be addressed rapidly through agreed processes. Ireland has ratified the Rotterdam, Stockholm and Basel Conventions and will continue to implement its obligations under these agreements and their associated EU regulations.

There is also another international agreement regarding POPs known as the Protocol to the 1979 UNECE Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants (referred to as the POPs Protocol) which also aims to reduce and eliminate the production, use and releases of POPs. This is further described in Section 2.5. As well as most of the POPs listed under the Convention, the POPs Protocol includes a number of other substances that have been classified as POPs, namely:

- Polycyclic aromatic hydrocarbons;
- Short-chain chlorinated paraffins;
- Hexachlorobutadiene; and
- Polychlorinated naphthalenes.

There are a number of other chemicals being evaluated for possible future listing under the annexes of the Stockholm Convention. This is further detailed in Section 6 of this plan. As more chemicals are listed, Ireland's National Implementation Plan will be updated in accordance with the requirements of the Convention.

1.2 Development of the National Implementation Plan

Ireland's National Implementation Plan has been prepared by the Environmental Protection Agency (EPA) in collaboration with a number of stakeholders. Prior to the development of the plan, a consultation paper, providing an overview of POPs and the National Implementation Plan development process, was prepared in June 2008. Submissions in relation to the preparation of the plan were invited. This consultation paper was advertised in national newspapers and communicated via the EPA and Department of Environment, Community and Local Government websites. A number of written submissions were subsequently received and were taken into consideration during the development of the plan.

A over of the plan was made available on the EPA's website for public consultation in August 2012. An advertisement was placed in national newspapers inviting written submissions and included details of a public consultation workshop on the draft plan. The EPA wrote to a number of national stakeholders and organisations and a public consultation workshop was held in September 2012 which included presentations and poster displays on the draft plan.

The draft plan was updated following the public consultation phase. A brief summary of the submissions arising from public consultation is included in Appendix III.

1.3 Structure of the National Implementation Plan

The Stockholm Convention Guidance for developing a National Implementation Plan for the Stockholm Convention (UNEP, 2005a) and the European Union Community Implementation Plan (EC, 2007) were taken into account when developing Ireland's National Implementation Plan. Figure 1 outlines the structure of the plan.

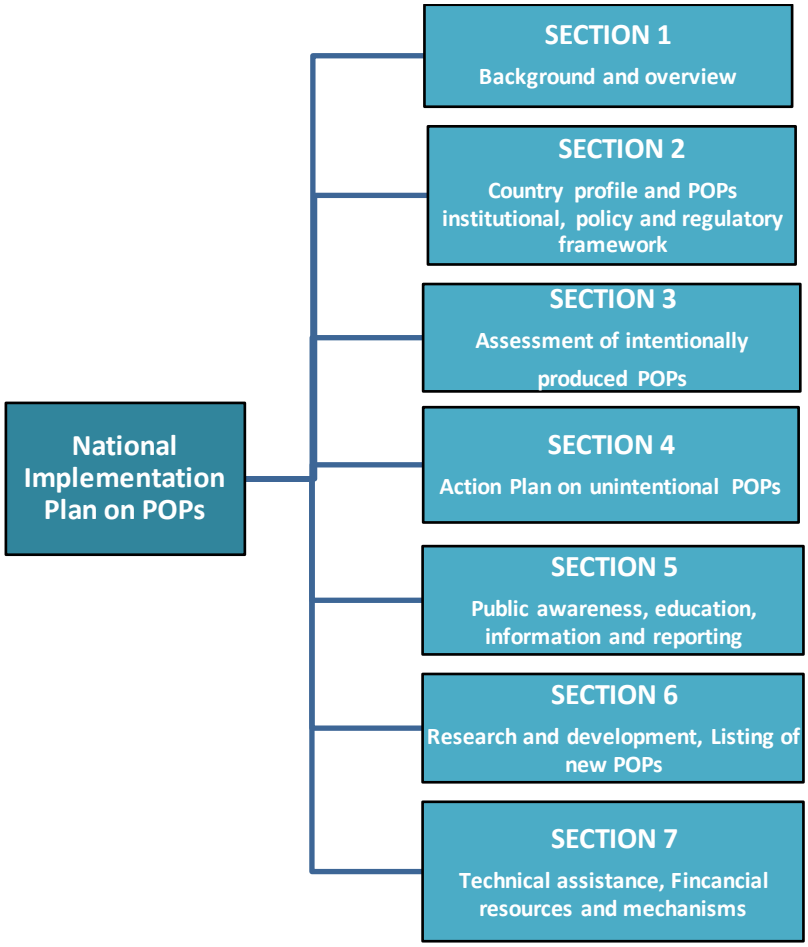


Figure 1 - Structure of Ireland's National Implementation Plan on POPs

SECTION 2

2. Country Profile

2.1 Geography and population

The Republic of Ireland (Ireland) occupies 70,282 square kilometres of the island of Ireland and is located in the north-west of Europe lying between 51° and 55° north latitude and 5° and 10° west longitude (Nolan, 2011). Agricultural lowlands make up a significant portion of the land area and inland waters comprise a much higher percentage of total area in Ireland compared to many other European countries. The extended, heavily indented coastline (over 7,000 km) and large expanse of territorial waters have contributed to its marine diversity (EPA, 2011a).

Ireland has a mild temperate climate. The dominant influence on Ireland's climate is the Atlantic Ocean. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at a similar latitude. Average annual temperature is about 9 °C. Summer mean daily maximum is about 19 °C and winter mean daily minimum is about 2.5 °C. Strong winds tend to be more frequent in winter than in summer. Sunshine duration is highest in the southeast of the country. Average rainfall varies between about 800 and 2,800mm (Met Eireann, 2011).

The Republic has a relatively sparse density of population with 58 inhabitants per square kilometre (Nolan, 2011). A population census in April 2011 revealed that Ireland's population is 4.5 million persons, compared with 4.2 million in April 2006, representing an increase of 8.1% in five years (CSO, 2011). The majority of Ireland's population live in urban centres with the greatest concentration in the Dublin region at 1.2 million. Life expectancy at birth in Ireland is 76.8 years for males and 81.6 years for females, and these figures are reasonably close to the EU average (CSO, 2010). In 2010, Ireland had the highest proportion of young people in the EU, and the lowest proportion of old people.

2.2 Political profile

Ireland is a parliamentary democracy. The National Parliament (Oireachtas) consists of the President and two Houses: Dáil Éireann (House of Representatives) and Seanad Éireann (the Senate) whose functions and powers derive from the Constitution of Ireland. The Dáil, or the principal chamber of the parliament, is composed of 166 members while the Seanad, or upper house, has 60 members (Oireachtas, 2012). Parliamentary elections are held every

five years. Ireland joined the European Union (then known as the European Economic Community) in 1973.

2.3 Economy

Ireland has a small, open, trade-dependent economy. Its openness is reflected in the international mobility of its labour and capital, demonstrated by strong migratory flows and high levels of foreign direct investment. Its high level of external trade is signalled by a high share of combined exports and imports in Gross Domestic Product which has been over 130% since 1995 and was over 180%, for example, in 2010 (ESRI, 2011).

Ireland's growth performance throughout the late 1990s and into the first half of the last decade had strong positive implications for employment growth. The total number of people employed rose from 1.2 million in 1990 to 2.1 million in 2007 – an increase of 75%. The rate of unemployment dropped to historically low levels in the mid 2000s, averaging 4.6 per cent in 2007. This period also saw a reversal of the trend of emigration that characterised the 1980s, and a net inward migration of over 67,000 was recorded in 2007. In more recent years Ireland has experienced a significant economic downturn due to the collapse in the financial sector. The economic downturn has had a severe impact on the labour market with the average rate of unemployment rising rapidly to reach 13.6 per cent in 2010 (CSO, 2011). Since 2008, the Irish government has been carrying out a very sizeable fiscal consolidation and this effort is continuing (OECD, 2011).

2.4 The Irish environment

Ireland has made progress in a number of important respects over recent years most notably in connection with certain emissions to air, waste management, and improvements in public transport.

The most recent state of the environment report prepared by the EPA in 2012 indicates that the quality of Ireland's environment is generally high and the assessment has identified a number of key environmental challenges for Ireland (EPA, 2012b):

- Valuing and protecting the natural environment;
- Building a resource efficient, low-carbon economy;
- Implementing environmental legislation; and
- Putting the environment at the centre of decision making.

2.4.1 Air

Air quality in Ireland is of a high standard across the country and is among the best in Europe, meeting all EU air quality standards in 2010.

There have been substantial reductions in Ireland's Greenhouse Gas emissions in recent years, due in significant part to the impact of the economic downturn. Ireland is on track to meet its Kyoto Protocol commitment for the 2008–2012 period.

2.4.2 Water

In comparison with other EU Member States, Ireland has better than average water quality. The principal cause of water pollution in Ireland is nutrient enrichment resulting in the eutrophication of rivers, lakes and tidal waters from agricultural run-off and discharges from municipal waste water treatment plants.

The EU Water Framework Directive is the main driver for the environmental protection and improvement of the quality of Irish water resources. The first six year cycle of river basin management plans occurred between 2004 and 2009 and the second cycle which commenced in 2010 is being implemented for the purpose of protecting and enhancing all waters such as groundwater, rivers, lakes, transitional waters (estuaries) and coastal waters including protection for related terrestrial ecosystems and wetlands.

2.4.3 Land and Soil

By European standards, Ireland has experienced a relatively high rate of land use change since the early 1990s. Generally, Ireland's soils are considered to be in good condition, with the exception of peat areas, which are particularly vulnerable to external pressures. However, the information available on land and soil is currently not sufficient.

2.4.4 Nature and biodiversity

Ireland's marine and terrestrial environment supports a wide variety of species and habitats, many of which are of international importance. While many species are doing well in conservation terms, there are a significant number of habitats and species that are not. Progress has been made in the designation of EU protected areas in Ireland, but several areas of national importance remain undesignated and significant aspects of biodiversity in Ireland are under considerable threat from unsustainable activities. Ireland's second National Biodiversity Plan (2011–2016) includes a programme of measures aimed at meeting Ireland's biodiversity obligations. Full implementation of the plan will help ensure

the sustainable management of biological resources and protection of biodiversity for future generations.

2.4.5 Waste

Ireland has advanced towards achieving most of its EU obligations across a broad range of waste legislation. The waste collection sector in Ireland has changed dramatically in the past four years, with the majority of local authorities exiting the domestic waste collection market. Moreover, as of 2012, virtually all households on a collection service are now offered at least a two-bin service (dry recyclables and residual), and 34% of serviced households are offered a three-bin collection (includes organics bin). Ireland's first merchant municipal waste incinerator commenced operation in 2011, and the use of waste derived fuels in industrial energy plants has grown significantly. However, 15 of Ireland's 28 operational municipal landfills will run out of consented capacity in three years, and there is only 12 years' gross municipal landfill disposal capacity in the State. Ireland continues to export nearly half of its hazardous waste for treatment/disposal.

2.5 Institutional, policy and regulatory framework

As a Member State of the European Union (EU), Ireland's environmental legislation is predominantly driven by European legislation which includes the control of chemicals such as POPs. In 2002, the European Parliament and Council adopted the 6th EU Environmental Action Programme, which takes a broad look at the environmental challenges and provides a strategic framework for the Commission's environmental policy up to 2012. This programme identifies four priority areas:

- climate change;
- nature and biodiversity;
- environment and health; and
- natural resources and waste.

The programme also contains a number of objectives and actions related to POPs. Proposals towards a 7th EU Environment Action Programme are currently being prepared.

There are other related measures particularly at European and national level that are referenced throughout this plan which are relevant to the control of POPs such as legislation concerning chemicals, pesticides and biocides, food safety and environmental quality. Appendix IV also outlines key EU legislation concerning dioxins, furans and PCBs.

A Community Implementation Plan on POPs for the European Union was prepared by the European Commission and transmitted to the Stockholm Convention Secretariat in 2007. This plan is currently being updated following the addition of new substances to the Stockholm Convention in 2009.

2.5.1 POPs legislative framework

Stockholm Convention on Persistent Organic Pollutants

The Stockholm Convention on POPs is a global treaty requiring Parties to take measures to eliminate or reduce the release of POPs into the environment. The Convention entered into force on 17th May 2004 and is administered by the United Nations Environment Programme. The European Union ratified the Stockholm Convention on 16th November 2004. Ireland became a Party to the Convention on 3rd November 2010 and is required to submit a National Implementation Plan on POPs before 3rd November 2012.

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 Transboundary Air Pollutants (CLRTAP) adopted a Protocol on POPs on 24th June 1998. Known as the POPs Protocol this UNECE region specific treaty focuses on a list of POP substances subject to long range transboundary atmospheric transport. The Protocol bans or severely restricts the production and use of some chemicals most of which are covered under the Stockholm Convention. It includes provisions for dealing with wastes containing chemicals that are banned. The Protocol obliges Parties to reduce emissions of dioxins, furans, certain polycyclic aromatic hydrocarbons (PAHs) and hexachlorobenzene below their levels in 1990 (or an alternative year between 1985 and 1995). For certain processes such as waste incineration the Protocol specifies specific limit values for releases of POPs.

As a Party to the Convention on Long-Range Transboundary Air Pollution (CLRTAP), Ireland is required to annually report emission data for a wide range of air pollutants and other substances released into the atmosphere. While Parties are required to report only on the substances and for the years set forth in Protocols that they have ratified, Ireland estimates and reports emissions for the full range of substances set down in Annex I to the Guidelines for Reporting Emission Data under the Convention on Long-Range Transboundary Air Pollution. This includes POPs covered under the POPs Protocol.

The European Union ratified the POPs Protocol on 30th April 2004. Ireland is progressing plans to ratify the POPs Protocol.

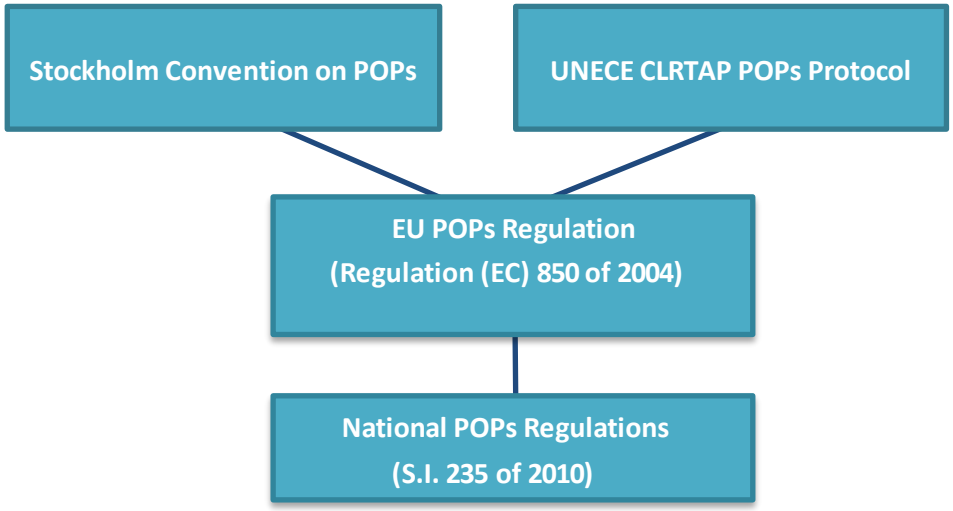


Figure 2 - Main legislative framework concerning POPs

EU legislation on Persistent Organic Pollutants

Regulation (EC) No 850/2004 on Persistent Organic Pollutants (EU POPs Regulation) is the principal European legal instrument for implementing the requirements of the Stockholm Convention and the UNECE Protocol on POPs in the EU. This Regulation is directly applicable in all Member States. It bans production, placing on the market and use (with some limited exemptions) of intentionally produced POP substances listed in the Stockholm Convention and the UNECE Protocol on POPs. It also specifies requirements with regard to the management of stockpiles, the preparation and maintenance of release inventories for unintentional POPs and specific waste management measures for POPs waste.

National legislation on Persistent Organic Pollutants

In Ireland the Persistent Organic Pollutant Regulations 2010[10] implement the EU POPs Regulation. These regulations designate the EPA as the competent authority for the purposes of the EU POPs Regulation. The EPA's responsibilities include the preparation and maintenance of release inventories and, in consultation with public authorities concerned and the public, the preparation of a national action plan and implementation plan setting out how Ireland is meeting its obligations under the Stockholm Convention. The national POPs regulations also set out the roles of public authorities concerned in relation to POPs including a general obligation to cooperate with respect to obligations concerning POPs. The EPA is responsible for reporting on certain aspects of implementation of the EU POPs Regulation both nationally and to the EU, while the Department of the Environment,

[10] Statutory Instrument 235 of 2010

Community and Local Government has responsibility for the remaining reporting requirements.

The national POPs regulations create offences for non-compliance with specific requirements of both the EU POPs Regulation and the national POPs regulations. Penalties for offences include:

- on summary conviction to a fine not exceeding €5,000 or to imprisonment for a term not exceeding twelve months, or at the discretion of the court to both such fine and such imprisonment;
- on conviction on indictment, to a fine not exceeding €500,000 or to imprisonment for a term not exceeding three years, or at the discretion of the court to both such fine and such imprisonment.

PCB Directive

Council Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls aims at disposing of PCBs and equipment containing PCBs as soon as possible, and for equipment containing more than 5 litres of PCB contaminated materials with PCB concentrations greater than 0.05% by weight before the end of 2010. It also sets requirements for the environmentally sound disposal of PCBs.

Member States are obliged to compile inventories, including specific data, of equipment with PCB volumes of more than 5 dm^3 (5 litres). Certain equipment and PCBs contained in the inventories were required to be decontaminated or disposed of by the end of 2010. Equipment on the inventory is subject to specific labelling requirements. Member States must prohibit the separation of PCBs from other substances for the purpose of reusing the PCBs and the topping-up of transformers with oil containing PCBs.

2.5.2 Other relevant international agreements

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

The Rotterdam Convention on Prior Informed Consent was established to allow countries to monitor and control the trade and use of certain hazardous chemicals including POPs. It puts in place a process where countries that are importing certain dangerous chemicals can refuse them or set out conditions for imported chemicals that must be met. The basic principle of the Rotterdam Convention is that the export of a banned or severely restricted chemical can only take place with prior informed consent of the importing Party. Ireland is a

Party to the Rotterdam Convention, having acceded to it on 10th June 2005. Exports of POP substances are regulated by the EU Prior Informed Consent (PIC) Regulation (EC) No 689/2008 (recently recast under Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals) which implements the Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade including POP substances.

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

The Basel Convention is a global environmental agreement on hazardous and other wastes. The Basel Convention entered into force in May 1992. The main principles of the Basel Convention are to:

- reduce and minimise the generation of hazardous waste;
- reduce transboundary movements of hazardous wastes to a minimum consistent with environmentally sound management; and
- treat and dispose of hazardous wastes as close as possible to their source of generation.

Ireland is a Party to the Basel Convention which entered into force for Ireland in 1994. In 1995, Decision III/1 (the export ban amendment) was adopted prohibiting transboundary movements of hazardous wastes from Parties listed in Annex VII of the Convention to all other countries (Annex VII includes all OECD member countries, the EU and Liechtenstein).

To date the export ban amendment has yet to enter into force due to the insufficient number of ratifications. However, it has been transposed by a number of OECD countries (the EU member states) into their national legislation.

The EU Transfrontier Shipment (TFS) Regulation[11] on shipments of waste addresses the requirements of the Basel Convention on transboundary movement of wastes. In Ireland the Waste Management (Shipments of Waste) Regulations 2007 addresses the administrative provisions to implement the EU TFS Regulation. All transfrontier shipments of waste originating in any local authority area in the State that are subject to the prior written notification procedures must be notified to and through Dublin City Council at the National TFS Office which was established to implement and enforce the 2007 Regulations.

[11] Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste

London and OSPAR Conventions

The 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention) is one of the first global conventions to protect the marine environment from human activities. Its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. The Convention entered into force for Ireland on 19th March 1982.

The 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) forms the framework for international cooperation on the protection of the marine environment of the North-East Atlantic. Ireland is a Party to the Convention which entered into force on 25th March 1998.

In accordance with OSPAR guidelines, contracting Parties (including Ireland) have produced national guidance levels (including levels for various POPs) for assessing the suitability of dumping of dredged material at sea.

The Aarhus Convention and Kiev Protocol on Pollutant Release and Transfer Registers

The UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (commonly referred to as the Aarhus Convention) was adopted on 25th June 1998. The Convention, which was ratified by Ireland in 2012, lays down rules to promote citizen's involvement in environmental matters.

The Kiev Protocol on Pollutant Release and Transfer Register is an international instrument on pollutant release and transfer registers. Its objective is to enhance public access to information through the establishment of coherent, nationwide pollutant release and transfer registers (PRTRs). PRTRs are inventories of pollution from industrial sites and other sources. Ireland has ratified the PRTR Protocol and has brought into force regulations concerning the establishment of a European Pollutant Release and Transfer Register[12]. Annual releases of pollutants (including POPs) are reported to the European Pollutant Release and Transfer Register.

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

[12] European Communities (European Pollutant Release and Transfer Register) Regulations 2007 , Pollutant Release and Transfer Register Regulations 2011

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). SAICM is a policy framework to promote chemical safety around the world. SAICM has as its overall objective the achievement of the sound management of chemicals throughout their life cycle so that, by 2020, chemicals are produced and used in ways that minimize significant adverse impacts on human health and the environment. This '2020 goal' was adopted by the World Summit on Sustainable Development in 2002 as part of the Johannesburg Plan of Implementation and was reaffirmed at the recent 2012 UN Conference on Sustainable Development (Rio+20) in Rio de Janeiro.

The UN Conference on Sustainable Development held in 2012 was aimed at securing renewed political commitment for sustainable development, assessing the progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development and addressing new and emerging challenges.

2.6 Roles and responsibilities of relevant bodies

Certain organisations that are considered to have a key role in the fulfilment of obligations under the EU POPs Regulation and the Stockholm Convention are listed in the national POPs regulations. This list is not exhaustive and there are other organisations that may also have a role to play in the monitoring and control of POPs. A description of the organisations referred to in the national POPs regulations is provided below and Table 2 outlines their main responsibility in relation to POPs.

Department of Environment, Community and Local Government

The Department of Environment, Community and Local Government (DoECLG) is the Irish government's department with primary responsibility for environmental policy and legislation concerning environmental protection.

Environmental Protection Agency

The Environmental Protection Agency (EPA) is the lead national agency for the protection of the natural environment and has responsibilities for a wide range of licensing, enforcement, monitoring, assessment and reporting activities associated with environmental protection. The EPA is the competent authority for the purposes of the implementation of the EU POPs Regulation.

Health and Safety Authority

The Health and Safety Authority (HSA) is the national authority with responsibility for securing health and safety at work in Ireland. The HSA is the lead competent authority with responsibility for enforcement of the key EU chemicals legislative framework. Under the Chemicals Act 2008, the HSA is the designated national authority for industrial chemicals for the purposes of the EU Prior Informed Consent Regulation which implements obligations under the Rotterdam Convention on Prior Informed Consent and the competent authority for the REACH Regulation. Under the Chemicals (Amendment) Act 2010, the HSA is competent authority for the purposes of the Classification, Labelling and Packaging Regulation[13].

Department of Agriculture, Food and the Marine

The Department of Agriculture, Food and the Marine (DoAFM) is responsible for control of the marketing and the use of pesticides and through the Pesticide Registration and Control Division implements the regulatory system for plant protection products and biocidal products. DoAFM is also responsible for the classification, packaging and labelling of plant protection and biocidal products and for the pesticide residue control program for primary agricultural food and feed. DoAFM also monitor certain PCB compounds in food of animal origin, eggs, milk and honey as part of the national residue monitoring programme. Under the Chemicals Act 2008 DoAFM is competent authority for the purposes of the EU Prior Informed Consent Regulation and the REACH Regulations in respect of pesticides.

Irish Medicines Board

The Irish Medicines Board (IMB) has responsibility for the regulation and authorisation of medicinal products (human and veterinary) and regulation of blood and blood products, tissues and cells, cosmetics and medical devices in Ireland.

Food Safety Authority of Ireland

The Food Safety Authority of Ireland (FSAI) is the national agency with responsibility for protecting public health and consumer interests in the area of food safety and hygiene. The FSAI enforces food legislation and undertakes a range of monitoring programmes focusing on identifying the presence of contaminants in the food-chain including POPs. This monitoring is carried out in conjunction with various official agencies including the Health Service Executive, Department of Agriculture, Food and the Marine, the Sea Fisheries Protection Agency, the Marine Institute and local authorities.

[13] Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures

Marine Institute

The Marine Institute is the national agency responsible for marine research and associated technology development and innovation. Its research and environmental contaminant monitoring programmes includes statutory monitoring under EU Directives such as the Water Framework and Shellfish Directives, and environmental monitoring contributing to OSPAR's coordinated environmental monitoring programme. The Marine Institute, in conjunction with the Sea Fisheries Protection Authority and the FSAI, monitor levels of chemical substances in seafood.

Health Service Executive

The Health Service Executive (HSE) is responsible for managing and delivering health and personal social services in Ireland. The HSE fulfils its statutory food control responsibilities by means of a service contract with the FSAI. This includes a coordinated national food surveillance programmes agreed between the environmental health service, laboratory service and the FSAI.

There are three Public Analyst's Laboratories that are official food control laboratories within the HSE. The HSE Public Analyst's Laboratory in Dublin is the national reference laboratory for the analysis of polycyclic aromatic hydrocarbons (PAHs) and is accredited for the analysis of the priority PAHs in a wide range of foodstuffs.

Office of the Revenue Commissioners

The Office of the Revenue Commissioners is primarily responsible for the assessment and collection of taxes and duties. Revenue's Customs Service is responsible for controlling imports into Ireland from, and exports from Ireland to countries outside the EU. All goods imported into and exported from Ireland to countries outside the EU must be declared to Customs on arrival and departure. Revenue's Customs Service ensures that goods declared for import or export are moving legally and are not prohibited or restricted. Under the Chemicals Act 2008, the Revenue Commissioners have been assigned certain specific responsibilities for the purposes of the EU Prior Informed Consent Regulation. These responsibilities relate to controls of the export of certain dangerous chemicals.

Local Authorities

There are a number of local authorities in Ireland who have responsibility for the monitoring, permitting, licensing or enforcement systems within their functional areas for the purposes of a range of legislation including the Waste Management Acts 1996 as amended, Water Pollution Acts 1977 as amended and Air Pollution Act 1987 as amended.

Table 2 - Main roles of organisations listed under the national POPs regulations relating to POPs

Organisation	Main responsibilities related to POPs
Department of Environment, Community and Local Government	Responsible for national policy and regulations concerning POPs
Environmental Protection Agency	Competent Authority for the purposes of the EU POPs Regulation. Monitoring, permitting, licensing or enforcement systems concerning licensable activities under the EPA Acts and activities under the Dumping at Sea Acts.
Health and Safety Authority	Carry out the administrative functions required under the EU Prior Informed Consent Regulation for POPs that are listed within this Regulation and the provision of relevant information to the EPA, as appropriate.
Department of Agriculture, Food and the Marine	Ensure that POPs intended for use as pesticides are not marketed or used. Monitoring of primary food and feed for the presence of POP pesticides. Cooperate with the EPA in the identification of any person who produces, places on the market or uses relevant substances containing POPs. The provision of data to the EPA resulting from monitoring, inspections, checks, examinations and investigations concerning POPs.
Irish Medicines Board	Ensure that medicinal products for human or veterinary use that are authorised for the Irish market do not contain POPs. Cooperate in the identification of any person who produces, places on the market or uses relevant substances containing POPs. The provision of data to the EPA resulting from monitoring, inspections, checks, examinations and investigations concerning POPs.
Food Safety Authority of Ireland	Monitoring and investigations relating to food and foodstuff containing POPs . The provision of data to the EPA resulting from monitoring, inspections, checks, examinations and investigations concerning POPs.
Marine Institute	Monitoring and investigations relating to POPs contamination in marine environmental matrices and seafood. The provision of data to the EPA resulting from monitoring, checks, examinations and investigations concerning POPs.
Health Service Executive	Food sampling, analysis and investigation of POPs in foodstuffs and public awareness of public health issues in consultation with the EPA.
Revenue's Customs Service	The control at point of importation of specified POPs to be based on criteria agreed with the EPA regarding the identification of consignments of interest to the EPA. Cooperate, by means of post clearance data exchange in the identification of relevant importations.
Local Authorities	Monitoring, permitting, licensing or enforcement systems within their functional areas regarding POPs and relevant requirements under the Waste Management, Water Pollution and Air Pollution Acts . Cooperate in the identification of any person who holds a stockpile or waste containing POPs or who produces, disposes or recovers POPs containing wastes. The provision of data to the EPA resulting from monitoring, inspections, checks, examinations and investigations concerning POPs.

In accordance with Article 9 of the national POPs regulations 2010, Table 3 includes details of the roles and responsibilities of public authorities and arrangements between the EPA and public authorities for cooperation, support, advice and guidance in the exercise of powers, functions and duties under the national and EU POPs Regulations.

Table 3 - Roles and responsibilities of the EPA and Public Authorities with respect to POPs and the National Implementation Plan

Authority	Relevance to POPs	Responsibilities and arrangements for implementing national and EU POPs Regulations
Environmental Protection Agency (EPA)	Competent Authority	Enforce requirements under Article 3 & 4 of the EU POPs Regulation regarding the production, placing on the market, use of POPs. Enforce requirements regarding POPs stockpiles and waste management of POPs as required under Article 5 & 7 of the EU POPs Regulation respectively. Inform, notify and communicate as appropriate to the Commission, Member States and Convention Secretariat as required under Article 4, 6, 7 and 8 of the EU POPs Regulation. Responsibilities in relation to release inventories, action plans, and processes under Article 6 of the EU POPs Regulation. Enter into arrangements with public authorities concerned regarding the carrying out of monitoring, inspections, examinations and investigations as appropriate by public authorities. Exchange information concerning POPs with other public authorities, where relevant. Agree with public authorities concerned regarding the arrangements for initiating proceedings in relation to prosecution of offences under the national and EU POPs Regulation. Agree a Memorandum of Understanding, if appropriate, with public authorities concerned regarding arrangements for fulfilment of obligations under the national and EU POPs Regulations. Coordinate in consultation with public authorities, their powers, functions and duties in relation to relevant POPs activities and provide relevant guidance and advice notes as appropriate. Develop, review, update, where required, and cooperate with public authorities regarding the implementation of the National Implementation Plan. Cooperate with the EU Commission regarding the establishment and maintenance of appropriate programmes and mechanisms for the regular provision of comparable monitoring data on unintentional POPs. Facilitate the exchange of information concerning POPs and alternatives within the EU and with third countries. Protect confidential information as mutually agreed with respect to information exchange with third countries.

Authority	Relevance to POPs	Responsibilities and arrangements for implementing national and EU POPs Regulations
		Promote and facilitate awareness programmes regarding POPs including health and environmental effect of POPs and alternatives, provision of public information and training of workers, scientists, educators and technical and managerial personnel. Collect and coordinate information required for EU POPs Regulation Article 12 Annual and Triannual Reports, and Stockholm Convention Article 15 Reports.
Department of Agriculture, Food and the Marine	POPs used or intended for use as pesticides	Ensure that plant protection products and biocidal products authorised for use in Ireland do not contain POPs listed under Annex I or II of the EU POPs Regulation. Carry out monitoring, inspections, checks, examinations and investigations in relation to POPs in pesticides and certain PCB compounds in food of animal origin where required. Maintain records and provide information including relevant monitoring data to the EPA when required. Cooperate with the EPA in the identification of any person who illegally places on the market or uses POP pesticides. Exchange information with the EPA with respect to POPs in pesticides. Advise the EPA on any suspected offences under the national and EU POPs Regulation. Facilitate awareness programmes with regard to POPs.
	Pesticides identified as persistent, bioaccumulative, or toxic or very persistent and very bioaccumulative under the REACH Regulations	Provide advice, where available, to the EPA on such substances that may be considered as candidate POP substances for listing under the Stockholm Convention
Irish Medicines Board	POPs used for use in medicinal products for human or veterinary use	Ensure that human and veterinary medicines authorised for use in Ireland do not contain POPs listed under Annex I or II of the EU POPs Regulation. Provision of data to the EPA resulting from monitoring, inspections, checks, examinations and investigations concerning POPs. Cooperate in the identification of any person who places on the market or produces a medicinal product, containing a POP for human or veterinary use.

Authority	Relevance to POPs	Responsibilities and arrangements for implementing national and EU POPs Regulations
		Exchange information with the EPA with respect to POPs in medicinal products for human or veterinary use. Advise the EPA on any suspected offences under the national and EU POPs Regulation. Promote and facilitate awareness programmes with regard to POPs. Maintain records and provide information relevant to POPs to the EPA when required.
Health and Safety Authority	Competent Authority role under the Chemicals Act 2008 as amended.	Carry out the administrative functions required under the EU Prior Informed Consent Regulation for POPs that are listed within this Regulation and the provision of relevant information to the EPA, as appropriate. Exchange information, where relevant, on POPs arising from meetings held at European or international level. Assist the EPA in providing information to the EU Commission, Stockholm Convention or any other relevant POPs body regarding candidate or emerging POPs considered for listing. Advise the EPA on any suspected offences under the national and EU POPs Regulation. Maintain records and provide information where relevant to the EPA. In accordance with Section 9 of the Chemicals Act 2008, cooperate with the EPA in the performance of functions under the REACH Regulation.
Food Safety Authority of Ireland	POPs in food and foodstuffs	Carry out monitoring, inspections, checks, examinations and investigations in relation to POPs in food and foodstuffs, where required. Provide the EPA with information arising from such activities. Exchange information with the EPA with respect to POPs in food and foodstuffs. Advise the EPA on any suspected offences under the national and EU POPs Regulation. Facilitate the provision of public information with regard to POPs in food and foodstuffs. Maintain records and provide information including relevant monitoring data to the EPA when required.
Marine Institute	POPs in seafood and the marine environment (biota, sediments and water)	Carry out monitoring, inspections, checks, examinations and investigations in relation to POPs in the marine environmental matrices, where required. Provide the EPA with information arising from such activities.

Authority	Relevance to POPs	Responsibilities and arrangements for implementing national and EU POPs Regulations
		Exchange information with the EPA with respect to POPs in the marine environment. Maintain records and provide information including relevant monitoring data to the EPA when required. Advise the EPA on any suspected offences under the national and EU POPs Regulation. Facilitate the provision of public information with regard to POPs in the marine environment.
Revenue's Customs Service	POPs being imported	At the request of the EPA, electronically profile declarations of importations of POPs and refer those to EPA for investigation. At the request of EPA provide post clearance data on imports of interest to the EPA.
Health Service Executive	Public health Issues concerning POPs	Carry out food safety monitoring and investigations in relation to POPs. Provide the EPA with information arising from such activities. Exchange information with the EPA with respect to POPs and public health issues. Facilitate the provision of public information with regard to POPs and public health issues in consultation with the EPA and relevant public authorities. Maintain records and provide information including relevant monitoring data concerning POPs and public health related issues to the EPA when required.
EPA and Local Authorities where relevant	Monitoring, permitting, licensing or enforcement systems as appropriate, concerning waste management, water pollution, air pollution under related legislation and licensable activities under the EPA Acts, and activities under Dumping at Sea Acts.	Ensure that all monitoring, permitting, licencing or enforcement relevant to POPs is carried out in accordance with respective legislative requirements. Carry out monitoring, inspections, checks, examinations and investigations in relation to POPs, where required. Cooperate in the identification of any person who holds a stockpile containing a POP or who holds, produces, disposes of or recovers a POP-containing waste. Advise the EPA on any suspected offences under the national and EU POPs Regulation. Promote and facilitate awareness programmes with regard to POPs. Maintain records and exchange information relevant to POPs to the EPA when required.

POPs issues are actively considered on an on-going basis in a number of specific areas (e.g.: monitoring under the Water Framework Directive, licencing enforcement, research, etc.), and actions are taken as considered appropriate under those specific areas. To facilitate arrangements outlined in Table 3 and the implementation of the National Implementation Plan, a POPs working group will be established. The group will monitor and evaluate Ireland's progress in implementing measures outlined in the plan and also on progress to reduce or eliminate unintentional POPs as detailed in the Action Plan on unintentional POPs. The group will discuss POPs issues that may require specific actions in addition to any further measures that are needed to be considered for inclusion in future revisions to the National Implementation Plan and Action Plan on unintentional POPs. The working group, which will be coordinated and chaired by the EPA, will comprise members representing the following organisations, as appropriate:

- Environmental Protection Agency
- Department of Environment, Community and Local Government
- Food Safety Authority of Ireland
- Marine Institute
- Department of Agriculture, Food and the Marine
- Irish Medicines Board
- Revenue's Customs Service
- Health Service Executive
- Health and Safety Authority
- Local Authority
- A representative from a Non-Governmental Organisation
- A representative from industry

The group will meet at least once every two years.

SECTION 3

3. Assessment of intentionally produced POPs in Ireland

Intentionally produced POPs are chemicals manufactured for specific purposes. These can include POP pesticides for specific uses in agricultural, forestry applications or for human health and or veterinary applications. They also include chemicals specifically produced for various industrial purposes such as Polychorinated biphenyls (PCBs) in electrical equipment and certain flame retardants in consumer products. This section describes the situation in Ireland for each of the intentionally produced POPs listed under the Stockholm Convention, including uses and measures that are being taken to prohibit or restrict them (if applicable), waste management and their presence in food and the environment based on available monitoring information. It is the responsibility of importers, manufacturers, consumers and the general public to ensure that they comply with legislation concerning POPs. Table 4 summarises the enforcement controls, activities and associated responsibilities regarding intentional POPs listed under the Stockholm Convention.

Table 4 - Specific enforcement controls, activities and responsibilities concerning intentionally produced POPs in Ireland

Substance(s)	Control / Activity	Responsibility
POP Pesticides		
POP Pesticides	Requirements regarding POP pesticides for use as plant protection products subject to prohibition or restriction under the Prior Informed Consent Regulation and the EU POPs Regulation.	Department of Agriculture, Food and the Marine, Revenue's Customs Service, Health and Safety Authority, EPA, where relevant
	Requirements regarding POP pesticides illegally placed on the market for use in medicinal products for human or veterinary use.	Irish Medicines Board, EPA
	Inspections of farms and awareness regarding possible stockpiles of POP pesticides.	Department of Agriculture, Food and the Marine
	Routine monitoring of POP pesticide residues in food of plant origin, cereals and food of animal origin.	Department of Agriculture, Food and the Marine
	Monitoring of POP pesticides in environmental media, as appropriate.	EPA

Substance(s)	Control / Activity	Responsibility
	Monitoring of POP pesticides in seafood and the marine environment, as appropriate.	Marine Institute (in conjunction with Sea Fisheries Protection Authority and Food Safety Authority of Ireland)
	Monitoring of POP pesticides in infant food.	Food Safety Authority of Ireland
	POP Industrial chemicals	
Polychlorinated biphenyls (PCBs)	Requirements regarding PCBs subject to prohibition or restriction under the Prior Informed Consent Regulation and the EU POPs Regulation.	Health and Safety Authority, EPA and Revenue's Customs Service, where relevant
	Identifying and working actively with confirmed holdings of PCBs to ensure they are meeting obligations to dispose and/or decontaminate equipment containing PCBs in an environmentally sound manner.	EPA and Local Authorities
	Identifying and working actively with suspected holdings of PCBs to ensure that they confirm if equipment under their control is contaminated with PCBs.	EPA and Local Authorities
	Surveys and inspections of sites confirmed or suspected of holding PCBs.	EPA and Local Authorities
	Updating and maintaining the national PCB inventory.	EPA
	Monitoring of PCB residues in food of animal origin.	Department of Agriculture, Food and the Marine
	Monitoring of PCBs in seafood and the marine environment, as appropriate.	Marine Institute
	Monitoring of PCBs and dioxin-like PCBs in various food groups, as appropriate.	Food Safety Authority of Ireland
POP Polybrominated diphenyl ethers (PBDEs)	Requirements regarding POP PBDEs subject to prohibition or restriction under the Prior Informed Consent Regulation and the EU POPs Regulation.	Health and Safety Authority, Revenue's Customs Service, EPA, where relevant
	Requirements regarding POP PBDEs illegally	Irish Medicines Board, EPA

Substance(s)	Control / Activity	Responsibility
	placed on the market for use in medicinal products for human or veterinary use.	
	Participation in EU discussions on proposals leading to control measures concerning POP PBDEs.	Department of Environment Community and Local Government, EPA
	Investigations and consultation on the implementation of appropriate mechanisms, for effective screening, separation and handling of waste containing POP flame retardants and manage as POPs waste, where required.	EPA, Waste Electronic and Electrical (WEEE) Sector, End of Life Vehicle Sector, and other relevant bodies, as appropriate
	Monitoring of electrical and electronic products to check compliance with the Restriction of certain Hazardous Substances Directive, as appropriate.	EPA
	Monitoring of POP PBDEs in environmental media, as appropriate.	EPA
	Monitoring of POP PBDEs in seafood and the marine environment, as appropriate.	Marine Institute (in conjunction with Sea Fisheries Protection Authority and FSAI)
	Monitoring of POP PBDEs in various food groups, as appropriate.	Food Safety Authority of Ireland
Hexabromobiphenyl	Requirements regarding Hexabromobiphenyl subject to prohibition or restriction under the Prior Informed Consent Regulation and the EU POPs Regulation.	Health and Safety Authority, Revenue's Customs Service, EPA, where relevant
	Requirements regarding Hexabromobiphenyl illegally placed on the market for use in medicinal products for human or veterinary use.	Irish Medicines Board, EPA
	Monitoring of electrical and electronic products to check compliance with the Restriction of certain Hazardous Substances Directive, and monitoring in packaging, as appropriate.	EPA
	Monitoring of polybrominated biphenyls (including hexabromobiphenyl) in various food	Food Safety Authority of Ireland

Substance(s)	Control / Activity	Responsibility
	groups, as appropriate.	
PFOS	Requirements regarding PFOS subject to prohibition or restriction under the Prior Informed Consent Regulation and the EU POPs Regulation.	Health and Safety Authority, Revenue's Customs Service, EPA, where relevant
	Requirements regarding PFOS illegally placed on the market for use in medicinal products for human or veterinary use.	Irish Medicines Board, EPA
	Participate in EU discussions on proposals leading to control measures concerning PFOS. Monitor and report to the EU Commission and Stockholm Convention Secretariat on the phase out of PFOS use.	Department of Environment Community and Local Government EPA, Industry organisations.
	Monitoring of PFOS in various food groups, as appropriate.	Food Safety Authority of Ireland

3.1 POP Pesticides

SUMMARY ASSESSMENT OF POP PESTICIDES IN IRELAND

POP pesticides listed under the Stockholm Convention are not produced in Ireland and are banned for use in Ireland. Their presence in food and the Irish environment is not of a significant concern although there is limited monitoring information available for soil. POP pesticides may continue to show up in low concentrations in the environment as result of their past use and persistent nature.

Safeguards are required to ensure the POPs pesticides do not make their way into the environment in particular as a result of importation or being present in food imported from countries where such pesticides may still be used. Measures such as routine monitoring of food undertaken by the Department of Agriculture, Food and the Marine are central in ensuring that associated legislative requirements are complied with. There is potential for stockpiles of POP pesticides from former use on farms. Inspections of farm chemicals under existing farm inspection programmes will assist in identifying such stockpiles and raising awareness.

Pesticide use in the context of POPs and the National Implementation Plan applies to a number of different applications such as use in agricultural (e.g.: plant protection products) and forestry applications, and insecticide use in veterinary and human applications.

3.1.1 POP Pesticide production and use

15 of the 22 POP substances listed under the Stockholm Convention are pesticide related. Production, placing on the market and use of the POP pesticides are prohibited under the EU POPs Regulation. None of these substances are produced in Ireland and have been banned for some time mainly as a result of European legislation prohibiting the placing on the market and use of plant protection products. Table 5 details when the POPs pesticides were banned in Ireland for plant protection use.

Table 5 - Date of ban in Ireland of POP pesticides listed under the Stockholm Convention for plant protection use

Substance	Effective date of ban for plant protection use
Aldrin	1988
Chlordane	1992
Dieldrin	1981
Endrin	1981
Heptachlor	1981
Hexachlorobenzene	1981
Mirex	(Never authorised for use in Ireland)
Toxaphene	1985
DDT	1985
Chlordecone	1992
Hexachlorocyclohexane (mixed isomers)	1981
Lindane (gamma hexachlorocyclohexane)	2002
Pentachlorobenzene	(Never authorised for use in Ireland)
Endosulfan	2005

3.1.2 POP Pesticide waste management and stockpiles

The Department of Agriculture, Food and the Marine previously held onto a strategic reserve of pesticides including DDT in the event of a pest epidemic. The reserve was stored at a central location in County Dublin and it was subsequently decided in the early 1990s to destroy this reserve. In 2001 there was a clear out of storage areas of old chemicals including chemicals from agricultural shops and co-operatives which were subsequently sent for waste disposal.

Case Study - Removal of Lindane product

Under the EU POPs Regulation, there was an exemption for restricted use of lindane (gamma hexachlorocyclohexane) until 31st December 2007 as a public health and veterinary topical insecticide. The Irish Medicines Board (IMB) previously authorised Oridermyl, a veterinary product containing lindane, for use for the treatment of parasites. The EPA consulted with the IMB and the company authorised for the supply of Oridermyl with regards to the removal of this product from the Irish market after the deadline specified in the EU POPs Regulation. A quantity equivalent to 322.45g lindane was illegally placed on the market between 1st January 2008 to 13th March 2008. Irish wholesalers were requested to remove the product from sale and a quantity equivalent to 453.7g lindane was recalled from wholesalers and returned to the distributor based in the UK. The returned products were destroyed in accordance with the EU POPs Regulation.

Article 5 of the EU POPs Regulation requires holders of stockpiles which consists of or contains any substance listed in Annexes I or II for which no use is permitted to manage that stockpile as a POPs waste. The Department of Agriculture, Food and the Marine will help ensure that this is the case and that farm inspections include awareness of the possible presence of POP pesticide stockpiles.

3.1.3 POP Pesticides in food

Pesticide residues in food are regulated in Ireland through the implementation of European legislation[14] which establishes maximum residues levels for all pesticides in fruit and vegetables, cereals and in food of animal origin. The Department of Agriculture, Food and the Marine pesticide residue control programme includes the monitoring of pesticides in the following food groups:

- food of plant origin (fruit and vegetables),
- cereals; and
- food of animal origin (fat, milk, honey, eggs and dairy produce).

Where a maximum residue level as set out in EU legislation is exceeded, a dietary intake calculation is carried out to determine if the residue presents a risk to Irish consumers, both adults and children. The results of these evaluations are independently verified by the FSAI. Where a risk to health is determined by the FSAI, the Department of Agriculture, Food and the Marine take appropriate enforcement action. This may involve removal of the produce

[14] Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC

concerned from the market and its subsequent destruction. Offenders may also be prosecuted or fined.

POP pesticides have been detected at very low levels in fruit, vegetables, cereals and food of animal origin as indicated in Table 6 for the period 2004-2009.

Of all POP pesticides, DDT has been the most commonly found POP residue detected under the pesticide residue control programme as illustrated in Figure 3. This is particularly the case in 2007 with a higher number of samples taken. The presence of DDT is considered to have resulted from levels in soil from former use as a pesticide and its persistent nature or from intake of trace levels in feed (DAFF, 2008a). It should be noted that the pesticide residue control programme also includes food originating from other EU Member States and countries outside the EU. Aldrin, endrin, chlordane, mirex and heptachlor were not detected in any of the monitoring.

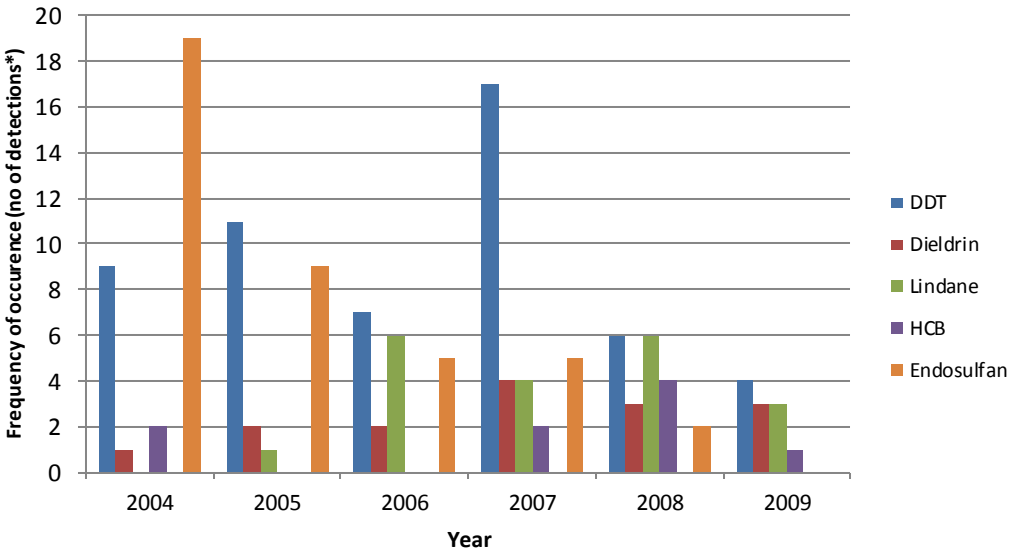
Table 6 – POP Pesticide monitoring in food between 2004 & 2009 and number of exceedences in Maximum Residue Levels found

POP Pesticide[15]	2004	2005	2006	2007	2008	2009
No of Samples	*1410*	*1326*	*1328*	*1424*	*1404*	*1324*
Aldrin	0	0	0	0	0	0
Dieldrin	0	1	0	0	0	0
Endrin	0	0	0	0	0	0
Chlordane	0	0	0	0	0	0
DDT	0	0	0	0	0	0
Heptachlor	0	0	0	0	0	0
Hexachlorobenzene	0	0	0	0	0	0
Mirex	0	0	0	0	0	0
Lindane	0	0	1	0	0	0
Endosulfan	0	0	0	0	0	0

Source: Data from DAFF 2006 - 2010

Note: 1 out of 1326 samples exceeded maximum residue limits in 2005. These related to a pear sample from Russia in the case of dieldrin. 1 out of 1328 samples exceeded the maximum residue limit for lindane in a poultry sample in 2006. The source of the trace lindane in the poultry sample is unclear and may have been associated with trace residues in poultry feed or may have been associated with the use of wood shavings used in poultry litter (DAFF, 2008b). Timber is frequently treated with a wood preservative and in the past some wood preservatives contained lindane which may have given rise to the contamination detected.

[15] Toxaphene, Chlordecone and Pentachlorobenzene not included in the residue control programme



Source: Data from DAFF 2006 – 2010
*detections include metabolites

Figure 3 - Frequency of occurrence of POP pesticides residues in food under the Department of Agriculture, Food and the Marine pesticide residue control programme between 2004 and 2009

The Department of Agriculture, Food and the Marine also test animal feed for POP pesticides (aldrin, chlordane, dieldrin, endrin, heptachlor, toxaphane, DDT, endosulfan and hexachlorobenzene). In the period 2004 to 2011 there was no detection of any of the POP pesticides analysed.

The Marine Institute monitors POP pesticides in seafood produced in Ireland or landed at Irish ports. No maximum residue levels or national standards exist for POP pesticides in seafood. However, although POP pesticides are routinely detected in monitoring, the levels are relatively low and consistently comply with the strictest standards applied in various other European countries in so far as they are known.

Pesticides including POP pesticides in infant food are also regulated[16]. The FSAI has carried out two studies on pesticides in infant food including POP pesticides. In their 2004 study, of 41 samples of infant food tested for pesticides including a number of POP pesticides, dieldrin was the only POP pesticide that was detected (at a level of 0.001ppm (0.001 $mgkg^{-1}$)) and the concentration level found was below limits set in legislation (0.003ppm (0.003 $mgkg^{-1}$)) (FSAI, 2004a). A further surveillance survey in 2006 found no detections of any of the POP pesticides that were analysed in infant food (FSAI, 2006).

[16] Commission Directive 91/321/EEC on infant formulae and follow-on formulae as amended and Commission Directive 96/5/EC on processed cereal-based foods and baby foods for infants and young children as amended

The FSAI also carried out a Total Diet Study which is designed to measure the dietary exposure of the population to particular chemicals that may pose a risk to health if taken into the body in excessive amounts. Pesticides were analysed in this study including a number of POP pesticides and the FSAI found that the very limited occurrence of pesticide residues indicated that the exposure of the Irish population to pesticides in their diet was found to be negligible (FSAI, 2011).

3.1.4 POP Pesticides in the environment

A number of POP pesticides have been monitored in the environment under various monitoring programmes. Due to their persistent characteristics, POP pesticides that have been used in the past are likely to be detected. Where information is available, low levels of POPs have been found and there appears to be a downward trend in their presence.

3.1.4.1 POP Pesticides in water and marine environment

Extensive monitoring of pollutants has been carried out in Irish lakes, rivers and groundwater as part of a screening and on-going surveillance programme for the purposes of the implementation of the Water Framework Directive. A report on water quality in Ireland which includes details on surveillance monitoring undertaken between 2007-2010 was published in 2010 (EPA, 2010b).

The aim of the screening programme, carried out in 2005 and 2006, was to determine a list of significant relevant pollutants that was to be included in the surveillance monitoring programme. The programme included water, biota and sediment monitoring. In relation to water, a number of POP pesticides were detected in the screening programme including hexachlorobenzene, pentachlorobenzene, dieldrin, DDT, lindane and endrin (TNO, 2008a, 2008b). Most of these were found at low concentrations however some exceed relevant environmental quality standards[17] as shown in Table 7.

A small number of POP pesticides were detected in biota and sediment monitoring. In biota these included hexachlorobenzene, DDT, pentachlorobenzene, dieldrin and lindane. The same pesticides were found in sediment, with the exception of lindane. With the exception of hexachlorobenzene in biota there are no environmental quality standards set for sediment or biota for the above POPs.

[17] Environmental quality standards for priority substances and certain other pollutants under the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009)

Table 7 – Concentration levels of POP pesticides in water samples that exceed environmental quality standards under the Water Framework Directive Screening Monitoring Programme

Substance	Unit	No of samples	No of detections	Min concentration of detected	Max concentration of detected	*Environmental Quality Standard*
Sampling sites						
Lindane	$\mu g l^{-1}$	287	2	0.011	**0.15**	*0.02*
Dieldrin	$\mu g l^{-1}$	287	18	0.006	**1.5**	*∑ = 0.010*[18]
Endrin	$\mu g l^{-1}$	287	2	**0.026**	**0.027**	*∑ = 0.010*
Target Sites						
Aldrin	$\mu g l^{-1}$	40	1	**0.071**		*∑ = 0.010*
4,4'-DDT	$\mu g l^{-1}$	287	16	0.0022	**0.25**	*0.010*

Source: Data from TNO, 2008a, 2008b

Following the screening programme, the EPA commenced a surveillance programme in July 2007 which continued in 2008 and 2009. There were approximately 250 river and lake sites included in the monitoring. The list of substances measured included priority substances determined at EU level[19] in addition to pollutants determined during the above mentioned screening programme. The list includes aldrin, endrin, dieldrin, DDT, hexachlorobenzene, lindane, pentachlorobenzene and endosulfan. The POP pesticides monitored were not detected.

Pesticides including dieldrin, DDT and lindane were also monitored at approximately 120 groundwater sites with low levels detected. Discharges of pollutants to groundwater are controlled by EU legislation[20]. National legislation[21] which entered into force in 2010 includes groundwater threshold values for dieldrin, DDT and lindane.

The Marine Institute has also carried out an assessment of hazardous substances in transitional and coastal waters. This included a survey of available data from specific monitoring programmes including Marine Institute shellfish growing waters monitoring, OSPAR coordinated environmental monitoring programmes, Marine Institute research activities as well as other available information (McGovern et al, 2011a). With this information the Marine Institute carried out an assessment of transitional and coastal waters based on environmental quality standards established under the Water Framework Directive. Where no such quality standards were available other assessment criteria were

[18] ∑ = 0.010 applies to cyclodiene pesticides (aldrin, dieldrin, endrin & isodrin)
[19] Decision No 2455/2001/EC of the European Parliament and of the Council of 20 November 2001 establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC
[20] Directive 2006/118/Ec Of The European Parliament And Of The Council of 12 December 2006 on the protection of groundwater against pollution and deterioration
[21] European Communities Environmental Objectives (Groundwater) Regulations, 2010

used including, for example, available national standards and OSPAR environmental assessment criteria.

OSPAR Environmental Assessment Criteria (EACs) represent the contaminant concentration in the environment below which no chronic effects are expected to occur in marine species, including the most sensitive species. Concentrations below the EACs are considered to present no significant risk to the environment. These were developed by OSPAR to support visual representations of contaminant data collected as part of the Coordinated Environmental Monitoring Programme (green/red threshold). They do not have any legal status. A background document on OSPAR Agreement 2009-2 on assessment criteria used for OSPAR Quality Status Report is available[22].

In some instances alternatives to EACs were required, primarily where EACs proposed were lower than the estimated background assessment concentration. Trend assessments were also reported for selected shellfish and sediment data which indicated if there was an upward or downward trend in concentrations found over time.

Hexachlorocyclohexanes, DDT, hexachlorobenzene, aldrin, dieldrin and endrin were not detected in water samples from transitional and coastal waters[23]. In the case of hexachlorocyclohexanes the analytical method did not achieve the required sensitivity for the very low environmental quality standard set for this pollutant in transitional and coastal waters. According to the McGovern *et al*, 2011a, many organochlorine pesticides have a strong affinity for organic material and so their detection in water would not have been anticipated. They are generally detected in biota but in the Marine Institute assessment, levels were found to be low and within assessment criteria. Where trends were detected, such as a metabolite of DDT, lindane and hexachlorobenzene in mussels at a monitoring station in Cork Harbour, Co Cork, the trend is indicating that the concentration level of these substances is reducing over time.

As outlined under Section 3.1.3 the Marine Institute monitors POP pesticides in seafood produced In Ireland or landed at Irish ports and have found that levels are relatively low and consistently comply with the strictest standards applied in various other European countries in so far as they are known.

[22] http://www.ospar.org/documents/dbase/publications/p00461_background%20doc%20cemp_assessmt%20criteria_haz_subs.pdf

[23] Not detected above laboratory reporting limit with the exception of two single detections (one each of αlpha hexachlorocyclohexane and βeta hexachlorocyclohexane).

3.1.4.2 POP Pesticides in air

Ireland participates in a global POPs monitoring project called GAPS (Global Atmospheric Sampling). The GAPS network which was initiated in 2004 includes more than 60 sites on 7 continents around the world including a station at Malin Head, Co. Donegal. The GAPS study sets out to fill information gaps on the spatial distribution of POPs at areas around the world. Target chemicals include a number of POPs listed under the Stockholm Convention. Seasonality and long term temporal trends are being investigated as part of this monitoring project. The 2005 monitoring under the GAPS study was published in 2009 (Pozo *et al*, 2009) and indicated low levels of concentrations of pesticides in air at the monitoring station at Malin Head in Co. Donegal. The levels found for hexachlorocyclohexanes, chlordane, dieldrin and DDT, ranged from 0.3-38 pgm^{-3}.

The EPA's environmental research programme has included recent transboundary air pollution research to assess the influence of long range transboundary air pollution on Irish surface waters and soils. This research, which has included monitoring of POP pesticides, is expected to be published in the near future.

3.1.4.3 POP Pesticides in soil

Limited environmental monitoring of POPs in soils has been carried out in Ireland. A report on heavy metal and certain organic pollutants in soils in the south eastern region of Ireland (McGrath & McCormack, 1999*)* included monitoring of POPs pesticides in 295 soil samples including hexachlorobenzene, hexachlorocyclohexane and DDT. Table 8 details the range of levels detected in soils in the south east of Ireland which represents 22% of the land area of the country.

Table 8 – Range of concentration levels of POPs pesticides monitored in soils in the south east of Ireland

Substance	Range (µg kg^{-1})
Gamma Hexachlorocyclohexane (Lindane)	0.0 - 78.3
Hexachlorobenzene	0.0 - 0.63
Sum DDT	0.0 - 101.0

Source: McGrath & McCormack, 1999

Lindane was found in amounts exceeding 1 μgkg^{-1} in 8 tillage, 6 pasture, 3 forest and 4 peats. Lindane was used in forest planting and one of the forest soils had 78 μgkg^{-1} of lindane with the next highest value being 4 μgkg^{-1}. According to the study the findings of some excess lindane in virgin bogs even at low levels of 1-2 μgkg^{-1} would indicate accumulation by adsorption from the atmosphere. DDT above 5 μgkg^{-1} was found in 18 tillage and 8 pasture soils. Highest levels of 100 μgkg^{-1} occurred in soils of both grassland and tillage land use types. The ratio for metabolite DDE to undegraded DDT was generally greater than 1 which would suggest that most of the residues were of considerable age.

3.2 Polychlorinated biphenyls (PCBs)

SUMMARY ASSESSMENT OF PCBS IN IRELAND

Relative to other POPs listed under the Stockholm Convention, PCBs are a significant POP in the Irish context. A pork contamination incident in 2008 has highlighted the risk that PCB contamination can potentially pose both to the environment and public health, and economic impacts. They may be found in long life electrical equipment such as transformers and capacitors. Relatively low levels of PCBs are being found in food and the Irish environment with some evidence of isolated elevated levels. There is an overall downward trend in PCB concentrations in the marine environment. Their persistent nature will mean that may be detected in the environment for many years.

It remains a priority that waste management measures concerning PCB waste are implemented in accordance with the relevant legislation with the aim of further reducing the presence of PCBs in Ireland. This includes the EPA and local authorities working actively with PCB holdings on the national PCB inventory to ensure they are meeting their obligations for PCB disposal or decontamination.

PCBs are a group of aromatic chlorinated organic compounds which share a common biphenyl molecular structure. There are 209 possible PCB compounds and some have been commercially produced and sold as pure oil or in equivalent form from around 1929. It is estimated that approximately one million tonnes of PCBs were produced worldwide (EPA, 2008b). Concern over the toxicity and persistence of PCBs led to restrictions on their marketing and use, particularly for open applications, in Europe and America in the early 1970s. However, the use of PCBs in closed systems was permitted up until the late 1970s in the USA and into the 1980s in Europe.

In the EU, the marketing and use of PCBs came under legislative control in 1989[24] which included the requirement that preparation, including waste oils, with PCB content higher than 0.005% by weight (50mgkg^{-1}) may not be used.

As well as intentional production and use, PCBs may also be formed as an unintentional by-product, specifically as a result of combustion processes. This is further discussed under Section 4 in relation to unintentional POPs.

[24] Council Directive 89/677/EEC of 21 December 1989 amending for the eighth time Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the member states relating to restrictions on the marketing and use of certain dangerous substances and preparations

3.2.1 PCB production and use

PCBs were used in a wide range of applications due to their thermal and electrical insulation properties including:

- *Open applications:* use as heat exchange fluids, hydraulic oils, lubricating oils and as additives in paints, plastics, solvents, adhesives and cements.

- *Closed applications:* use as insulating fluid in electrical transformers, capacitors, power factor correction units, lighting ballasts, vacuum pumps and submersible pumps.

There is no information available on the actual amount of PCBs produced or imported into Ireland however equipment such as electrical transformers have previously been manufactured within the State. Commercial PCBs were sold under a variety of different trade names.

Inspection of an Electrical Transformer

3.2.2 PCB waste management and stockpiles

As a result of the ban and control on PCBs in the late 1980s there was a significant amount of PCBs sent for disposal in the early 1990s. The Waste Management (Hazardous Waste) Regulations 1998[25], implement provisions of the European PCB Directive[26] which set out the requirements in terms of disposing of PCBs and registering holdings of PCB contaminated materials and equipment.

[25] Statutory Instrument 163 of 1998
[26] Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)

The regulations require that holders of PCBs or PCB contaminated materials containing an aggregate volume of more than a total of 5 litres of PCB contaminated materials (referred to as large PCB holdings) give notice to the EPA of such PCB holdings on an annual basis. Equipment contaminated by materials with PCB concentrations greater than 500 $mgkg^{-1}$ and containing an aggregate volume of more than 5 litres of such material were to be decontaminated or disposed of in an environmentally sound manner by their holders prior to 31st December 2010. Equipment contaminated by materials with PCB concentrations of between 50 $mgkg^{-1}$ and 500 $mgkg^{-1}$ could be retained in use but must be disposed of in an environmentally sound manner at the end of its useful life. Any equipment or materials which are reasonably suspected of containing PCBs are assumed to contain PCBs unless otherwise proven and until such time, they are included in the national PCB inventory.

The regulations also require that the national inventory of PCB holdings be prepared by the EPA. The EPA has maintained this inventory since initial work undertaken in 2001 and has continued to complete PCB surveys and inspections that have formed the basis for creating and updating the national PCB inventory. This work is continuing to identify new holdings of equipment suspected to contain PCBs.

A breakdown of the recent national PCB inventory is detailed in Table 9.

Table 9 - 2012 PCB Inventory

2012 PCB Inventory		
	No. of Holdings	**Litres**
Confirmed large holding	27	11,479
Suspect large holding	90	32, 529
Total	**117**	**44, 008**

Figure 4 illustrates the trend of the national PCB inventory over the past decade. The initial trend shows significant increases up to 2010 since the inventory was first devised due to a number of reasons including:

- increased targeted PCB surveys by the EPA from 2007 onwards;
- an increased awareness of facilities in the identification of equipment with the potential to contain PCBs; and
- increased accuracy in estimating volumes of PCBs in suspected electrical equipment.

From 2010, there has been a significant decrease in the national PCB inventory, which is largely attributed to the 31st December 2010 deadline for certain PCB contaminated equipment disposal or decontamination.

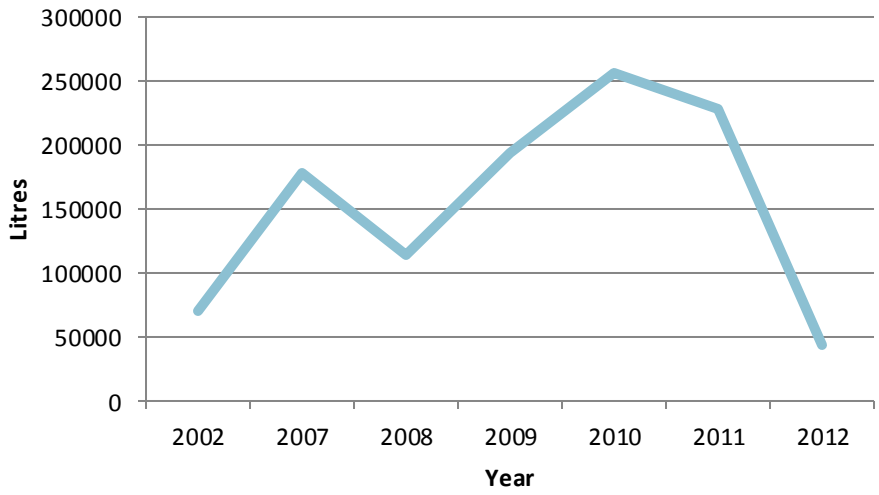


Figure 4 - Trend in confirmed and suspect PCB holdings from 2002 to 2012

The EPA and local authorities are in on-going communication with all suspect holdings requesting them to confirm their plans for the removal of all suspect equipment or the provision of analytical and/or manufacturers information to confirm equipment PCB contamination status. Work to continue the downward trend in PCB holdings will be a priority action in this plan.

Additional work has also been done on developing guidance for potential PCB holders to enable them to correctly survey their sites. Guidance on the appropriate disposal and decontamination of PCB contaminated equipment and waste is being finalised by the EPA and will soon be available.

Waste PCB capacitors stored in a drum for onward waste management

Article 5 of the EU POPs Regulation requires holders of stockpiles which consists of or contains any substance listed in Annexes I or II for which no use is permitted to manage that stockpile as waste. The EPA and local authorities are working actively with confirmed holdings on the national inventory to ensure that they are aware of their obligations to comply with the disposal requirements of the PCB Directive. Due to the absence of the required specialist waste management infrastructure for PCB waste in Ireland, such waste is typically exported as hazardous waste under transfrontier shipment procedures for destruction or irreversible transformation in accordance with legislative requirements.

3.2.3 PCBs in food

The Department of Agriculture, Food and the Marine's residue control programme includes the monitoring of certain PCBs in food of animal origin and in egg, milk and honey samples. So-called marker PCBs[27] are used as indicators of the total PCB content representing commercial mixtures. Food of animal origin under the monitoring programme include bovine, equine, ovine, porcine, poultry and venison. The annual number of samples has typically ranged from 5 to 130 samples depending on the animal type.

The PCBs monitored have been detected in very few samples under the residue control programme. No concentration level above the laboratory analytical limit of detection was found in egg, milk and honey samples over the monitoring period 2004-2009. Detections of trace levels of PCBs were found in a porcine, ovine and poultry sample in 2005, 2007 and 2008 respectively but these were not considered to be significant. In 2008, highly elevated

[27] PCB congeners 28, 52, 101, 118, 138, 153 and 180

levels were detected in a porcine sample which led to an investigation into a pork contamination incident as described below.

Case Study – 2008 Pork Contamination Incident

In 2008 unusually high PCB congener residues were found in a pork sample. The presence of these PCB congeners at the levels found triggered an investigation which confirmed dioxins in Irish pork. A total of 360 feed, porcine and bovine samples were analysed to ensure that all contaminated product was removed from the food chain and to confirm the safety of new product placed on the market. Available evidence suggested that the incident occurred as a result of PCB contaminated fuel being used in an oil-fired burner used to dry animal feed. The incomplete combustion of PCBs gives rise to chlorinated dioxins. Analysis of pork products and slurries from those farms, where the contaminated feed was used, indicated that the levels of dioxins and PCBs were well below the levels that would classify them as POPs wastes under the EU POPs Regulation.

In 2009 as part of a follow up control programme, 213 feed and cereal samples were analysed by the Department of Agriculture, Food and the Marine for PCB content. No PCB residues were detected in the samples analysed (DAFF, 2010).

In the immediate aftermath of the 2008 incident, an inter-agency review group was established to carry out a complete review of, and report on, all aspects relevant to the incident (Wall, 2009). The Department of Agriculture, Food and the Marine set up a working group in 2010 to implement the recommendations of the inter agency review group report.

The Department of Agriculture, Food and the Marine also has an annual programme in place for the monitoring of PCBs and dioxins in animal feed. Other than the feed linked to the 2008 dioxin in pork incident and an occasional isolated case the levels found are generally below the maximum levels set out in EU legislation (Directive 2002/32/EC[28] as amended). The Department of Agriculture, Food and the Marine has substantially increased (tripled) the numbers of animal feed samples tested for PCBs and dioxins since the pork contamination incident in 2008, currently testing 250 samples annually.

The FSAI carries out monitoring of PCBs in a number of different food types. These include the dioxin-like PCBs and the non-dioxin-like PCBs including the marker PCBs. Results obtained for the dioxin-like PCB are provided in Section 4. Food legislation has recently

[28] Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on undesirable substances in animal feed

established maximum limits for non-dioxin like PCBs (6 marker PCBs)[29]. The levels of marker PCBs in a number of different food types reported by the FSAI are shown in Table 10.

Refer to Glossary of Terms for further explanation on the different forms of dioxins and PCBs including marker PCBs.

Table 10 – Concentration levels of PCBs[30] found in main food groups under FSAI monitoring between 2003 and 2010

	2003		2004		2005		2006		2010	
Food Group	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
µgkg $^{-1}$ whole weight										
Cereals	0.11	0.12								
Fish	5.30	25.56	0.00	23.93					0.07	18.33
Fruit	0.07	0.07								
Vegetables	0.07	0.07								
Food Supplements					0.27	148.59				
µgkg $^{-1}$ fat weight										
Carcass Fat	0.23	2.78					0.28	5.01		
Offal	0.66	3.34			0.50	3.53	0.41	6.26		
Fats & Oil	0.37	1.16								
Dairy	0.78	1.35			0.52	2.63	0.31	1.25		
Eggs	1.12	275.94					0.48	30.78		
Soup	0.47	0.47								

Source: Data from FSAI 2004 – 2010 & personal communication from FSAI

Note: Results are expressed in range of upperbound levels (<limit of quantification/detection = limit of quantification /detection). The 2003 high result for eggs was attributed to one organic egg sample (FSAI, 2004b). The 2006 result for eggs was traced back to the use of a particular paint in the egg lobby of the house as the source of the isolated high level (FSAI, 2010a).

Levels were found to be generally low with the exception of isolated egg samples in 2003 and 2006 as shown in Table 10. Additional information in relation to the sampling and analysis of the various food groups is available in FSAI publications and from their website (www.fsai.ie).

The Marine Institute monitors marker PCBs in seafood produced in Ireland or landed at Irish ports and implement occasional surveys of dioxin-like PCBs. PCBs are routinely detected in fisheries products, with highest levels in oily fish and long lived fish. Levels measured consistently comply with new limits for PCBs in seafood as set in Commission Regulation (EU) 1259 of 2011 (McGovern *et al*, 2011b).

[29] COMMISSION REGULATION (EU) No 1259/2011 of 2 December 2011 amending Regulation (EC) No 1881/2006 as regards maximum levels for dioxins, dioxin-like PCBs and non dioxin-like PCBs in foodstuffs

[30] Sum of the marker PCB congeners 28, 52, 101, 118, 138, 153 and 180

3.2.4 PCBs in the environment

PCBs have been monitored under various monitoring programmes for a number of years. In general PCBs have been found at low levels and their findings typically reflect residual environmental pollution associated with diffuse historical sources.

3.2.4.1 PCBs in water and marine environment

PCBs (marker PCBs) were monitored as part of the Water Framework Directive screening programme which ran from 2005 to 2006. PCBs were detected in water, sediment and biota samples and the range of concentration levels are shown in Table 11. The more volatile PCB compounds (congeners) were found in water samples in concentrations ranging from 0.002 μgl^{-1} to 0.064 μgl^{-1}. PCBs in sediment and biota samples were found in concentrations up to 138 μgkg^{-1} and 126 μgkg^{-1} dry weight respectively. PCBs are not currently listed as priority substances and do not have associated environmental quality standards. Dioxin-like PCBs are currently being proposed for inclusion in the list of priority hazardous substances under the Water Framework Directive.

Table 11 – Range of concentration levels of Sum 7 Markers PCBs detected under 2005/2006 Water Framework Directive Screening Programme

Media	No of samples	No of detections	Sum 7 Marker PCBs
Water	327	132	0.002 - 0.10 μgl^{-1}
Sediment	24	16	0.50 - 138 μgkg^{-1} dw
Biota	21	21	9.6 - 126 μgkg^{-1} dw

Source: Data from TNO, 2008a, 2008b

The Marine Institute's assessment of hazardous substances for the monitoring and classification of transitional and coastal waters included an assessment of PCBs in seawater and shellfish. Different PCB congeners exhibit different toxicities and consequently Environmental Assessment Criteria have been established for individual PCB congeners (McGovern *et al,* 2011a). Some PCB compounds have a dioxin-like toxicity (e.g.: PCB 118) and a very low Environmental Assessment Criteria has been established for these in shellfish.

In general PCB concentrations are found to be low in Irish transitional and coastal waters. PCBs were not detected in seawater samples. In shellfish PCB concentrations were typically found to be higher close to urban/developed areas. The Environmental Assessment Criteria

established for PCB 118 has been exceeded in a number of samples according to the Marine Institute's assessment. The Marine Institute indicate these exceedances may reflect residual environmental pollution associated with diffuse historical sources (e.g. harbour) and may not be due to local or recent PCB contamination.

Other measured PCB congeners tended not to exceed relevant Environmental Assessment Criteria. In terms of trend in PCB contamination in the marine environment, the levels of PCBs were found to be decreasing.

As outlined under Section 3.2.3, the Marine Institute monitors marker PCBs in seafood produced in Ireland or landed at Irish ports and implement occasional surveys of dioxin-like PCBs. Levels measured consistently comply with limits for PCBs in seafood.

3.2.4.2 PCBs in soil

Limited environmental monitoring of PCBs in soils in Ireland has been carried out. The study on pollutants in soils in the south eastern region of Ireland (McGrath & McCormack, 1999) indicated that levels for PCBs in 73 soils examined were consistently low indicating no serious addition of this material by spillage to soil and it is indicated that the narrow range of values (1.2-6.8 μgkg^{-1}) was consistent with adsorption from the atmosphere.

The Geological Survey of Ireland completed a recent baseline survey of heavy metals and organic chemicals in topsoils in the greater Dublin area which included the analysis of PCBs. Sample locations were chosen randomly to give an overview of baseline conditions in the city. Of the 1058 samples taken, a subset of 194 samples were analysed for PCBs. The results indicate isolated, low level detections of PCBs in Dublin, mainly in the city centre. The PCB compositions in soils indicate that contamination is probably associated with historical industrial sources and old paint rather than modern, active sources (Glennon *et al* 2012).

3.2.4.3 PCBs in air

The Global Atmospheric Sampling project in which Ireland participates, includes the monitoring of PCBs. In 2005 concentrations in air were found to be low and in the range of 16 -74 pgm^{-3}.

The EPA's transboundary air pollution research into the influence of long range transboundary air pollution on Irish surface waters and soils includes PCB monitoring. This research is expected to be published in the near future.

3.3 Polybrominated diphenyl ethers (Tetra, Penta, Hexa, Hepta bromodiphenyl ethers)

SUMMARY ASSESSMENT OF POP POLYBROMINATED DIPHENYL ETHERS (PBDES) IN IRELAND

PBDEs are a group of flame retardants that have previously been used in many applications from automobiles to household upholstery. They have been banned for a number of years in the EU but may still be present in certain longer life applications such as vehicles and electrical equipment that have yet to enter the waste stream.

In general PBDEs have not been found in significant concentrations in food or in the Irish environment however the fact that they are still in various consumer products that have not reached the end of their life means there is still a risk for release and emissions of PBDEs into the environment if they are not appropriately managed when they eventually enter the waste stream.

Monitoring of PBDEs in food and the environment will continue to be a priority due to their previous widespread use in certain products. Studies have been prepared at EU and national level to obtain a better understanding of the presence of PBDEs in various waste streams. Based on limited monitoring to date in Ireland, certain plastics in electronics (e.g.: CRT plastics of TVs and monitors manufactured prior to 2003) and shredder residue resulting from the treatment of end of life vehicles contain PBDEs at certain concentrations.

Polybrominated diphenyl ethers (PBDEs) are a group of brominated flame retardants, which have been used in various applications to reduce fire risk such as vehicles, upholstery, furniture, textiles and electrical and electronic equipment. PBDEs were typically produced in three commercial forms; pentabromodiphenyl ether, octabromodiphenyl ether and decabromodiphenyl ether (decabromodiphenyl ether is not listed as a POP).

Commercial pentabromodiphenyl ether and octabromodiphenyl ether are both commercial mixtures of various brominated diphenyl ethers (BDEs) and were listed substances for elimination under the Stockholm Convention in May 2009. The following specific BDEs have been listed under the Stockholm Convention:

- TetraBDE
- PentaBDE

These are mainly present in Commercial PentaBDE.

- HexaBDE
- HeptaBDE

These are mainly present in Commercial OctaBDE.

As a result of the listing under the Stockholm Convention in May 2009, the BDEs listed above were included under the EU POPs Regulation in August 2010. Under the EU POPs Regulation, without prejudice to electrical and electronic equipment within the scope of the Restriction of certain Hazardous Substances Directive[31], the production, placing on the market and use is allowed for articles and preparations containing concentrations below 0.1 % (1000 $mgkg^{-1}$) of each BDE listed by weight when produced partially or fully from recycled materials or materials from waste prepared for re-use.

3.3.1 PBDE production and use

Commercial PentaBDE and OctaBDE are no longer produced in the EU and their uses have been restricted since 2004 as result of EU Legislation[32]. Restrictions were then transferred into REACH legislation[33], whereby pentaBDE and octaBDE derivatives were not to be placed on the EU market or used as a substance or a constituent of other substances (in the case of OctaBDE) or in mixtures of concentrations higher than 0.1% (1000 $mgkg^{-1}$) by weight. The same applied for finished articles, which were not to be placed on the EU market if they, or flame-retardant parts thereof, contained the substance in concentrations higher than 0.1% (1000 $mgkg^{-1}$) by weight. Under the Restriction of certain Hazardous Substances Directive, the use of PBDEs in specified electrical and electronic equipment was allowed up to a maximum concentration value of 0.1% by weight in homogeneous materials from 1st July 2006. The new recast of the Restriction of certain Hazardous Substances Directive[34] maintains these maximum concentration values for PBDEs but will broaden the scope so that it will apply to more categories of electrical and electronic equipment.

Commerical PentaBDE was previously used in a number of applications including electrical and electronic appliances, components in transport vehicles, building materials, textiles and packaging (UNEP, 2006a). According to a recent study commissioned by the European

[31] Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

[32] Council Directive of 27 July 1976 on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations (76/769/EEC). Council Directive 76/769/EEC and all its amending directives were repealed with effect from 1st June 2009, and replaced by Title VIII and Annex XVII of the EU REACH Regulation No. 1907/2006, as amended.

[33] Regulation (EC) No 552/2009 of 22 June 2009 amending Regulation (EC) No 1907/2006

[34] Directive 2011/65/EU of the European parliament and of the council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)

Commission, approximately 95% of Commercial PentaBDE in Europe was used in flexible polyurethane (PUR) foams which in turn were mainly used for the production of automotive and upholstery applications (BiPRO, 2011). PUR foam was used in various automotive applications including seating, head rests, car ceilings, steering wheels, acoustic management systems, dashboards and door panels. In soft furnishings Commercial PentaBDE was also used in upholstered furniture and mattresses.

The main historic use of Commercial OctaBDE was in acrylonitrilebutadiene-styrene (ABS) polymers used in electrical equipment such as computer and TV monitors.

3.3.2 PBDE waste management and stockpiles

The European Commission recently commissioned a study to evaluate existing data on the new POPs (e.g.: PBDEs) and candidate POPs[35], and to assess impacts of proposed POPs concentration limits on waste management. This study was published in 2011[36] and based on its findings it is possible that wastes including WEEE plastics, foams from end of life vehicles and certain bulky wastes such as specific soft furnishings that contain certain flame retardants above a certain concentration threshold may fall within the definition of POPs waste.

Waste containing Commercial Penta BDE

The 2011 BiPRO study has indicated that for Commercial PentaBDE, longer life products such as PUR foams in cars manufactured prior to 2000 and in soft furnishings such as upholstery that may contain Commercial PentaBDE may still be in use. The report estimates that 92% of the total accumulated Commercial PentaBDE in finished articles in the EU has already been subject to specific waste treatment operations and around 8% of the substance accumulated in automotive and upholstery applications remains for treatment in the upcoming years. The report assumes a typical 10

[35] nominated substances that are currently being assessed for POP characteristics
[36] http://ec.europa.eu/environment/waste/studies/pdf/POP_Waste_2011.pdf

year lifespan for upholstery and 16 years for automobile applications and therefore estimates that such products potentially containing Commercial PentaBDE may continue to enter the waste stream until 2014 and 2016 respectively.

In Ireland there is the potential for PUR foams containing Commercial PentaBDE from end of life vehicles to enter the waste stream. Following depollution at authorised treatment facilities, end of life vehicles are typically sent to metal shredder facilities for metal recycling and recovery. There are currently three metal shredder facilities operating in Ireland. After removal of materials during the shredding process a shredder residue is produced at the end of the process which is typically a combination of plastics, textiles, glass and metals which may not have been extracted during the process.

In 2010 and 2011, the EPA organised limited sampling and analysis of Irish shredder residues to determine the presence of the BDEs that have been listed under the EU POPs Regulation. The majority of the levels of BDEs from analysis were found at very low concentrations or not detected. Some samples indicated concentration levels above low POP concentration limits currently being proposed in the study that was commissioned by the EU Commission. In the case of soft furnishings such as mattresses and upholstery, these are typically managed as bulky waste and have been sent to landfill or recovered as solid recovered fuel. In December 2011 the EPA organised some very limited sampling and analysis of bulky waste including carpets, mattresses and upholstery (e.g.: sofas) to identify the presence of BDEs. The study did not detect levels of POP BDEs in the wastes sampled.

Waste containing Commercial Octa BDE

The main occurrence of Commercial OctaBDE has been in the housings/casings of office equipment and business machines and in particular the plastic housing of cathode ray tubes in computer and TV monitors that were manufactured prior to 2003. In Ireland waste electrical and electronic equipment (WEEE) is subject to the requirements of the WEEE

Directive[37] which requires the separation of plastic containing brominated flame retardant plastics from WEEE. Currently a large proportion of waste computer and TV monitors are collected and sent to a WEEE processing facility in Ireland where the plastics are separated out and sent on to a plastics recycling company for onward recycling. In 2011, the EPA carried out some limited sampling of WEEE plastics from computer and TV monitors to determine the presence of BDEs. The results indicated a range of concentrations levels of POP PBDEs including a small number of samples which indicated a concentration level above the proposed low POP concentration limits set out in the study commissioned by the European Commission. Ireland will continue to participate in EU discussions on proposals leading to control measures concerning waste containing POP BDEs.

Investigations and consultation on the implementation of appropriate mechanisms for effective screening, separation and handling of waste containing POP brominated flame retardants will be carried out which will involve input from various stakeholders.

3.3.3 PBDEs in food

In recent years PBDEs have been monitored in a variety of food available on the Irish market, including meat, offal, dairy products, fruit and vegetables. Table 12 provides an overview of levels found in various groups from studies carried out between 2003 and 2010. Highest levels were found in fish oil containing supplements, with a maximum level found of 15.5 μgkg^{-1} fat weight. A Tolerable Intake Level (tolerable daily or weekly intake) has not yet been determined for PBDEs by the European Food Safety Authority, because there is as yet insufficient information available on their toxicity and their occurrence in food. However the most recent study by the FSAI (FSAI, 2010a) has indicated that the Irish population's dietary exposure to PBDEs appears to be low and studies have indicated that exposure to PBDEs in Ireland is similar to that observed in other EU countries.

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

Table 12 – PBDE concentration levels in various food groups under FSAI monitoring between 2003 and 2010

Food group	2003		2004		2005		2006		2008		2010	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
μgkg^{-1} whole weight												
Cereals	0.2	0.3										
Fats and Oils	0.2	0.8										
Fish			0.3	5.1							0.03	2.4
Fruit	0.2	0.2										
Vegetables	0.2	0.2										
μgkg^{-1} fat weight												
Carcass fat	0.8	2.2					0.3	2.9				
Dairy	0.9	1.1			0.3	1.5	0.2	3.0	0.3	1.9		
Eggs	1.2	1.5					0.5	1.9				
Liver	1.0	1.8			0.4	2.1	0.5	2.9				
Soup	0.9	0.9										
Supplements					0.2	15.5						

Source: Data from FSAI publications between 2004 & 2010 and personal communication from FSAI

Note: Range of upperbound sum of 16 BDE congeners measured in all surveys: 17, 28, 47, 49, 66, 71, 77, 85, 99, 100, 119, 126, 138, 153, 154, 183

3.3.4 PBDEs in the environment

In view of increased international awareness of the issue of the presence in the environment of brominated flame retardants, PBDEs have been monitored in the Irish environment in recent years, however limited information is available on PBDEs in soil and air.

3.3.4.1 PBDEs in water and marine environment

PentaBDE and octaBDE mixes were among a suite of parameters that were analysed for in 2005/2006 as part of a Water Framework Directive screening programme

The number of samples and range of results are presented in Table 13.

Table 13 – Range of concentrations levels of PentaBDE and OctaBDE found during the 2005/2006 Water Framework Directive Screening programme

Media	No of Samples	Sum diphenyl ether, pentabromo derivative		Sum diphenyl ether, octabromo derivative	
		No of detections	Range of concentration levels	No of detections	Range of concentration levels
Water*	327	143	0.001-0.036 μgl^{-1}	2	0.009-0.0034 μgl^{-1}
Sediment	24	9	0.3-4.6 μgkg^{-1} dry weight	0	<Limit of detection (0.20 μgkg^{-1} dry weight)
Biota	21	19	1-25 μgkg^{-1} dry weight	0	<Limit of detection (0.10 μgkg^{-1} dry weight)

Source: Data from TNO, 2008a, 2008b

*It should be noted that there is currently no standardised methodology for the analysis of PBDEs in water to meet Water Framework Directive requirements and therefore the results should be considered with caution.

The Water Framework Directive monitoring surveillance in 2007, 2008 and 2009 included the monitoring of PBDEs in river and lake sites[38]. PBDEs were not found above the level of detection (0.2 μgl^{-1})[39].

PBDEs were also monitored under the Marine Institute monitoring programme and as part of OSPAR assessment. PBDE congeners were detected in mussel samples from Irish coastal waters (Dublin Bay, Cork Harbour, Barrow/Nore/Suir estuary, Shannon Estuary). PentaBDE congeners (BDE 47 and BDE 99) were among the highest concentrations detected amongst others such as BDE 209 (DecaBDE). The concentration level for range of the sum of BDE congeners[40] found in shellfish from Irish coastal waters was 0.45 – 33.7 μgkg^{-1} dry weight (McGovern *et al*, 2011a). Both minimum and maximum values were derived from samples from a sampling station in Cork Harbour. As outlined under Section 3.3.3, monitoring of PBDEs in food including fish is carried out under FSAI monitoring. The FSAI have concluded

[38] The PBDE congeners monitored were specifically PBDE 99 and 100 in 2007 and PBDE 28, 47, 99, 100, 153 & 154 in 2008 and 2009

[39] Available laboratory analytical methods do not currently have the capabilities to detect below the environmental quality standard for brominated diphenylethers in inland surface waters (0.0005 μgl^{-1}) as set out in the Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009)

[40] PBDE congeners 28, 47, 99, 100, 153, 154 which are stipulated in Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council

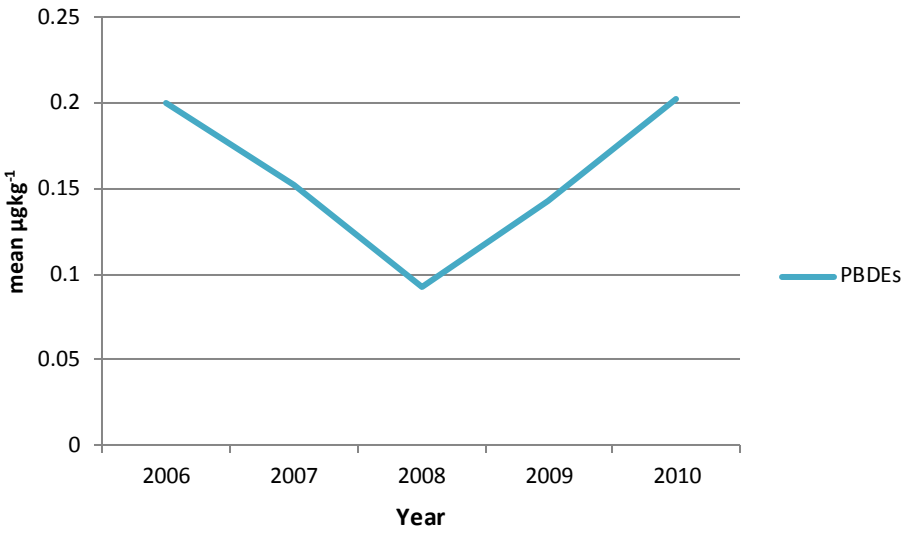
that the Irish population's dietary exposure to PBDEs appears to be low and is similar to that observed in other EU countries.

In 2011 the EPA organised limited sampling and analysis of PBDEs in sewage sludge from waste water treatment plants. No penta, hexa or heptaBDEs were measured above the limit of detection in any of the sludge samples collected from the nine waste water treatment plants. Trace concentrations of tetraBDE within the range of 1-16 μgkg^{-1} were detected in sludge sampled at four waste water treatment plants.

3.3.4.2 PBDEs in air

The EPA regularly publishes reports on dioxin levels in the environment based on levels in cows' milk which includes the monitoring of brominated flame retardants including PBDEs (EPA, 2005-2011b). Given that the primary mechanism for dioxins and other micropollutants entering the food chain is through atmospheric deposition, cows' milk is considered to be a particularly suitable matrix for assessing their presence in the environment, since cows tend to graze over relatively large areas. These compounds, where present, concentrate in the fat content of the milk. Samples are taken in June and July when the cows are expected to be grazing outdoors.

Figure 5 illustrates the trend of PBDEs found in cows' milk between 2006 and 2010. Five samples were taken for each of these years and the levels of PBDEs have been found to be in line with international comparisons. In the 2010 survey, a sample from a single farm in Co. Cork showed higher than normal levels for pentabromodiphenylether. This is under on-going investigation by the FSAI and Department of Agriculture, Food and the Marine.



Source: Data from EPA 2005 – 2011

Figure 5 - Mean sum concentration levels of PBDEs in cows' milk samples under EPA monitoring between 2006 and 2010[41]

The Global Atmospheric Sampling project which Ireland participates in includes the monitoring of PBDEs at a station at Malin Head, Co. Donegal. In 2005 all concentrations were found to be below detection limit with the exception of one reading of 4.1 pgm^{-3}.

The EPA's transboundary air pollution research into the influence of long range transboundary air pollution on Irish surface waters and soils includes PBDE monitoring. This is expected to be published in the near future.

[41] Seventeen PBDE congeners are analysed (BDE-17, 28, 47, 49, 66, 71, 77, 85, 99, 100, 119, 126, 138, 153, 154, 183 and 209)

3.4 Hexabromobiphenyl

SUMMARY ASSESSMENT OF HEXABROMOBIPHENYL IN IRELAND

Hexabromobiphenyl belongs to a group of flame retardants known as polybrominated biphenyls and was used in several products including electronics. Its production and use has ceased for several years and there are no known uses in Ireland. There is limited data on the levels of hexabromobiphenyl in food and the environment however limited information suggests that it is not present in significant amounts.

The EPA will continue to test for polybrominated biphenyls including hexabromobiphenyl in electrical and electronic products to check compliance with the RoHS Directive and will monitor this substance in packaging as part of product testing. The EPA also participates in a European wide RoHS Enforcement Network where any issues of concern such as non-compliant products are notified via the network. Hexabromobiphenyl will also be monitored in food and is subject to reporting under the EPRTR Regulations.

Hexabromobiphenyl like other polybrominated biphenyls (PBBs) has been used as a flame retardant and was mainly used in the 1970s. It was included under substances listed for elimination under the Stockholm Convention in May 2009.

3.4.1 Hexabromobiphenyl production and use

Hexabromobiphenyl has been used as a flame retardant mainly in acrylonitrile-butadiene-styrene (ABS) thermoplastics for, for example, machine housings and coated cables. According to the available data, production and use of hexabromobiphenyl has ceased in most, if not all, countries for a number of years (UNEP, 2006b). No data is available on production and use of hexabromobiphenyl in Ireland.

3.4.2 Hexabromobiphenyl waste management and stockpiles

The use of PBBs has already been subject to restrictions for several years. Under the EU Marketing and Use Directive, items that contained PBBs and could come in contact with skin, such as garments, undergarments and linen, were not allowed to be sold. This restriction was included in full in REACH Legislation[42]. In line with the Restriction of certain Hazardous Substances (RoHS) Directive, there has been a ban on the presence of PBBs in electric and electronic equipment since 1 July 2006. According to available information production of hexabromobiphenyl has ceased some decades ago in most countries and

[42] Regulation 1907 of 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

based on an expected lifetime of 5-10 years for electrical and electronic products it is expected that products containing hexabromobiphenyl have already been disposed of (UNEP, 2007a). Testing of products for PBBs has been undertaken by the EPA as part of product compliance checking under the RoHS Directive. To date no concentration levels of PBBs including hexabromobiphenyl exceeding permitted levels have been found in electrical and electronic equipment. The EPA also participates in a European wide RoHS Enforcement Network where any issues of concern such as non-compliant products are notified via the network. The substance will also be monitored in packaging as part of product testing.

3.4.3 Hexabromobiphenyl in food

A 2010 food monitoring study included an assessment of PBBs (FSAI, 2010a). According to the FSAI, liver is a target organ for POPs, and ruminants in particular tend to store these contaminants in the liver. Several PBBs which are not listed as POPs were detected in carcass fat, liver and eggs. The POP, hexabromobiphenyl congener (PBB 153), was detected in one ovine liver sample.

3.4.4 Hexabromobiphenyl in the environment

There is very limited monitoring information available on hexabromobiphenyl in the Irish environment. EU legislation concerning European Pollutant Release reporting[43] requires the reporting of hexabromobiphenyl exceeding a limit of 0.1 kg/year separately to air, water and land. Between 2007 and 2010 no releases in Ireland of hexabromobiphenyl were reported.

[43] Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC

3.5 Perflourooctane sulfonic acid and its derivatives (PFOS)

SUMMARY ASSESSMENT OF PFOS IN IRELAND

PFOS is an industrial chemical that has been used in the past in several applications such as fire fighting foams and textiles. It is still permitted for certain uses under the EU POPs Regulation and in Ireland it is used under derogation in small amounts within the semi-conductor industry. PFOS has not been found in significant levels in food and the Irish environment based on limited monitoring information. Its potential presence in certain consumer products which have yet to enter the waste stream may present a risk in terms of release to the environment.

The EPA will continue to communicate with the semi-conductor industry regarding progress on the phase out and elimination of PFOS use in its manufacturing process. Such progress will be communicated to the EU Commission and Stockholm Convention Secretariat in line with reporting requirements.

Monitoring of PFOS in food and the environment will continue to be a priority due its previous uses. Studies have been prepared at EU and national level to obtain a better understanding of the presence of PFOS in various waste streams.

Perfluorooctane sulfonic acid and its derivatives (PFOS) are synthetically produced fluorinated organic molecules. They have been used as surface-active agents in a number of different applications (UNEP, 2006c) and have previously been used in many applications including fire fighting foams, carpets, leather/apparel, textiles/upholstery, paper and packaging and coating additives. Many of the uses stopped between 2000 and 2004 due to a voluntary production phase out by one of its major producers (BiPRO, 2011).

3.5.1 PFOS production and use

As a result of the inclusion as substances listed for restriction under the Stockholm Convention in May 2009, PFOS was listed under the EU POPs Regulation in 2010. Prior to amendments to the EU POPs Regulation, PFOS was controlled under chemicals legislation[44] with similar restrictions that have been brought into the EU POPs Regulation. A number of derogations that are included for acceptable purposes for the use of PFOS include:

- wetting agents for use in controlled electroplating systems, until 26 August 2015;
- mist suppressants for non-decorative hard chromium plating in closed loop systems;
- photoresists or anti-reflective coatings for photolithography processes;
- photographic coatings applied to films, papers, or printing plates; and
- hydraulic fluids for aviation.

[44] Regulation (EC) No 552/2009 of 22 June 2009 amending Regulation (EC) No 1907/2006

Where the above derogations relate to activities under the Integrated Pollution Prevention Control Directive the relevant best available techniques for the prevention and minimisation of emissions of PFOS apply. Efforts are required to be undertaken to find safer alternatives for these uses and are required to be reported on. Member States are also required to report to the Commission every four years on progress made to eliminate PFOS.

In relation to the derogated uses, Ireland currently avails of one of the acceptable uses provided for in the EU POPs Regulation. This relates to the use of PFOS for photoresists coatings for photolithography processes. In recent years significant progress in the phase out of PFOS use in such operations have been made. The EPA is in communication with the semi-conductor industry regarding progress on the phase out and elimination of PFOS use in its manufacturing process.

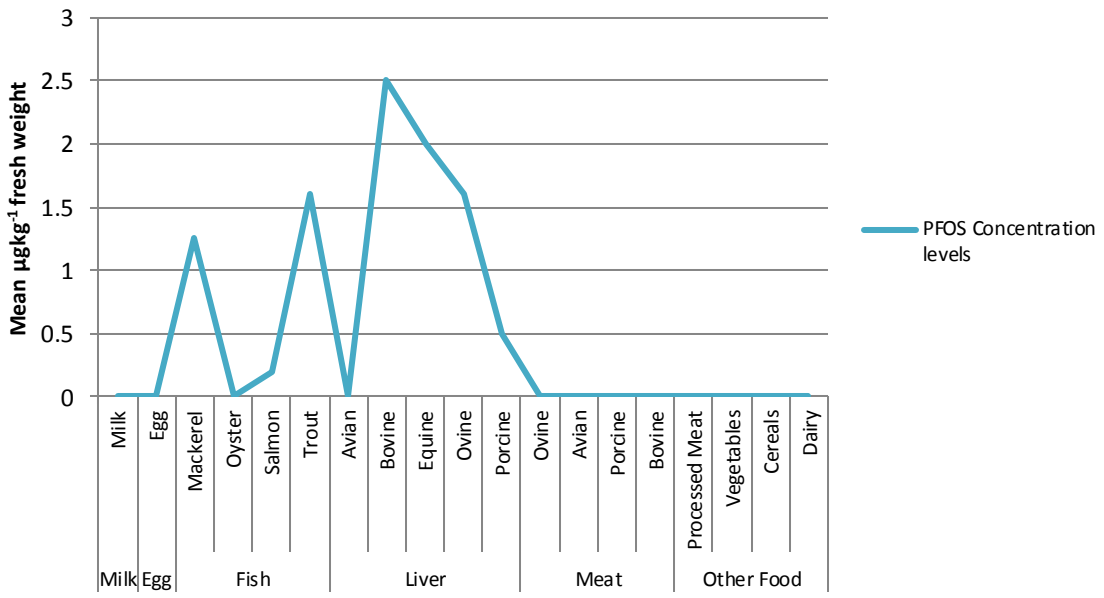
The Stockholm Convention establishes a register for Parties that have specific exemptions for uses as provided for in the Annexes of the Convention. In relation to PFOS sulfonic acid and its derivatives, Annex B of the Convention requires Parties to notify the Secretariat of the Stockholm Convention of the intention to produce and/or use PFOS, its salts and PFOS-F for acceptable purpose(s). The EU, as a Party to the Stockholm Convention, has notified the Convention Secretariat of the use of PFOS for acceptable purposes within the EU.

3.5.2 PFOS waste management and stockpiles

According to BiPRO (2011) products with a short life time that have contained PFOS can be considered as historical uses. Products with a longer lifetime however may still be in use. Products include upholstery made of leather and carpets made of synthetic fibres. In Ireland waste carpets are typically managed as bulky waste sent to landfill or recovered for solid recovered fuel. In December 2011 the EPA organised some limited sampling and analysis of bulky waste to identify the presence of PFOS in upholstery and carpets. The study found very low or undetected levels of PFOS in bulky waste such as carpets, mattresses and upholstery.

3.5.3 PFOS in food

In 2010 the FSAI published an investigation into the levels of perfluoroalkylated substances (PFAS) in Irish meat, offal, eggs, fish, milk and processed products. PFAS substances are the collective name for a very large group of fluorinated compounds which consist of neutral and anionic surface-active compounds with high thermal, chemical and biological inertness. This group of substances includes PFOS.



Source: Data from FSAI, 2010b

Figure 6 – Concentration levels of PFOS in food under FSAI monitoring expressed as µgkg^{-1} fresh weight[45]

The mean PFOS levels found in different food groups are shown in Figure 6. The highest individual levels found were 3 µgkg^{-1} of PFOS in two liver samples. According to the FSAI, PFOS does not follow the pattern of other POPs by partitioning into fatty tissues but instead binds to proteins in the blood and the liver (FSAI, 2010b). The FSAI have concluded that the levels of perfluoroalkylated substances found in this study indicate a low level of contamination in the Irish food chain and are comparable to other countries that have conducted similar studies.

3.5.4 PFOS in the environment

There is limited monitoring information available on PFOS in the Irish environment. In 2011 the EPA organised some limited sampling and analysis of PFOS in sewage sludge from 9 waste water treatment plants. Trace concentrations (1.4 & 2.1 µgkg^{-1}) of PFOS were detected in sludge pellets sampled at two Waste Water Treatment Plants. In samples from seven other plants, PFOS was not detected.

As part of Marine Institute monitoring, perfluorinated compounds including PFOS were assessed. According to McGovern *et al* (2011a), there are no Environmental Assessment

[45] Concentrations shown as 0 µgkg^{-1} indicates levels that were less than the Limit of Quantification (LOQ) of 1 µgkg^{-1}.

Criteria for such compounds at present although OSPAR are proposing to develop such criteria for PFOS.

For available monitoring data, PFOS and PFOA concentrations in 4 mussel samples from the OSPAR trend stations were below the limits of quantification for the analytical method that was used. Five oyster samples from shellfish growing waters sampled in 2007 also showed PFOS concentrations to be below the limit of quantification.

PFOS is currently being proposed for inclusion in the list of priority hazardous substances which will mean that water quality will have to meet associated environmental quality standards under the EU Water Framework Directive.

3.6 Stockpiles and wastes containing POPs

The Stockholm Convention requires Parties to develop appropriate strategies to identify stockpiles, products and articles in use and wastes consisting of, containing or contaminated with POPs substances listed under the Convention. Such stockpiles and wastes are required to be managed in an environmentally sound manner. The Convention requires wastes containing POPs to be disposed of in such a way that the POPs content is destroyed or irreversibly transformed. Waste can be otherwise disposed of in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option, or where the POP content is low (i.e.: below certain concentration limits).

The EU POPs Regulation includes specific obligations in relation to the management of stockpiles and waste on both the holders and competent authority. The requirements in the Convention for waste management have been implemented in Article 7 and Annex IV and V of the EU POPs Regulation, which contain a number of specific waste-management provisions. Low POPs concentration limits are specified in Annex IV of the EU POPs Regulation. Wastes containing POP concentration above low POPs concentration limits are required to be managed as POPs wastes. These limits are included in Table 14.

Table 14 - Low POPs Concentration Limits specified in Annex IV of the EU POPs Regulation

Substance	Low POPs Concentration Limit
Dioxins & Furans	$15\mu g kg^{-1}$
Tetrabromodiphenyl ether	EU concentration limits to be decided
Pentabromodiphenyl ether	
Hexabromodiphenyl ether	
Heptabromodiphenyl ether	
PFOS and its derivatives	
Endosulfan	
All other POPs	$50mg kg^{-1}$

The EU POPs Regulation requires POPs wastes to be disposed of or recovered in such a way as to ensure that the POPs content is destroyed or irreversibly transformed, for example, by:

- physicochemical treatment;
- incineration on land; and
- use as secondary fuel, excluding PCB wastes.

Permitted disposal and recovery operations are set out in Annex V of the EU POPs Regulation.

The EU POPs Regulation also allows certain waste management derogations whereby POP wastes up to certain maximum POP concentration limits, may be subject to limited, specific, alternative treatment methods in the event where destruction or irreversible transformation is not the environmentally preferable option. These limits and alternative treatment methods are listed in Annex V of the EU POPs Regulation. The alternative treatment operations listed (e.g. deep filling in a salt mine) are not available in Ireland but POPs waste can be exported for such waste management operations where available, subject to certain requirements under the EU POPs Regulation.

Further information on specific measures for reducing or eliminating release from stockpiles and wastes containing the POPs are described under the different listed POPs described in this plan.

3.7 Sites contaminated with POPs

Under the Stockholm Convention, Parties shall 'endeavour to develop appropriate strategies' to identify sites contaminated by POPs. The Waste Management Acts 1996 as amended provides for the identification of sites at which waste disposal activities were carried on, including those which involved hazardous waste to a significant extent.

Regulations[46] came into force in Ireland in 2009 which assign rules on liability and when remediation of contaminated land may be carried out. The EPA has developed a number of tools for assessing environmental liability and for the assessment and management of contaminated land and groundwater at IPPC licensed and waste licenced sites in Ireland. Further information is available on the EPA website (http://www.epa.ie/downloads/consultation/contaminated/).

[46] The European Communities (Environmental Liability) Regulations 2008

SECTION 4

4. Unintentionally released POPs and Ireland's Action Plan

Unintentionally formed POPs are not specifically manufactured as commercial substances. Also referred to as unintentional by-products they may be formed inadvertently as a result of certain processes or activities (e.g.: combustion and chemical processes).

Under the Stockholm Convention unintentional POPs are subject to measures to reduce or eliminate their releases. The chemicals currently listed as unintentional POPs under the Stockholm Convention are:

- Polychlorinated dibenzo-p-dioxins and dibenzofurans (dioxins & furans);
- Polychlorinated biphenyls (PCBs);
- Hexachlorobenzene; and
- Pentachlorobenzene.

As a result of being listed under the Stockholm Convention the above chemicals were listed under the EU POPs Regulation as substances subject to release reduction measures. Certain polycyclic aromatic hydrocarbons (PAHs)[47] have also been listed in the EU POPs Regulation as a result of being listed as unintentionally formed substances under the UNECE POPs Protocol.

Article 5 of the Stockholm Convention requires Parties to develop an Action Plan designed to identify, characterise and address the release of unintentional POPs. Specific elements required for the Action Plan include:

i) An evaluation of current and projected releases, including the development and maintenance of source inventories and release estimates, taking into consideration the source categories (listed in Appendices VI & VII of this plan);

ii) An evaluation of the efficacy of the laws and policies of the Party relating to the management of such releases;

iii) Strategies to meet the obligations for developing the action plan taking into account the evaluations in (i) and (ii);

[47] Specifically benzo(a)pyrene, benzo(b) fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-cd) pyrene.

iv) Steps to promote education and training with regard to, and awareness of, those strategies;

v) A review every five years of those strategies and of their success in meeting the obligations of this paragraph; such reviews shall be included in reports submitted pursuant to Article 15 of the Convention on reporting;

vi) A schedule for implementation of the action plan, including for the strategies and measures identified therein.

Parties to the Stockholm Convention are further required to promote the application of available, feasible and practical measures that can give a realistic and meaningful level of release reduction or source elimination of unintentional POPs. Furthermore, the Convention requires Parties to promote the development and, where it deems appropriate, require the use of substitute or modified materials, products and processes to prevent the formation and release of unintentional POPs taking into account the general guidance on prevention and release reduction measures in Annex C of the Convention and guidelines adopted under the Convention.

Parties are also required to ensure the use of best available techniques (BAT) and promote best environmental practices (BEP); for new sources within source categories (listed in Appendix VI) within four years of entry into force of the Convention for it and promote BAT and BEP for existing sources listed under source categories (listed in Appendix VI and VII) and new sources (listed in Appendix VII). Parties may also set release limit values or performance standards in order to fulfil commitments for the use of best available techniques.

4.1 Evaluation of releases of unintentional POPs

SUMMARY ON THE ASSESSMENT OF RELEASES OF UNINTENTIONAL POPS IN IRELAND

Ireland has produced inventories of emissions for releases of dioxins, furans, PCBs and hexachlorobenzene to air, land and water. The most significant POPs in terms of potential sources of unintentional releases are PCBs and dioxin & furans. The main potential sources for these POPs are quite similar being open burning such as accidental burning of vehicles, buildings and backyard burning in addition to emissions from energy such as heat and power generation. For dioxins it is estimated that circa 46% of dioxin emissions to air is attributed to open burning processes and 36% emissions from heat and power generation. Hexachlorobenzene is not considered to be a significant POP in Ireland and its main release is assumed, based on available information, to be as a result of its presence as an impurity in the pesticide chlorothalonil, all of which is imported into Ireland.

Estimated releases of unintentional POPs in 2010				
SUBSTANCE	**Air**	**Land**	**Water**	**Main Sources**
Dioxins & Furans	**16.10 g ITEQ**	**29.2 g ITEQ**	**0.52 g ITEQ**	*Open burning, emissions from heat and power*
PCBs	**17.44 kg**	**124.74 kg**	***No data***	*Open burning, emissions from heat and power, PCB contaminated equipment*
Hexachlorobenzene	**<1.16 kg**	**<0.47 kg**	**<0.016 kg**	*Impurity in pesticide*
Pentachlorobenzene	***No data***	***No data***	***No data***	*No Data (known sources include combustion such as open burning)*

There is uncertainty with some of the data for certain sources and in particular where releases relate to land and water. Assumptions have been made where such gaps exist and the Action Plan will attempt to address such gaps. In addition, pentachlorobenzene releases and projections of future POP emissions will be developed as part of the Action Plan.

Article 5 of the Convention requires an evaluation of current and projected releases of unintentional POPs including the development and maintenance of source inventories and release estimates. Every year the EPA produces an inventory of emissions for a wide range of air pollutants and other substances released into the atmosphere as a requirement of the UNECE Convention on Long Range Transboundary Air Pollution (CLRTAP). The inventory includes the reporting of releases to air of unintentional POPs as listed under the Stockholm Convention (with the exception of pentachlorobenzene) and the UNECE Protocol on POPs (e.g.: certain polycyclic aromatic hydrocarbons).

In order to illustrate the current releases of unintentional POPs for the National Implementation Plan and national reporting requirements under the Stockholm Convention, the releases of unintentional POPs described below have been mapped and reported under the main source categories established in the UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases (UNEP, 2005b). These are listed in Table 15. Subcategories of the main source categories listed are presented in Appendix V.

In 2007 the EPA tendered a project to develop an inventory of POPs in Ireland which includes releases to air, land and water for the period 1990 to 2006. The emission estimates were drawn upon data from measurements and research within Ireland, but are also supplemented by calculations using literature emission factors and available activity data such as industry information in Ireland (Creedon *et al* 2010). For the purpose of this National Implementation Plan, the inventories for releases to land and water have been updated for the years 2007, 2008, 2009 and 2010 in line with the air emission inventories which have been updated yearly to meet requirements under the CLRTAP and have subsequently been mapped to the main source categories listed under UNEP toolkit (Table 15).

It should be noted that limited data exists for several sources of POPs. Assumptions have been made to provide a quantitative estimate of POPs releases with a heavy reliance on available emission factors that are commonly based on international measurement data. When applying these emission factors to Ireland-specific sources, there may be an even greater uncertainty due to the potential differences in process technologies, operating conditions and practices, and pollution control equipment. This lack of data is evident across emissions to all media, but mainly emission sources to land and water. This is further detailed in the inventories report by Creedon *et al,* 2010.

Table 15 - UNEP Toolkit Main Source Categories

Group	Main Source Categories
1	Waste Incineration
2	Ferrous & Non-Ferrous Metal Production
3	Heat & Power Generation
4	Production of Mineral Products
5	Transportation
6	Open Burning Processes
7	Production of Chemicals & Consumer Goods
8	Misc. (e.g. Crematoria, Dry Cleaning)
9	Disposal
10	Potential Hot-Spots (e.g.: PCB containing equipment)

Ireland does not currently have information on projected releases of POPs to air, land and water. It is intended that projections of such releases will be carried out as part of the Action Plan on unintentional POPs.

4.1.1 Dioxin and furan releases

Dioxins are produced unintentionally due to incomplete combustion, as well as during the manufacture of some pesticides and other chlorinated substances. They can be produced from the uncontrolled burning of waste and can also occur during combustion from automotive fuels, peat, coal, and wood. There are 75 different dioxins. Furans which arise from many of the same sources of dioxins are structurally similar to dioxins.

Toxic equivalent factors have been established for dioxins and furan releases as grams International Toxic Equivalent (g-ITEQ) representing the relative toxicity of the compound being measured to the most toxic congener, 2,3,7,8-tetrachlorodibenzo-p-dioxin.

4.1.1.1 Dioxin releases to air

Based on inventory emissions estimated by the EPA, in Ireland, total emissions of dioxins to air in 2010 were estimated to be 16.10 g ITEQ. Figure 7 shows that the main source of releases of dioxins to air is considered to be from open burning processes with over 45% contribution and fuel used for heat and power generation accounting for 36% of dioxin emissions.

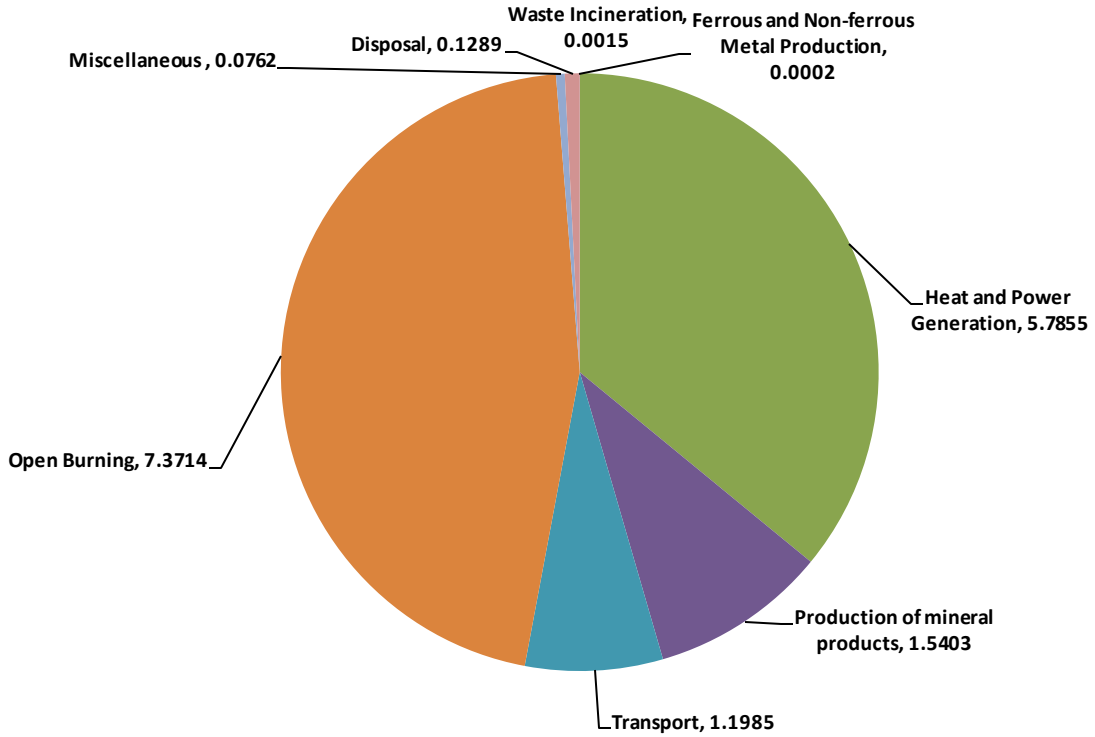


Figure 7 - Estimated dioxin emissions (grams ITEQ) to air in 2010 (Total Emissions – 16.10 g ITEQ)

The main open burning processes that contribute to dioxin releases are accidental burning of vehicles and buildings with approximately 85% contribution from these activities. Such fires are poorly controlled events and, depending on the materials being burned, can lead to significant releases of dioxins and furans. Due to different chemical composition of these materials it is difficult to obtain activity data and apply emission factors correctly. It is estimated that the remainder of dioxin releases under the category of open burning are from combination of domestic burning of waste, burning of farm plastic, wood waste burning on construction sites and bonfires that take place during the Halloween festive period in October of each year.

There is limited data available on open burning practices particularly with regard to domestic burning of waste where it is assumed that these are practices carried out by households that do not receive or avail of a waste collection service. There are other degrees of uncertainty for example the combustion of treated wood used for construction, gardening and furniture, etc. where such wood has been pre-treated with chlorinated fungicides (EPA, 2012a). Similarly domestic bonfires normally include a variety of garden wastes (e.g. wood, leaves, etc.), and their significance with respect to POP emissions is greatly increased in cases where other wastes are added to the bonfires (e.g. plastics).

The next significant source sector with regard to dioxin emissions is considered to be from heat and power generation with 50% of the dioxin releases attributed to residential combustion, and 40% from fossil fuel power plants.

Residential combustion includes household open fireplaces, stoves and boilers with a wide range of fuels from different types of coal (bituminous, anthracite, lignite), peat (sod, briquette), wood, oil, natural gas and LPG. Such combustion activities typically are unabated or have very low abatement compared to other sectors (e.g.: industry) which explains the higher contribution of dioxins from this sector.

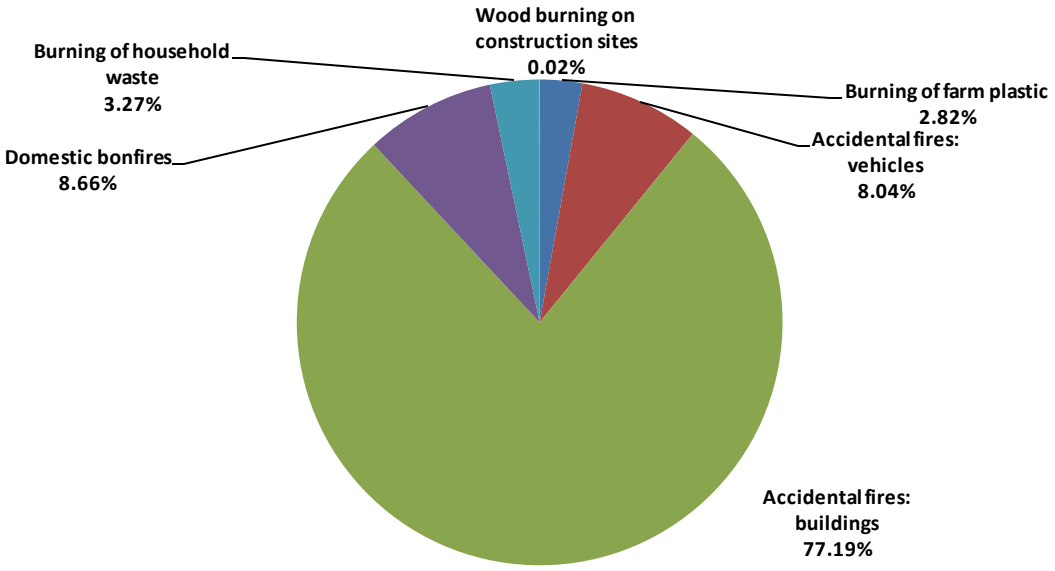


Figure 8 - Percentage contribution of dioxin emissions to air from open waste burning in 2010

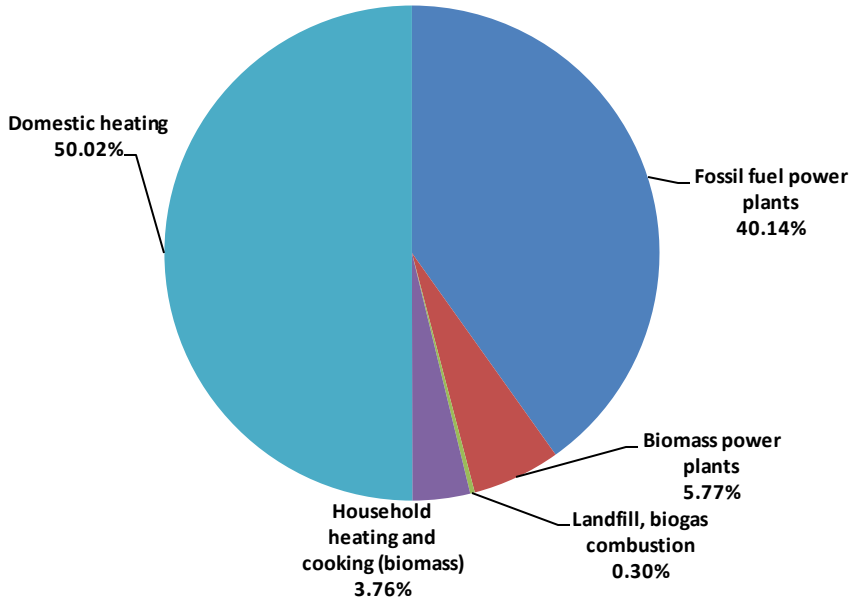


Figure 9 - Percentage contribution of dioxin emissions to air from heat & power generation in 2010

Regarding waste incineration, environmental protection controls (through high temperature combustion, high standards of pollution abatement and strict dioxin emission limits) have greatly reduced the emissions from this sector. In Ireland, there is one municipal waste incinerator currently in operation. This has been in operation since September 2011 and therefore release data included in this plan does not include any emission data from this operation. Currently there are two cement plants which co-incinerate waste and a third cement plant has received a licence for co-incineration. There are also a number of industrial facilities (pharmaceutical) that have on-site incinerators for the purpose of site specific waste management (e.g.: liquid waste and vapours). Two of these plants are also co-incinerating solvent waste in boilers. The estimated releases of dioxins from this category to air in 2010 are comparatively insignificant compared with open burning activities (e.g.: backyard burning, vehicle and building fires) which has contributed up to an estimated 5000 times more dioxin emissions than that of controlled incineration in 2010. The industrial source sectors now have high standards of pollution abatement in order to comply with the Waste Incineration Directive and routine monitoring of emissions is undertaken.

4.1.1.2 Dioxin releases to land and in residue

Total dioxin emissions directly to land were estimated to be 29.2g ITEQ in 2010, a significant portion of which includes residue (e.g.: ashes) to controlled landfill. Emissions of dioxins

directly to land (15.97g ITEQ) are considered to result from disposal of ash from open burning activities, dioxins in compost and the spreading of sewage sludge on land. With the absence of appropriate monitoring data, estimates are primarily based on available international emission factors and further research and monitoring is necessary to improve estimated releases. For example, in the case of sewage sludge, limited monitoring information available suggests that the emission factor currently used may significantly overestimate the dioxin releases via sewage sludge and therefore as part of the action plan (under Section 4.6) further comprehensive testing of sewage sludge will be carried out to try to obtain an appropriate emission factor. The characterisation of waste residues from open and accidental burning and also from controlled burning of some fuels are also not as well understood and, hence, the level of uncertainty in these estimates is higher. Assumptions and methods used to estimate releases to landfill are also uncertain.

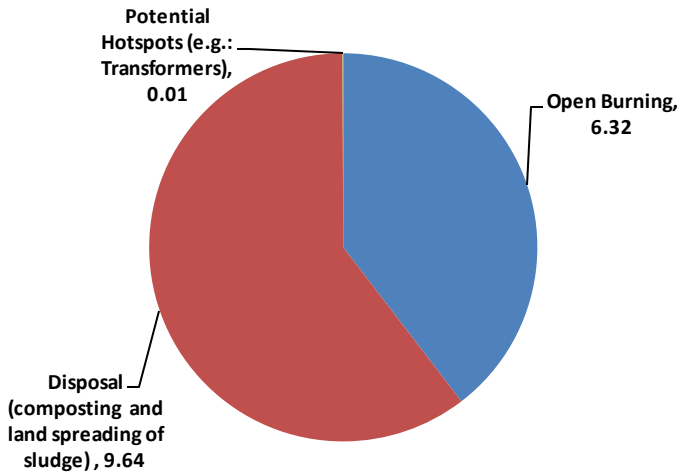


Figure 10 - Estimated dioxin emissions (grams ITEQ) to land (excluding residual dioxins to controlled landfill) in 2010 (Total Emissions – 15.97g ITEQ)

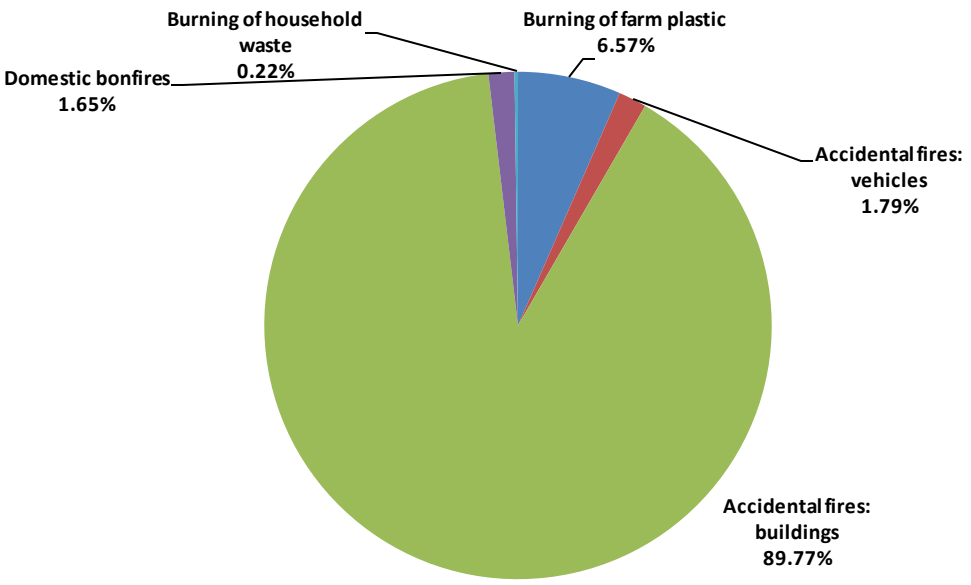


Figure 11 - Percentage contribution of dioxin emissions to land in 2010 from open burning activities

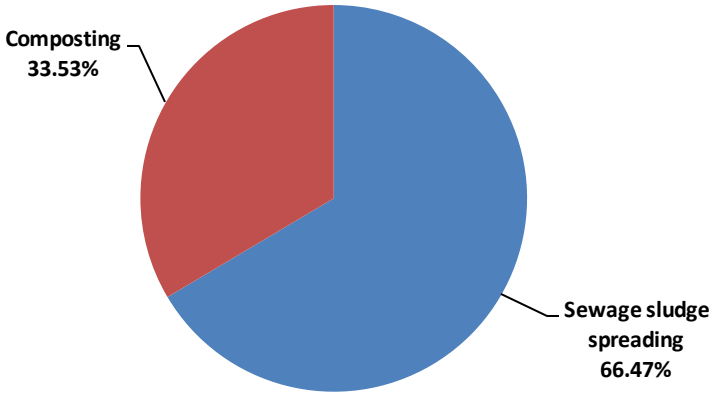


Figure 12 – Percentage contribution of dioxin emissions directly to land in 2010 under disposal category

13.27 g ITEQ of dioxins to land is residue sent to controlled landfill. This is mainly attributed to emission calculations based on the quantity of municipal solid waste sent to controlled landfill in addition to the ashes from combustion activities such as from fossil fuel power plants (combustion of solid fuels to generate electricity, namely coal and peat). Some ash

from coal and peat fired power stations is used in cement production with the remaining sent to associated landfill.

4.1.1.3 Dioxin releases to water

Total emissions to water in 2010 were estimated to be 0.52 g ITEQ. Estimated dioxin emissions to water are considered to be attributed to trace concentrations in effluent from water and sewage sludge treatment and emissions to groundwater from landfill leachate.

Waste oil dumping contributes to dioxin releases to water. Waste oil is subject to waste management requirements and according to Ireland's National Hazardous Waste Management Plan 2008-2012 (EPA, 2008e), collection rates for waste oil from garages are high. The unauthorised use of this waste oil in space heaters has been reported and actions have been taken to prevent this unauthorised use. There is also likely to be a small proportion of motorists that change their own oil that may dispose of the oil to sewer, or unaccounted oil may be disposed to landfill as liquid or on oily rags and containers.

4.1.1.4 Dioxins and furans monitoring in food and the environment

Approximately 90% of human exposure to dioxins and furans results from the consumption of food contaminated with dioxins. They can occur mainly in foodstuffs of animal origin with a high fat content as dioxins and furans accumulate in fatty tissues including meat, fish, eggs and milk (FSAI, 2009).

Seafood is generally considered to be a potential significant contributor to dietary intake of POPs. McGovern et al, (2011b) estimated that dioxin and dioxin-like PCB dietary intake from seafood for an adult Irish seafood consumer accounted for 17% of the Tolerable Weekly Intake. Lipid-rich fish were the primary source of this intake, but given the clear health benefits associated with intake of omega-3 fatty acids in these same species, the benefits of fish consumption were considered to outweigh the risks.

Food safety surveillance coordinated by the FSAI includes the monitoring of dioxins and dioxin like PCBs. In their most recent study, in 2010, on chlorinated and brominated organic pollutants in carcass fat, offal, eggs and milk produced in Ireland, the FSAI stated that dioxins, furans and PCB levels in Irish food are relatively low compared with similar products from more industrialised countries in the European Union and exposure of Irish consumers of Irish food to chlorinated dioxins and furans in food is below the maximum tolerable monthly intake.

In 2002 some fish oil and fish liver oil capsules representing a small percentage of the Irish market were found to have elevated levels of dioxins however the vast majority of the Irish consumers of these products were only being exposed to very low levels of dioxins (FSAI, 2002). Elevated levels were found prior to legislation that was put in place and which established limits. Subsequent monitoring demonstrated compliance with legislative limits.

Most of the food groups that were monitored, for dioxins and dioxin like PCBs, between 2003 and 2010 were found to be at low levels and below limits set out in food legislation as indicated in Tables 16 and 17. Please refer to the FSAI publications for further information in relation to the sampling and analysis of the various food groups.

Table 16 – Concentration levels (WHO TEQ $ngkg^{-1}$) of dioxins in main food groups under FSAI monitoring between 2003 & 2010

Food group	2003		2004		2005		2006		2010	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
$ngkg^{-1}$ whole weight										
Cereals	0.03	0.03								
Fish	0.14	0.82	0.00	0.82					0.03	0.66
Fruit	0.03	0.03								
Vegetables	0.03	0.03								
Food Supplements					0.07	1.51				
$ngkg^{-1}$ fat weight										
Carcass Fat	0.08	0.62					0.07	0.46		
Offal	0.32	4.04			0.50	6.76	0.18	18.38		
Dairy	0.08	0.25			0.20	0.56	0.11	0.27		
Eggs	0.10	2.70					0.13	0.52		
Fats & Oil	0.05	0.24								
Soup	0.12	0.12								

Source: Data from FSAI 2004 – 2010 & personal communication from FSAI.

Note: Ranges that are indicated incorporate various types of food or products within the food group (e.g.: eggs include battery, barn, free range and organic eggs)

As shown in Table 16, dioxins were found at highest concentrations in animal liver, which, due to the nature of the substances tested and the metabolic function of this organ was to be expected (FSAI, 2005). A more recent study has indicated that levels of chlorinated dioxins, furans and dioxin like PCBs in Irish produce were well below existing legal limits with the exception of one sheep liver sample, however, a possible change of legislative limits for animal offal are currently under discussion (FSAI, 2010a).

Table 17 – Concentration levels (WHO TEQ ngkg^{-1}) of sum of dioxin like PCBs[48] and dioxins/furans in main food groups under FSAI monitoring between 2004 and 2010

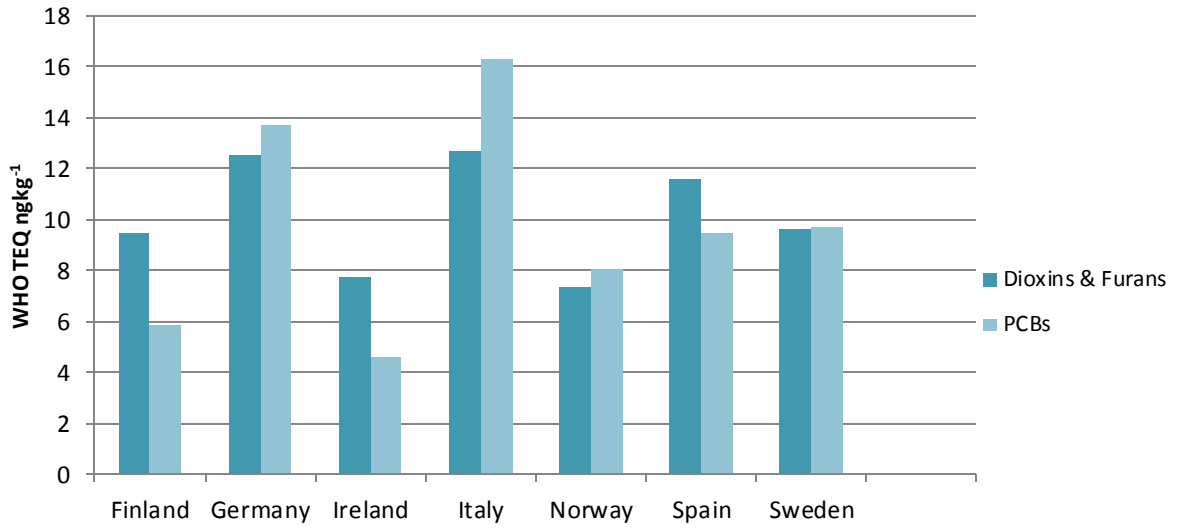
Food group	2003		2004		2005		2006		2010	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
ngkg^{-1} whole weight										
Cereals	0.05	0.06								
Fish	0.69	3.24	0.00	2.86					0.06	2.50
Fruit	0.05	0.05								
Vegetables	0.05	0.05								
Food Supplements					0.25	10.15				
ngkg^{-1} fat weight										
Carcass Fat	0.14	1.23					0.12	0.88		
Offal	0.43	5.46			0.75	8.34	0.25	22.43		
Dairy	0.13	0.50			0.34	0.88	0.22	0.66		
Eggs	0.37	6.63					0.20	0.72		
Fats & Oil	0.09	0.45								
Soup	0.19	0.19								

Source: Data from FSAI 2004- 2010 & personal communication from FSAI.

Note: Ranges that are indicated incorporate various types of food or products within the food group (e.g.: eggs include battery, barn, free range and organic eggs). As indicated under Table 10 the 2003 high result for eggs was attributed to one organic egg sample (FSAI, 2004b).

In 2001 Ireland participated in a World Health Organization (WHO) study of dioxin levels in human breast milk. The study provided baseline data on dioxins levels in the Irish population and an indication of exposure to dioxins present in the Irish environment. Results as illustrated in Figure 13 indicate that Irish median levels of dioxins in human milk are low when compared to levels in a number of other EU countries (van Leeuwen and Malisch, 2002).

[48] Non ortho PCBs 77, 81, 126, 169 and mono-ortho PCBs 105, 114, 118, 123, 156, 157, 167, 189



Source: Data from van Leeuwen and Malisch, 2002

Figure 13 – Median concentration levels of dioxins and furans & dioxin like PCBs in human milk (2001/2002)

In 2010 the FSAI carried out a further breast milk study, to follow up on the results obtained in 2001-2002 and also to establish whether the pork contamination incident that occurred in 2008 had had a detectable impact on dioxins and furans and PCB concentrations in human milk in Ireland (Pratt *et al* 2012). The results showed a downward trend in concentrations of total dioxins and furans and dioxin-like PCBs in Irish breast milk from 2001/2002 to 2010, as shown in Table 18.

Table 18 - Concentration levels (WHO TEQs in pg g^{-1} fat weight) of dioxins, furans & dioxin-like PCBs in pooled milk samples from Ireland, 2002 and 2010

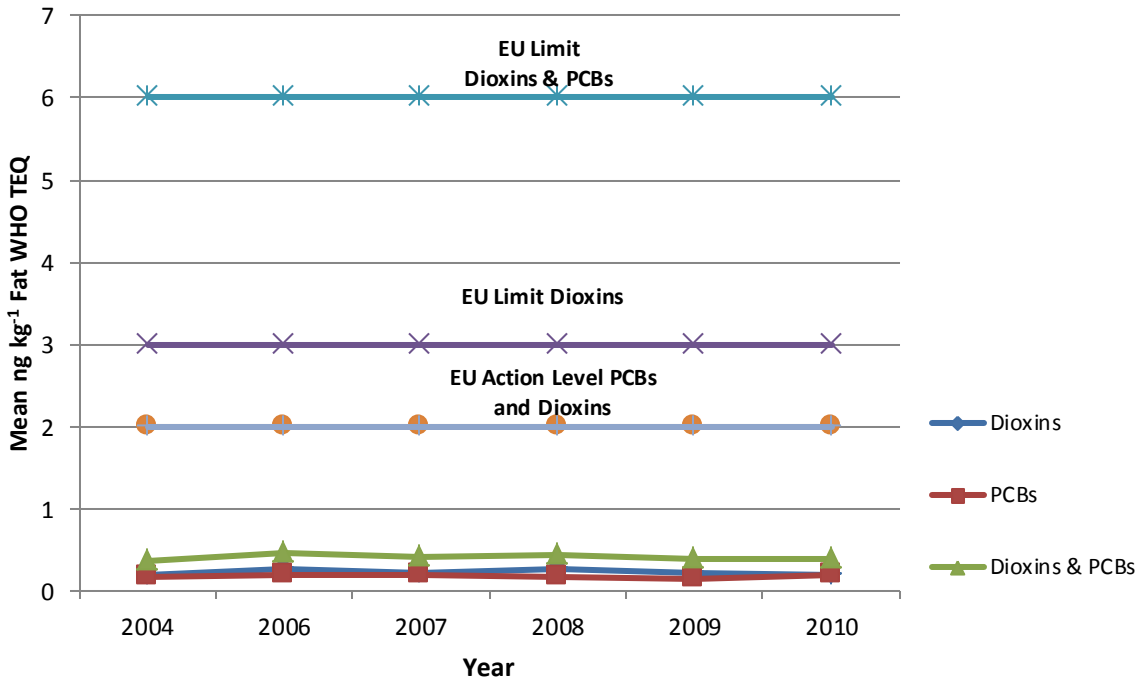
Breast milk samples	Dioxins and Furans	Dioxin-like PCBs	Sum of WHO TEQs
	WHO TEQs in pg g^{-1} fat weight		
Dublin, 2002	8.54	5.19	13.73
Cork, 2002	8.82	4.48	13.3
Wicklow, 2002	6.91	4.66	11.57
Donegal, 2002	6.19	2.72	8.91
Pooled sample from Dublin and Galway, 2010	6.32	3.34	9.66

Source: Data from Pratt *et al*, 2012

4.1.1.5 Dioxin Levels in the Irish environment based on levels in cows' milk

Since 1995 the EPA has undertaken monitoring of dioxin levels in the Irish environment based on dioxin levels in cows' milk. Samples are taken in June and July when the cows are likely to be grazing outdoors. These assessments have been published for the years 1995, 2000, 2004 and annually since 2006 and are available on the EPA website (www.epa.ie).

Sampling stations are used for the sampling of cow's milk include background stations covering the entire country and potential impact stations in areas of perceived potential risk such as areas of higher anthropogenic activity (e.g..: urban environment) or in the vicinity of specific sources.



Source: Data from EPA 2005 – 2011b

Figure 14 - Mean concentration levels of dioxins and PCB in cow's milk fat under EPA monitoring between 2004 and 2010

EU legislation includes limits for dioxins and furans for milk and milk products at 3.0 $ngkg^{-1}$ fat with an action value of 2.0 $ngkg^{-1}$ fat. When PCBs are included the limit is 6.0 $ngkg^{-1}$ fat[49]. There is currently no separate limit for PCBs however there is action level set at 2.0 $ngkg^{-1}$ fat[50]. Figures 14 illustrates the mean levels found for the period 2004 to 2010 for dioxins,

[49] Commission Regulation (EC) No 199/2006 of 3 February 2006 amending Regulation (EC) No 466/2001 setting maximum levels for certain contaminants in foodstuffs as regards dioxins and dioxin-like PCBs

[50] Commission Recommendation of 6 February 2006 on the reduction of the presence of dioxins, furans, and PCBs in feedingstuffs and foodstuffs.

PCBs and dioxins and dioxin like PCBs. Results to date indicate compliance with regulatory limits and mean levels found in all of the Irish surveys are at least an order of magnitude below the EU limits. In addition, a study by O'Donovan *et al* (2011) which examined temporal trends in dioxins, furans and PCB concentration levels in cow's milk from farms adjacent to industrial and chemical installations in Co. Cork found a decrease in concentration levels of these substances over the 15 year study period (1991-2005).

4.1.1.6 Dioxins in water and the marine environment

Under the 2005/2006 screening programme as part of implementation of the Water Framework Directive, dioxins were found in very few samples and at very low levels as indicated in Table 19. Consequently, dioxins were not monitored under the 2007-2009 Water Framework Directive surveillance programme.

Table 19 - Levels of dioxins & furans found during Water Framework Directive screening programme

Media	Sum Dioxins & Furans (TEQ)
Water	0.0011-2.2 pg TEQ/l
Sediment	8.3 $ngkg^{-1}$ dry weight
Biota	2.1-12 $ngkg^{-1}$ dry weight

Source: Data from TNO, 2008a, 2008b

Dioxins, furans and dioxin-like PCBs are currently being proposed for inclusion in the list of priority hazardous substances and associated environmental quality standards under the Water Framework Directive.

Case Study – Investigation of contaminants in European Eel

The occurrence of persistent chlorinated and brominated organic contaminants in the European Eel in Irish waters was investigated (McHugh *et al*, 2010). Samples were taken from five Irish catchments (River Suir, Lough Conn, River Corrib, River Farne and Burrishoole). The analysis looked at levels of dioxins, furans, polychlorinated biphenyls (PCBs), brominated flame retardants and organochlorine pesticides in eel muscle tissue. Elevated dioxins (especially the congener OCDD) were found in eels from the Burrishoole catchment. The study suggested the cause being attributed to a specific catchment source at this location. It has not proved possible to date to definitively identify the source. The study did indicate that with the exception of the elevated levels of dioxins in three samples from one catchment area POP levels in general were low in eels from Irish waters compared to those in other countries. Moreover, as the elevated dioxin congeners were those with lower toxic equivalent factors and as PCB levels were low the total toxic equivalents (dioxins/furans and dioxin like PCB) were well within the EC Maximum Limit in eels set for human consumption purposes (as set out in Regulation 1881/2006 (now amended by Regulation 1259/2011)).

4.1.2 PCB releases

As described in Section 3.2, PCBs were produced industrially for use as dielectric agents in transformers and capacitors, as heat transfer agents, lubricants, plasticisers, flame retardants and waterproofing substances. Potentially significant sources include leaks and losses from electrical transformers and capacitors. Like dioxins, PCBs can be formed during fuel combustion processes, particularly where chlorinated petroleum-based materials are burned at low temperatures. They may be released to soil, water or air at sites at which PCBs were present in products or during the disposal until eventual destruction of the waste such as where PCB contaminated soil, capacitors, transformers or other machinery are handled. Monitoring information in relation to PCBs in food and the environment is detailed under Section 3.2.3 and 3.2.4.

4.1.2.1 PCB releases to air

Total emissions of PCBs to air in 2010 have been estimated to be 17.44kg. Figure 15 shows that, like dioxins, the main sources of PCB emissions to air are open burning processes accounting for 47% of the total and fuel combustion based emissions from heat and power generation accounting for approximately 42%.

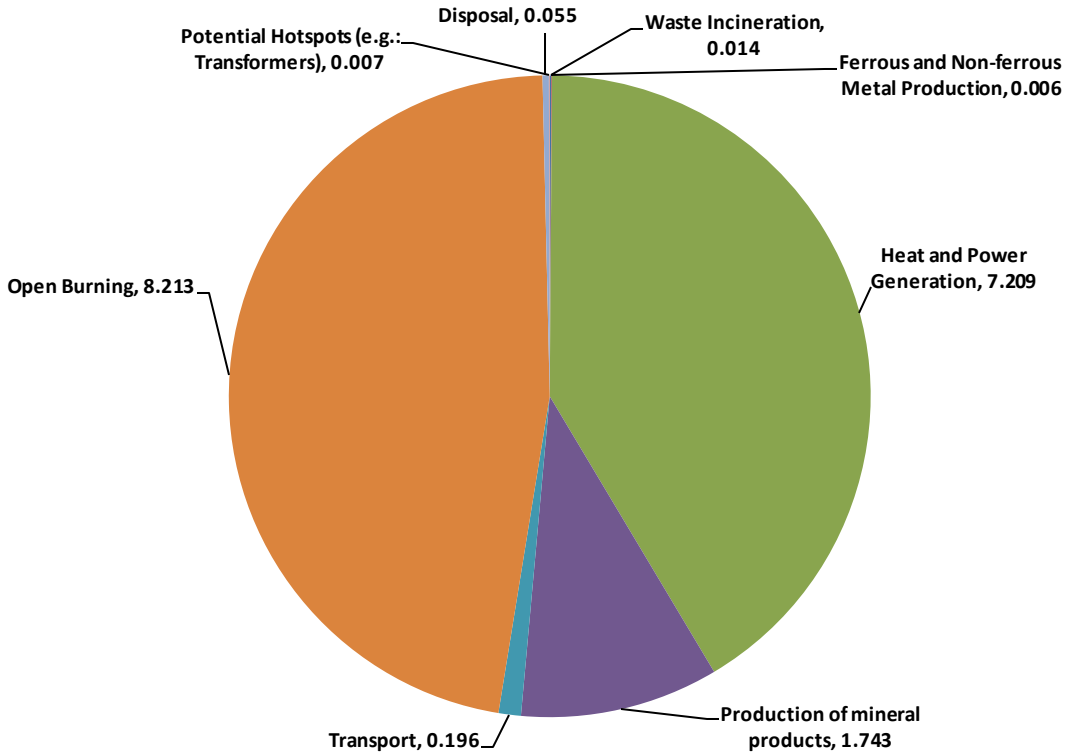


Figure 15 - Estimated PCB emissions (kg) to air in 2010 (Total Emissions - 17.44 kg)

In terms of open burning processes over 87% of PCB emissions to air is attributed to accidental vehicle and building fires with the remainder resulting from a combination of domestic burning of waste, wood waste burning on construction sites, bonfires and burning of farm plastic, as shown in Figure 16. Estimates that have been made are based on available emission factors and assumptions similar to those described under dioxins (e.g.: composition of the waste being burned). In addition the estimates of PCB emissions have predominantly been based on literature emission factors, which tend to be provided for total PCBs. Total PCBs include congeners that do not exhibit the same extent of toxicity as the subset dioxin like PCBs.

In terms of the source sector heat and power generation, the main contributors to PCB emissions are the combustion of fuels in the residential sector and the power generation industry (e.g.: use of peat and coal to generate electricity). Estimates are based on fuel type and use and associated PCB emission factors which also carry a degree of uncertainty. Also for certain fuels such as gas and LPG, there are no available emission factors. It is expected that residential combustion would have a significant contribution due to the absence of abatement. As coal and peat remain an integral part of the energy generation sector, this sector remains a significant contributor in this source category.

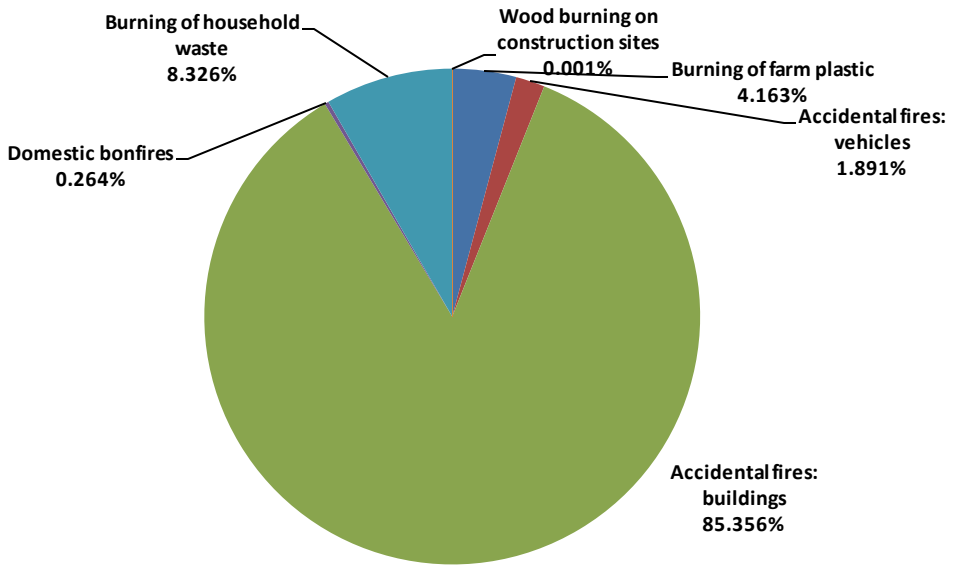


Figure 16 - Percentage contribution of PCB emissions to air from open burning processes in 2010

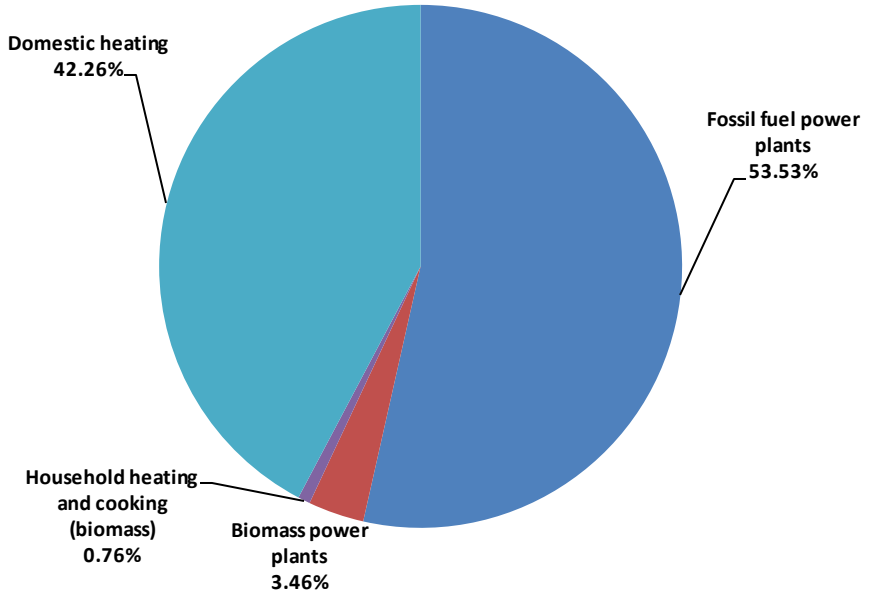


Figure 17 - Percentage contribution of PCB emissions to air from heat & power in 2010

4.1.2.2 PCB releases to land and water

The main potential release of PCBs to land is from the leakage of PCBs from remaining old electrical equipment. PCB releases to land in 2010 were estimated to be approximately 125kg. It is very difficult to obtain data on actual quantities of PCBs in old electrical equipment and leakage rates. Releases to land are based on calculations using UK emission rates to land from PCB stocks. The release of PCBs from this source will continue to decrease as the remaining electrical equipment containing PCBs are replaced and PCBs disposed of as required by relevant legislation.

No PCB emissions to water have been estimated for 2010 due to lack of available data.

4.1.3 Hexachlorobenzene releases

Only limited activity data is available for releases of hexachlorobenzene (HCB) from contaminated pesticides such as chlorothalonil. Further work is required to determine in more detail information regarding historic and current pesticide applications and measurements of actual HCB concentrations in chlorothalonil. There is very limited information on the release of HCB to the environment for other source sectors in Ireland. It may be produced as an unintentional by-product, for example, as a result of certain combustion activities. Monitoring information in relation to HCB in food and the environment is described under Section 3.1.3 and 3.1.4.

4.1.3.1 Hexachlorobenzene emissions to air

Total estimated emissions of HCB to air in 2010 is low at less than 1.16kg. Based on available information the dominant source of HCB emissions to air is certain pesticide (1.15kg) use (chlorothalonil) in agricultural practices where it can occur as an impurity, however limited information is available in relation to other potential sources. With regard to the presence of HCB as an impurity in the pesticide chlorothalonil, emissions can occur due to spraying application and subsequent volatisation of HCB from the surface of plants. European legislation sets a limit of 0.01 gkg^{-1} HCB in chlorothalonil (Creedon *et al*, 2010). Calculations of HCB emissions are based on assumptions of chlorothalonil use based on imports and the legal limit for HCB in chlorothalonil.

There is limited information on the release of HCB to air for most potential sources and further research is needed in this area. For example HCB contamination in fireworks have been reported by other EU Member States.

4.1.3.2 Hexachlorobenzene releases to land and water

For releases of HCB to land and water in 2010, estimated emissions from pesticide use resulted in less than 0.5 kg to soil and 0.016 kg to water. It is considered that spray drift and run-off contributes to the estimated low levels of releases to water.

4.1.4 Pentachlorobenzene releases

Pentachlorobenzene can be unintentionally formed whenever organic compounds are burned or exposed to high energy in presence of a chlorine source (BiPRO, 2011). Main sources of unintentional releases can be from combustion processes and in particular uncontrolled burning such as backyard burning. The EPA will be updating inventories to include estimated pentachlorobenzene releases. This will be completed under the Action Plan measures outlined under Section 4.6.

4.2 Evaluation of the laws and policies relating the management of releases of unintentional POPs

Article 5 of the Stockholm Convention requires an evaluation of the laws and policies of the Party relating to the management of unintentional POP releases. Ireland's controls on unintentionally released POPs are typically driven by European Union and national legislation and policies. Main European Union legislation concerning dioxins, furans and PCBs are described in Appendix IV. A significant reduction in emissions from industrial

sources has been the result of legislation and also improvements in abatement technologies and the application of Best Available Techniques in order to achieve stringent limits. Appendices VI and VII outline the main controls that are in place in Ireland for the source categories listed under the Stockholm Convention.

In order to evaluate the effectiveness of the laws and policies relating to the management of releases of unintentional POPs, an assessment of the trends of such releases in Ireland between 1990 and 2010 has been carried out and the reasons for such trends outlined. The trends are based on the emission inventories produced by the EPA (EPA, 2012a & Creedon *et al*, 2010) and which have been mapped under the main source categories established in the UNEP Standardized Toolkit (UNEP, 2005b) for the purpose of the National Implementation Plan. The most comprehensive dataset for unintentional releases of POPs is for emissions to air. The trends demonstrate a significant decline in emissions in unintentional POPs over the last two decades. Table 20 summarises the trend and the contributing factors that have influenced the downward trends in emissions to air.

Table 20 - Trends in releases of unintentional POPs to air

Trend in releases of unintentional POPs to air				
SUBSTANCE	1990	2010	% Reduction	Contributing factors
Dioxins & Furans	26.51 g ITEQ	16.10 g ITEQ	**39%**	*Closure of industry (e.g.: Irish Steel Plant). Banning of leaded petrol. Legislative controls (e.g.: controls on industrial emissions).*
PCBs	68.03 kg	17.44 kg	**74%**	*Closure of Irish Steel Plant. Legislative factors (e.g.: PCB Directive)*
Hexachlorobenzene	40.24 kgs	1.16kgs	**97%**	*Banning of hexachloroethane (HCE)-based cover gas use in secondary aluminium processing*
Pentachlorobenzene	*No Data*			

Figures 18 to 20 show the individual environmental trends for dioxins, PCBs and HCB between 1990 and 2010 and demonstrate the effectiveness of legislation and policies over this period including other factors that have influenced trends such as closure of certain industry.

4.2.1 Trends in dioxin emissions to air

Figure 18 illustrates the dioxin release trend for the main source categories over the time series. In terms of levels of emissions to air from 1990-2010, dioxin and furan emission levels decreased from 26.51g ITEQ in 1990 to 16.10 g ITEQ in 2010. This represents a 39% decline since 1990.

Factors contributing to the decline in dioxin emissions include the closure of medical waste incineration in the mid-1990s. Following the closure of the Irish Steel plant in 2001, the ferrous and non-ferrous source sector is no longer a significant contributor to the trend. The introduction of unleaded petrol and technological improvements in road vehicles has cushioned an increasing number of vehicles on the road however an increase in emissions can be seen over the time series.

Other source categories have remained consistent in releases of dioxins. Combustion emissions from energy use in the heat and power generation sector (residential, commercial/institutional, industry, energy generation) account for an increasing proportion of total emissions of dioxin emission across the time series. Process emissions from the manufacture of cement in the production of mineral products sector continue to be a source of dioxin emissions.

In terms of open burning processes, emissions from the sector peaked between 2002 and 2004 due to an estimated increase in the assumed combustion of household waste that remains unaccounted for in national statistics for these particular years.

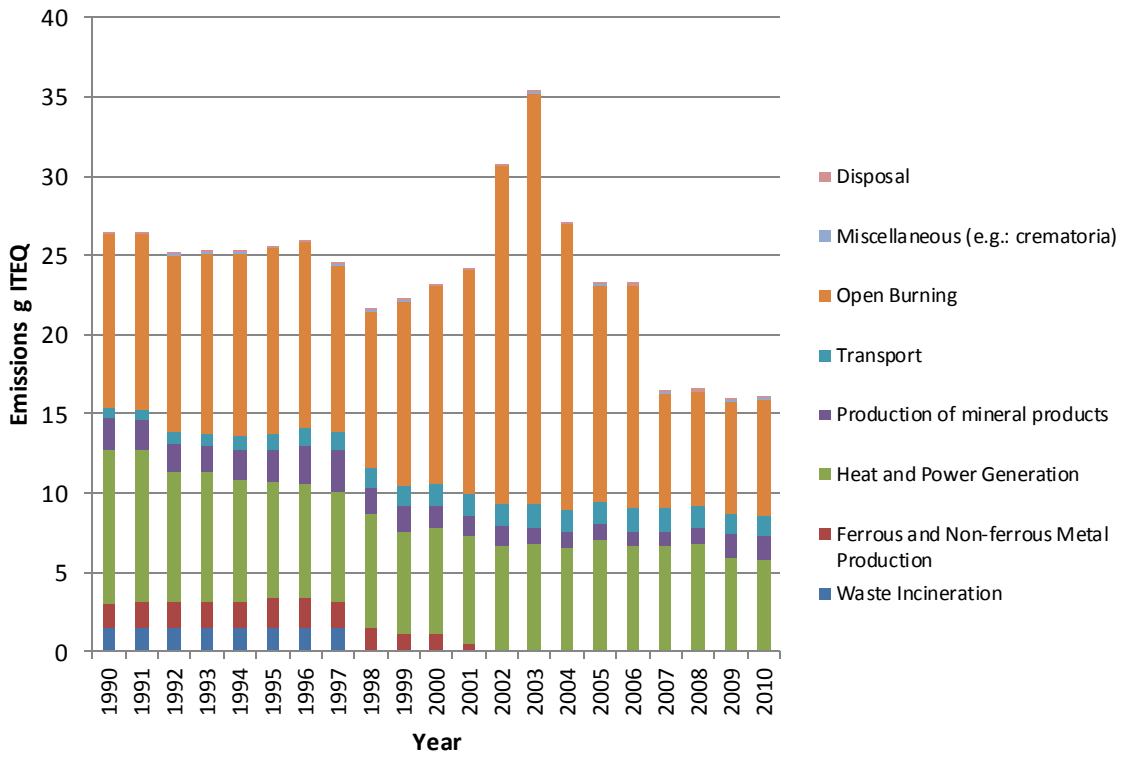


Figure 18 - Trend in dioxin emissions to air from 1990 - 2010

4.2.2 Trends in PCB emissions to air

National total emissions of PCBs to air have decreased by over 73% from 68kg in 1990 to less than 17.5kg in 2010 as shown in Figure 19. The factors influencing the decline in PCB emissions include the closure of the Irish Steel plant in 2001. This industry was the main determinant of the trend throughout the 1990s however emissions from the sector are now very low. There has also been a significant decline in emissions from end of life vehicle and waste electrical and electronic equipment shredder facilities. In the early part of the time series this was a significant contributor of PCB emissions to air. The emissions over the last number of years have decreased rapidly and, since 2006, have reached very low levels mainly as a result of legislative factors such as the Waste Electrical and Electronic Equipment (WEEE) Regulations[51].

In recent years open burning processes are the main contributors to the trend in PCB emissions in Ireland. As is the case with dioxins, emissions from the sector peaked between 2002 and 2004 due to an estimated increase in the quantity of household waste that remains unaccounted for in national statistics and which is assumed to be burned. Increases

[51] European Communities (Waste Electrical and Electronic Equipment) Regulations 2011

in cement production have led to increases in both fuel-combustion-based emissions in the heat and power generation and process emissions.

The other source sectors are similar to dioxins in their consistent proportion of releases over the time series (emissions as a result of combustion from energy use in the heat and power generation sector (residential, commercial/institutional, industry)).

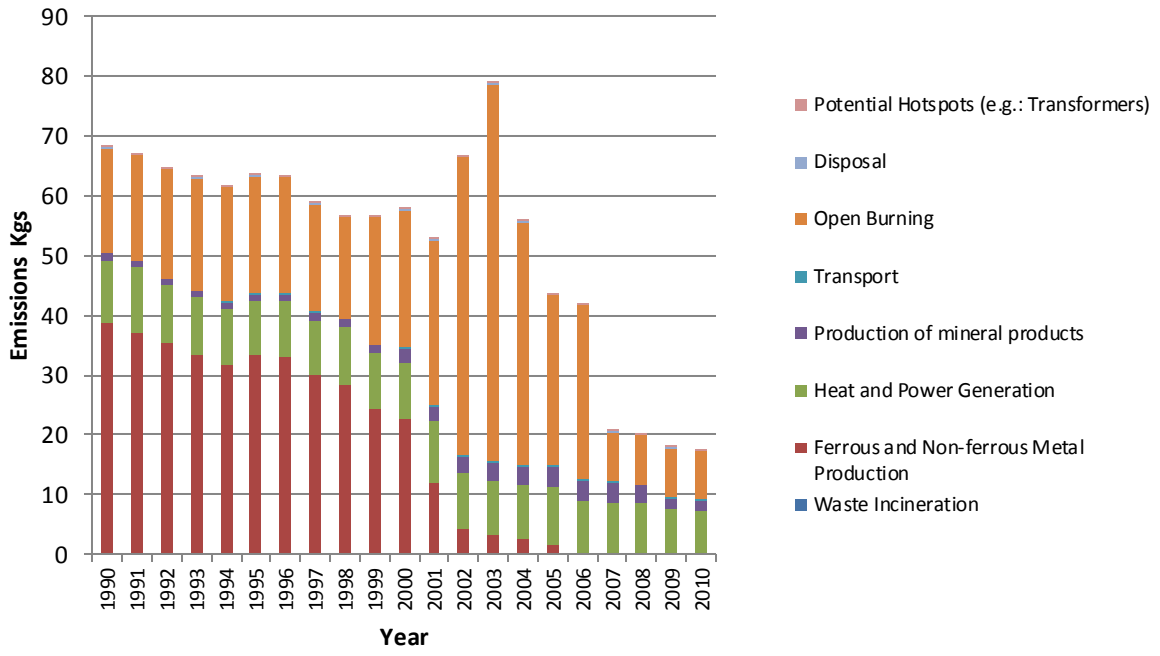


Figure 19 - Trend in PCB emissions to air from 1990 - 2010

4.2.3 Trends in hexachlorobenzene emissions to air

Figure 20 shows the significant drop in hexachlorobenzene emissions in Ireland across the 1990–2010 time series with an approximately 97% decline from 40.24 kg to 1.16kg. The drop in 1997 is attributed to the banning of hexachloroethane (HCE)-based cover gas use (HCB was present as a contaminant in such cover gases) which was used in secondary aluminium processing (part of the ferrous and non-ferrous production sector). Since then pesticide use is the main known source contributing to HCB emissions.

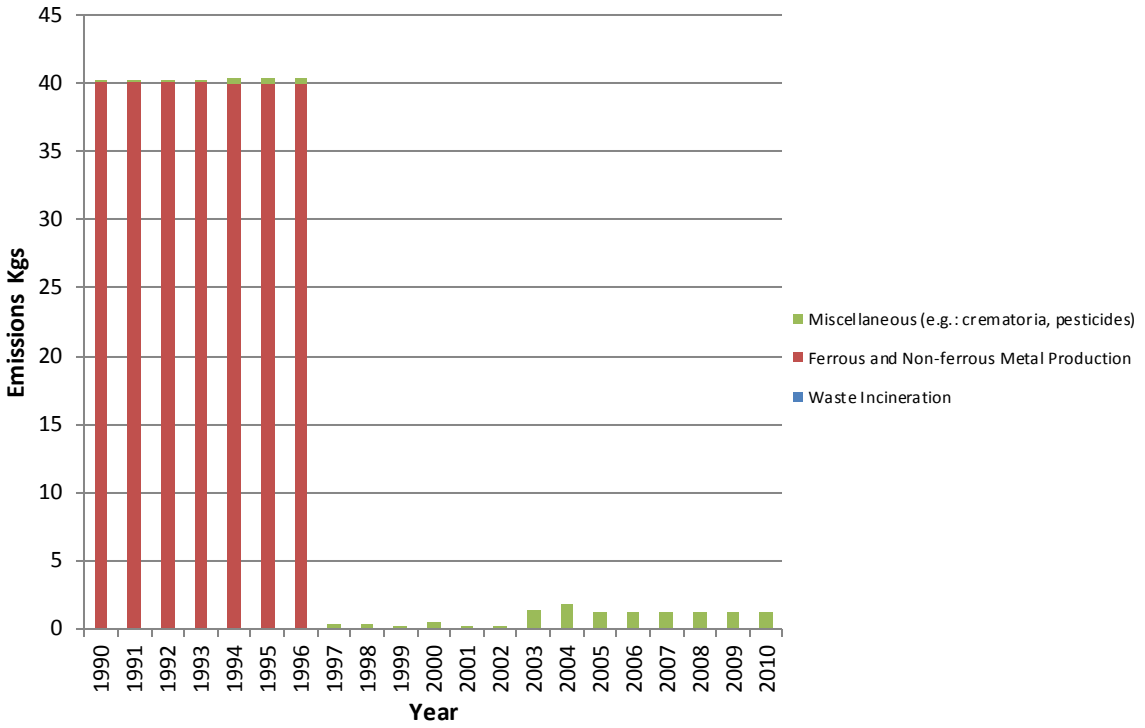


Figure 20 - Trend in HCB emissions to air from 1990 - 2010

4.3 National strategies in place to reduce releases of unintentional POPs

Article 5 of the Stockholm Convention requires strategies to meet obligations in the development of an action plan to identify, characterise and address the releases of unintentional POPs taking in account the evaluation of releases and the efficacy of laws and policies.

Furthermore Article 5 requires Parties to promote the development and, where appropriate, require the use of substitute or modified materials, products and processes to prevent the formation and release of unintentional POPs taking into account relevant guidance detailed in the Stockholm Convention and guidelines adopted by the Stockholm Convention Conference of the Parties.

Ireland is committed to its continued goal of protecting human health and the environment which includes reducing the risk posed by unintentional POPs listed under the Stockholm Convention. The last two decades has seen a decline in emissions from dioxins, PCBs and HCB mainly as a result of legislation and policy, technological advances and changes in industrial activity.

Former significant sources of POPs have been greatly reduced as a result of closure of some activities (e.g.: Irish Steel), closure of medical waste incineration and strict requirements regarding abatement techniques and emission limits for waste incineration and industrial processes. At EU level, releases of POPs from industrial installations are mainly regulated by the IPPC Directive requiring licencing with specific conditions based on Best Available Techniques (BAT) for a number of sectors and Waste Incineration Directive 2000/76/EC (setting maximum permissible limit values for dioxin and furan emissions to air and water for the specific activities of waste incineration and co-incineration). The EPA licence scheduled activities and licence conditions and emission limits are based on BAT.

In relation to energy use, measures to improve energy efficiency have been put in place through the National Climate Change Strategy 2007-2012, with an increased focus on wasteful fuel consumption and waste management and consequent emphasis on non-combustion energy alternatives (DEHLG, 2004). This will have a positive impact in reducing dioxin levels in the future. The recently published National Energy Efficiency Action Plan 2009 – 2020 which aims to achieve by 2020 a 20% reduction in energy demand across the economy, should also have a similar impact (DCENR, 2011). The Air Quality Regulations 2011[52] is another related piece of legislation which can contribute to a reduction of dioxin emissions.

This section further describes in detail existing measures in place to address the releases of unintentional POPs. Future measures are also detailed in Section 4.6.

4.3.1 Controls on emissions from major industrial and waste management activities

The Integrated Pollution Prevention Control (IPPC) Directive and Waste Incineration Directive (which will be superseded by the Industrial Emissions Directive from 2013[53]) sets out the framework for the control of emissions including dioxins from major industrial installations and waste facilities. Such facilities are required to have licences for their operations and must comply with certain conditions including compliance with emission limit values.

In Ireland, the EPA licences over 500 industrial facilities and over 200 waste and waste water facilities through IPPC licensing and waste licensing. The EPA's Office of Environmental Enforcement undertakes regular inspections of these operations. Emissions monitoring is

[52] S.I. No. 180 of 2011 (Air Quality Standards Regulations 2011)
[53] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

also undertaken to ensure compliance with their licence conditions. Local Authorities also have a role in regulating and enforcing specified waste activities.

EPA licenced operations are required to operate to Best Available Techniques (BAT) Guidance and have monitoring requirements imposed as part of their licences. The concept of BAT was introduced as a key principle in the IPPC Directive[54]. This Directive has been incorporated into Irish law by the Protection of the Environment Act 2003. To meet the requirements of this Directive, relevant sections of the Environmental Protection Agency Act 1992 and the Waste Management Acts 1996 have been amended to replace BATNEEC (Best Available Technology Not Entailing Excessive Costs) with BAT. Thus, for activities falling within the scope of the Directive and regulated by these Acts, BAT must be applied. The EPA continues to develop BAT guidance notes for various industrial sectors. Where relevant, controls on POPs emissions are included in order to ensure BAT compliance and minimise emissions from specific sectors.

4.3.2 National Waste Prevention Programme

In 2004 the Minister for the Environment, Heritage and Local Government established the National Waste Prevention Programme (NWPP) which is led by the EPA. The EPA publishes annual reports detailing the work that was carried out under the programme. This includes work that has been undertaken in relation to POPs and PCBs. In addition, the NWPP and other programmes are implementing concrete projects with industry, commercial sectors and general society to promote resource efficiency in conjunction with a variety of stakeholders which are leading to a reduction in resource consumption and consequent reduction in POPs emissions.

4.3.3 National Hazardous Waste Management Plan

The National Hazardous Waste Management Plan 2008 to 2012 (EPA, 2008e) is the second National Hazardous Waste Management Plan to be issued, the first plan having been published in 2001. This Plan sets out the priority actions that should be taken in relation to the prevention of hazardous waste including:

- improved collection rates for certain categories of hazardous waste;
- steps that are required to improve Ireland's self-sufficiency in hazardous waste management; and
- management of certain legacy hazardous wastes such as contaminated soil.

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

The review of the National Hazardous Waste Management Plan commenced in 2012 and the National Implementation Plan and Action Plan will be considered when updating this plan.

4.3.4 Code of practice for unregulated waste disposal sites

The EPA published a Code of Practice for the Environmental Risk Assessment for Unregulated Waste Disposal Sites (EPA, 2007). The Code of Practice sets out a risk-based assessment procedure to be applied to historic unregulated waste disposal sites and sites at which waste disposal activities, being activities which involved hazardous waste to a significant extent, have been carried on. It provides guidance on completing environmental risk assessment of unregulated waste disposal sites, which have been identified through the application of the EPA's site identification methodology.

4.3.5 Controls on waste disposal by burning

In September 2009, regulations concerning waste disposal by burning[55] were brought into force, strengthening the law against waste disposal by uncontrolled burning. These regulations make explicit the offence of disposal of waste by uncontrolled burning and prohibits such disposal within the curtilage of a dwelling. Failure to comply with these regulations is an offence and fines of up to €3,000 may be imposed.

The EPA and local authorities have regularly organised advertisement campaigns covering backyard burning and illegal waste collection. The aim of these campaigns is to increase public awareness of the dangers of illegal burning (including the potential for unintentional POP emissions) and the problems of illegal waste and hence reduce the emissions from these practices. These campaigns are typically organised at Halloween at the end of October when bonfires traditionally take place.

Section 4.6 further details key priority target areas and measures that will support Ireland's strategies for further reducing releases of unintentional POPs and includes the schedule for implementation of these measures.

4.4 Steps to promote education and training and awareness of strategies

Article 5 of the Stockholm Convention requires the Action Plan to include steps to promote education and training with regard to, and awareness of, those strategies (refer to Section

[55] Waste Management (Prohibition of Waste Disposal by Burning) Regulations 2009 (SI No. 286 of 2009)

4.3). Further public awareness and guidance activities are planned as part of the implementation of measures outlined in the National Implementation Plan and Action Plan on POPs. Refer to Section 4.6 regarding public awareness activities concerning unintentional POPs. Awareness measures are also detailed under Section 5 of this plan. Education and training also forms a significant part of research and development activities. These are further detailed under Section 4.6 and Section 6 of this plan.

4.5 Review of Action Plan

In accordance with Article 5 of the Stockholm Convention, the strategies in the Action Plan on unintentional POPs and their progress and success in meeting the obligations of Article 5 will be reviewed periodically after submission of the National Implementation Plan. The reviews will be reported to the Secretariat of the Stockholm Convention in line with reporting requirements under Article 15 of the Stockholm Convention.

4.6 Implementation schedule for Action Plan on unintentionally released POPs

Article 5 of the Stockholm Convention requires a schedule for implementation of the Action Plan including for strategies and measures. This section details the further actions to be undertaken and the timeframe for the implementation of measures to support the strategies to identify, characterise and address releases of unintentional POPs.

4.6.1 Enforcement of existing legislation

The EPA's Office of Environmental Enforcement will continue to ensure that conditions relating to unintentional POPs under licenced activities (e.g. incineration and co incineration) are enforced and enforcement action is taken in the event of non-compliance. Legislation concerning unauthorised use of waste oils for space heating and the prohibition of waste disposal by burning will continued to be enforced.

With respect to PCBs, local authorities and the EPA will continue to identify holders of PCB contaminated equipment and work actively to ensure that holders decontaminate and/or dispose of PCBs and PCB contaminated equipment in an environmentally sound manner.

Activity	Responsibility	Timeline
Continued implementation and enforcement of multilateral environmental agreements and legislation directly or indirectly related to POPs, where relevant	All relevant public authorities	Ongoing
Continued enforcement of the Waste Management (Hazardous Waste) Regulations 1998 with respect to PCB holdings. Identify and work actively with confirmed holdings on the national inventory to ensure that obligations to comply with the disposal and or decontamination requirements of the PCB Directive are fulfilled	EPA, Local Authorities and holders of confirmed or suspected PCBs	Ongoing
Continued enforcement activities to prevent unauthorised use of waste oils for space heating	EPA and Local Authorities	Ongoing
Continued enforcement of the Waste Management (Prohibition Of Waste Disposal By Burning) Regulations 2009	Local Authorities	Ongoing

4.6.2 Regulation and control

The EPA is the competent authority for the IPPC Directive under the Protection of the Environment Act. Regarding IPPC licenced operations, such operations are required to operate to BAT and have associated monitoring requirements imposed as part of their licences. Where relevant, controls on POPs emissions are included in order to ensure BAT compliance. The IPPC Directive will be replaced by the Industrial Emissions Directive from 2013, which places a greater emphasis on the application of BAT to industrial activities.

Parties are required to ensure the use of BAT and promote the use of BEP for priority new sources in the sources categories listed in the Convention (Appendix VI). For existing priority source categories (Appendices VI and VII) and other new sources (Appendix VII) listed in the Stockholm Convention Parties are required to promote the use of BAT and BEP. In this regard, the use of BAT and BEP should take into consideration the general guidance on prevention and release reduction measures detailed in the Stockholm Convention and guidelines on BAT and BEP adopted by the Stockholm Convention Conference of the Parties.

The EPA and local authorities will require new facilities related to certain unintentional POP source categories listed under the Stockholm Convention, to use BAT (and promote BEP) taking into consideration Stockholm Convention general guidance on BAT and BEP

guidelines. The EPA, local authorities, and other bodies as appropriate will also promote, where appropriate, the use of BAT and BEP.

Activity	Responsibility	Timeline
Assessment of activities, where appropriate, related to unintentional POP source categories to facilitate the promotion and requirement, where relevant, of the use of Best Available Technologies (BAT) and Best Environmental Practice (BEP) taking into consideration Stockholm Convention general guidance and guidelines	EPA, Local Authorities, and other bodies as appropriate.	2012-2014 (and ongoing, where relevant)

4.6.3 Monitoring

Official agencies will continue monitoring unintentional POPs in food, where required, to check and enforce compliance with respective legislative requirements. Monitoring programmes in other Member States has indicated the presence of hexachlorobenzene in imported fireworks. The EPA will investigate the potential occurrence of hexachlorobenzene in fireworks imported into Ireland. The EPA will carry out an assessment of current environmental monitoring activities (e.g.: air, water, soils and waste) in order to consider possibilities for further appropriate POPs monitoring. For example, due to the lack of data of POPs in soil, further monitoring of soils to better characterise releases of POPs to soil will be considered.

Activity	Responsibility	Timeline
Dioxin, dioxin like PCB, brominated flame retardant monitoring in cows' milk	EPA	Annually
Investigation into the occurrence of hexachlorobenzene in imported fireworks	EPA	2012-2013
Monitoring of certain contaminants in cereals and food of animal origin as part of routine monitoring	Department of Agriculture, Food and the Marine, Marine Institute	Annually
Investigation into levels of POPs in a range of foodstuffs and research into dietary intake of POPs	Coordinated by FSAI	Ongoing
Assessment of environmental monitoring programmesto determine the need for further POPs monitoring (e.g. air, water, soils & waste)	EPA, Marine Institute	2013-2014
Keep up to date on international biomonitoring programmes in relation to POPs to inform any future action in this area.	EPA and other relevant bodies as appropriate	Ongoing

4.6.4 Research and improving the quality of inventories of POPs

The analysis of available data to compile multimedia inventories of POPs has indicated several key sources where data are currently insufficient to provide a rigorous and accurate method for estimating emissions. The EPA will seek to address these gaps to improve inventories estimates and will concentrate on specific areas to assess emissions of POPs from sources where data is lacking or where there is uncertainty. Consideration will be given to research related to small-scale burning and domestic waste disposal activities. Other research activities that will be considered include examination of the appropriateness of emission factors used for estimating emissions from certain sources (e.g.: peat) and an assessment of releases of POPs into environmental media.

The EPA will consult with the Department of Agriculture, Food and the Marine regarding research into the import and use of pesticides potentially containing hexachlorobenzene as an impurity (e.g. chlorothalonil) with the aim of increasing understanding of the estimates of releases from pesticide use.

Activity	Responsibility	Timeline
Improvement of inventories of unintentional POP substances to air, land and water.	EPA	2013-2014
Completion of Inventories for pentachlorobenzene releases to air, land and water	EPA	2012-2013
Assessment of import and use of pesticides to better estimate the unintentional release of hexachlorobenzene	EPA and Department of Agriculture, Food and the Marine	2013-2014
Completion of projections of releases of unintentional POP substances	EPA	2012-2013
Research concerning POPs emissions from various sources (e.g.: peat burning, sewage sludge analysis) to inform the appropriateness of current emission factors	EPA	2013-2015
Research concerning POP releases to environmental media	EPA	2013-2015
Research related to small scale burning and domestic waste disposal activities (e.g.: backyard burning)	EPA	2013-2015

4.6.5 Guidance and awareness regarding unintentional POPs

The EPA will provide input and guidance to future national plans and programmes that may help to reduce or prevent unintentional POP releases. The EPA and local authorities will continue to raise public awareness regarding harmful emissions associated with domestic

burning practices and there will be continued enforcement of regulations concerning the prohibition of waste disposal by burning. Public awareness mechanisms such as guidance will be used to highlight concerns with such practices including, for example, that the use of contaminated wood as a fuel is a significant source of POPs emissions that must be reduced, (e.g.: furniture, treated wood with chlorinated products). The EPA will provide guidance or advice to public authorities concerned, for implementation of the POPs Regulations, as appropriate.

Activity	Responsibility	Timeline
Provide guidance or advice for implementation of POPs Regulations, as appropriate.	EPA	Ongoing
Provide input and guidance to future national plans and programmes that may help to reduce or prevent unintentional POP releases.	EPA	Ongoing
Public awareness regarding harmful emissions from domestic burning practices and guidance, as appropriate.	EPA and Local Authorities	2012, 2013 & 2014
Consumer advice on contamination in food, as appropriate	FSAI	Ongoing

SECTION 5

5. Public awareness, education, information exchange and reporting

This section details measures put in place in order for Ireland to meet requirements under the Stockholm Convention with respect to public awareness, education, information exchange and reporting.

5.1 Exchange of information, public awareness and education

The requirements of Article 10 of the Convention regarding public Information, awareness and education are also addressed in Article 10 of the EU POPs Regulation and Article 8 regarding public participation. Parties are required to encourage industry and professional users to facilitate the provision of information. Requirements on industry regarding the provision of information on chemicals is addressed in a number of pieces of EU legislation such as REACH legislation[56], Plant Protection Products Regulations[57], the PCB Directive and in particular regulations concerning Classification, Labelling & Packaging of substances and mixtures[58]. The regulations are directly applicable to all Member States. The PCB Directive has been transposed in Ireland by the Waste Management (Hazardous Waste) Regulations 1998. Pollutant Release and Transfer Registers are inventories of pollution from industrial sites and other sources. Ireland has brought into force regulations concerning the establishment of a European Pollutant Release and Transfer Register[59]. Annual releases of pollutants (including POPs) are reported to the European Pollutant Release and Transfer Register.

Article 10 of the EU POPs Regulation implements the requirements of the Stockholm Convention regarding information exchange. The Stockholm Convention requires a national focal point for each Party to the Convention for the exchange of information. An official from the Department of the Environment, Community and Local Government is Ireland's national focal point.

[56] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency
[57] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC
[58] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures
[59] European Communities (European Pollutant Release and Transfer Register) Regulations 2007 , Pollutant Release and Transfer Register Regulations 2011

Requirements on confidentiality and non-confidentiality of information are included in Article 10 of the EU POPs Regulation without prejudice to EU Directive on public access to information[60]. This EU Directive has been transposed in Ireland[61].

Ireland continuously participates in information exchange with other Member States. The EPA attends EU POPs Competent Authority Meetings which are held at least once a year and provide an opportunity for information exchange. Other exchange mechanisms include meetings, teleconferences and email communications.

There are number of other specific examples how public information and awareness has been carried out in relation to POPs including:

5.1.1 Website information

The EPA and the Department of Environment, Community and Local Government has established a dedicated POPs webpage which informs the public about POPs, the POPs regulations, Ireland's National Implementation Plan consultation, etc.:

www.pops.ie
http://www.environ.ie/en/Environment/Atmosphere/AirQuality/PersistentOrganicPollutants/

The EPA maintains a dedicated webpage relating to PCBs and regularly updates the national PCB holdings inventories:

www.pcbs.ie

The EPA published a report 'Focus on Environmental Enforcement in Ireland – A report for the years 2006-2008' (EPA, 2009a). The report details the environmental outcomes achieved by the environmental enforcement activities of the local authorities and the EPA including illegal waste activities. The report includes information on POPs including PCBs. The EPA regularly provides information on its website, through BAT Guidance Notes, PRTR reports, emissions inventories, monitoring and various environmental status reports which include POPs related information:

http://www.epa.ie/downloads/pubs/

[60] Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC
[61] S.I. No. 133/2007 — European Communities (Access to Information on the Environment) Regulations 2007

Ireland has a dedicated website for information on Pollutant Release and Transfer Register website. Quantities of pollutant releases (including POPs) to air, water and waste water as well as off-site transfers of waste are available online:

http://prtr.epa.ie/

The FSAI produces a Toxicology Factsheet Series which includes documents on POPs. The aim of the documents is to provide food business operators, enforcement officers, and other stakeholders with a concise overview of health hazards and regulations concerning contaminants in food. In 2009 the following factsheets were published:

- Dioxins and PCBs in Food
- Pesticides in Food
- Polycyclic Aromatic Hydrocarbons (PAHs) in Food

Factsheets and POPs in food related studies are available at:

http://www.fsai.ie/news_centre/toxicology_factsheets.html
http://www.fsai.ie/resources_publications.html

The Marine Institute publishes reports relating to the monitoring for contaminants in the marine environment including POPs:

http://www.marine.ie/home/Publications/

The Department of Agriculture, Food and the Marine publish reports on pesticide residues in food including results of certain POP pesticides detected:

http://www.pcs.agriculture.gov.ie/ppp.htm

5.1.2 Media campaigns

There have been a number of media campaigns carried out by the EPA in relation to backyard burning and bonfires in addition to a public awareness campaign highlighting the health and environmental dangers of burning waste in fireplaces and stoves. "SEE SOMETHING? SAY SOMETHING!" is a leaflet produced by the Environmental Enforcement Network, to make it easier for members of the public to make an environmental complaint. The leaflet was launched by the Minister for the Environment, Heritage and Local Government in April 2007. Instances such as illegal burning of waste, illegal dumping and water pollution are examples of where the public can assist by reporting problems to

the relevant authorities. Figure 21 provides an example of a previous advert campaign a number of years ago in relation to backyard burning.

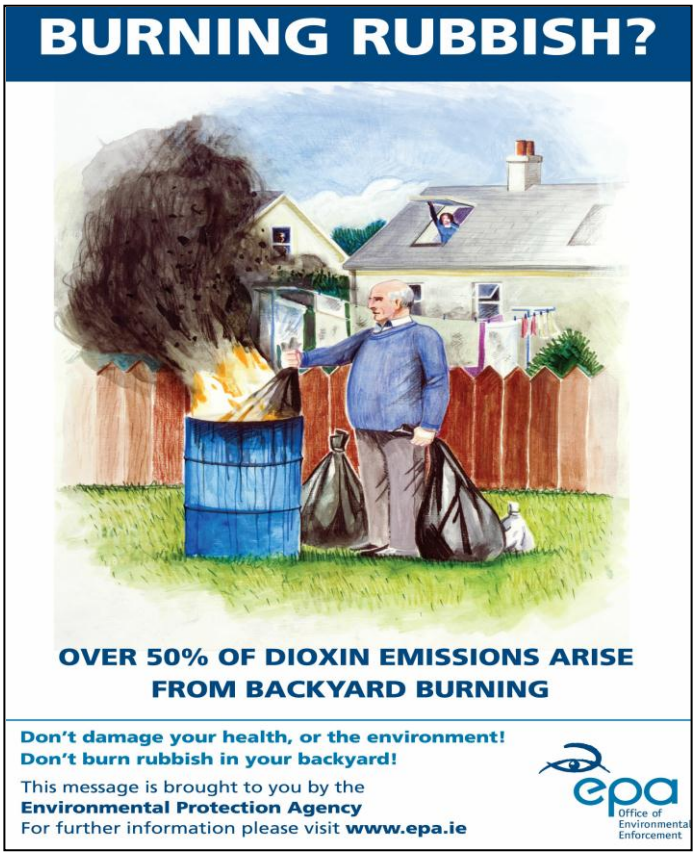


Figure 21 – Backyard burning awareness campaign in 2007

5.1.3 Networking and capacity building

The EPA facilitates training in relation to POPs. In relation to the identification of potential PCB containing equipment in 2009 the EPA carried out 4 Regional Training Events for Local Authorities on how to complete PCB Surveys. The EPA also facilitates training through attendance of conferences, meetings with relevant stakeholders and attendance at competent authority meetings.

The Irish Medicines Board periodically hold information days for marketing authorisation holders and for manufacturers and wholesalers of human and veterinary medicines and publish a quarterly newsletter. In 2010 an information day included a presentation on the national POPs regulations.

5.2 Reporting

Table 21 outlines Ireland's reporting requirements under both the Stockholm Convention and the EU POPs Regulation. Article 15 of the Stockholm Convention requires Parties to report on their implementation of the Convention. Ireland will submit its first Article 15 report in 2014 in line with its requirements upon ratification.

Table 21 - Ireland's POPs reporting requirements

Report	Reported to	Date
National Implementation Plan	Stockholm Convention Secretariat, EU Commission and Member States	November 2012
Stockholm Convention Article 15 Report	Stockholm Convention Secretariat	2014 and periodically as required
EU POPs Regulation Article 12 Annual Report	EU Commission	Annually
EU POPs Regulation Article 12 Triannual Report	EU Commission	Triennially (next report due in 2013)

Article 12 of the EU POPs Regulation requires Member States to report on quantities produced and placed on the market on an annual basis including the name of the importing or exporting countries. Ireland has submitted this annual report to the Commission since 2004, when the EU POPs Regulation came into effect. In addition Article 12 requires Member States to submit a triannual report to the Commission every three years relating to how obligations have been fulfilled for the previous three years. Ireland has submitted two triannual reports to the Commission to date relating to the periods 2004-2006 and 2007-2009.

Under Article 12 of the national POPs regulations, the EPA is responsible, following consultation with public authorities concerned for the collection and coordination of information required for reporting under the EU POPs Regulation.

SECTION 6

6. Research, development and monitoring, listing of new POPs

6.1 Research, development and monitoring

Parties are required, within their capabilities, to carry out and encourage appropriate research, development and monitoring of POPs and their alternatives. This includes sources and releases, trends, transport, fate and transformation, effects on health and the environment, socio-economic and cultural impacts, release reduction and elimination, methodologies for inventories and techniques for measuring releases.

Article 52 of the Environmental Protection Agency Act 1992 assigns responsibility to the EPA for monitoring of the quality of the environment and the promotion and co-ordination of environmental research. The EPA has a dedicated unit called Science, Technology, Research and Innovation for the Environment (STRIVE) which facilitates and funds research on a variety of environmental issues. It is anticipated that future EPA research projects, subject to funding, will include POPs research. Research and monitoring information are regularly published on the relevant websites and are publically available.

Previous research has been carried out by a number of public authorities including the Marine Institute, FSAI and EPA on various POPs in the food chain and the environment. Inventories of unintentional POPs have been reported under the Convention on Long Range Transboundary Air Pollution (CLRTAP). Parties are required to support international programmes on research and monitoring. As a Party to the European Monitoring and Evaluation Programme (EMEP) Protocol under the CLRTAP, Ireland operates a number of EMEP air quality monitoring sites and makes an annual financial contribution under EMEP. Ireland also participates in a Global Atmospheric Sampling monitoring project which includes POPs monitoring. The network which was initiated in 2004 includes more than 60 sites on 7 continents around the world including one site in Ireland.

The EPA has carried out a number of studies on sampling and analysis of various waste streams in order to determine the presence of new POPs and to gain knowledge on the experiences with such sampling and analysis. Information on such studies has been communicated to the EU Commission to further assist with EU understanding on the issues associated with the management of wastes containing new POPs substances.

Future research, development and monitoring activities regarding unintentional POPs are also detailed in Section 4.6.

6.2 Listing of new POPs

The Stockholm Convention details how Parties can nominate new substances to the Convention Secretariat to be considered for listing of POPs under the different annexes of the Convention. The POP Review Committee (POPRC) is a subsidiary body to the Stockholm Convention established for reviewing chemicals proposed for listing under the Convention. The POPRC which meet every year comprises of 31 members representing Parties on a global scale and Members are rotated periodically. The POPRC also addresses other POPs related matters as a result of decisions made at previous Conference of Parties (COP).

The Stockholm Convention requires Parties to take measures to prevent the production and use of new chemicals and pesticides which exhibit characteristics of POPs and to take these criteria into consideration when assessing existing substances. These provisions are addressed in Article 3(3) of the EU POPs Regulation and are implemented within the framework of the Community regulatory and assessment regimes for chemicals (REACH), pesticides and biocides. The nomination, by the EU and its Member States, of substances to undergo the POPRC review process for chemicals proposed for listing is informed, inter alia, by the substance assessments carried out to identify the existence of persistence, bioaccumulation and toxicity (PBT) properties or very persistent and very bioaccumulative (vPvB) properties under Community regulatory and assessment schemes.

Emerging substances that have recently been added under the UNECE Protocol or have been nominated for listing under Stockholm Convention on POPs and/or the UNECE Protocol are listed in Table 22.

Since becoming a Party to the Stockholm Convention, Ireland has attended the 5th Conference of Parties and has attended as an observer at the 7th and 8th POPRC meetings. Ireland will continue to contribute to the implementation and development of the Stockholm Convention decision making process.

Table 22 - New and candidate POP substances

Substance	Use/Application	Status
Short Chained Chlorinated Paraffins (SCCPs)	Previously used in rubber industry (e.g.: conveyor belts) paints, sealants, adhesives, textiles, leather.	Listed under UNECE Protocol in 2009 (not yet in force). Vote by EU Member States to add SCCPs to EU POPs Regulation in 2012 (Regulation (EU) No 519/2012)[62] Nominated for listing under the Stockholm Convention
Hexachlorobutadiene (HCBD)	Historically used as solvent for rubber, washing liquor. Unintentional by-product during production of chlorinated chemicals.	Listed under UNECE Protocol in 2009 (not yet in force). Vote by EU Member States to add HCBD to EU POPs Regulation in 2012 (Regulation (EU) No 519/2012) Nominated for listing under the Stockholm Convention
Polychlorinated Napthalenes (PCNs)	Historically used as insulator for (e.g.: cables and capacitors). Can form unintentionally (e.g.: certain combustion activities).	Listed under UNECE Protocol in 2009 (not yet in force). Vote by EU Member States to add PCNs to EU POPs Regulation in 2012 (Regulation (EU) No 519/2012)
Pentachlorophenol (PCP)	Previously used in wood impregnation and the textile industry.	Nominated for listing under the Stockholm Convention and UNECE Protocol
Hexabromocyclododecane (HBCD)	Used for several decades. Mainly used as a flame retardant. Predominant use in building construction in insulation boards (expandable polystyrene (EPS) and extruded polystyrene (XPS)) and high impact polystyrene (HIPS) used in electrical and electronic equipment. Also used in textiles for upholstery fabrics. HBCD is subject to authorisation under REACH with sunset date of July 2015 (above certain concentration).	Nominated for listing under the Stockholm Convention and UNECE Protocol
Dicofol	Pesticide	Nominated for listing under UNECE Protocol
Trifluralin	Pesticide	Nominated for listing under UNECE Protocol

[62] Commission Regulation (EU) No 519/2012 of 19 June 2012 amending Regulation (EC) No 850/2004 of the European Parliament and of the Council on persistent organic pollutants as regards Annex I

SECTION 7

7. Technical assistance, Financial resources and mechanisms

Article 12 of the Stockholm Convention requires Parties to recognise that the provision of timely and appropriate technical assistance to developing country Parties and Parties with economies in transition is essential to the successful implementation of the Convention. This is further supported within the EU by Article 11 of the EU POPs Regulation, which places an obligation on the Commission and Member States to cooperate in providing appropriate and timely technical assistance to developing countries and countries with economies in transition to assist them, upon request and within available resources, and taking into account their particular needs, in implementing their obligations under the Convention.

While Ireland has a long tradition of providing financial and technical assistance to developing countries through the Overseas Development Assistance Programme, the principal route for providing assistance to developing countries in relation to POPs is through the Global Environment Facility (GEF). Since 2001, the GEF has served as the financial mechanism for the Stockholm Convention and POPs are one of the focal areas for GEF funding. Although the initial focus of the funding was to support developing country Parties in developing National Implementation Plans, more recent activities have concentrated on efforts to assist these Parties to strengthen their capacity to implement their obligations under the Convention. Ireland has maintained its level of contribution to the GEF over the most recent round of funding (GEF4: 2006-2009) and has pledged to maintain funding during GEF5 which runs from 2010 to 2013. In addition, Ireland supports the activities of the Stockholm Convention Secretariat through its annual assessed contributions to the Convention General Trust Fund.

At national level, in respect of Article 13 of the Stockholm Convention regarding financial resources and mechanisms, the EPA is provided with financial support through the Environment Fund for enforcement and waste prevention activities.

8. References

BiPRO, 2011. *Study on waste related issues of newly listed POPs and candidate POPs* [online] Available at http://ec.europa.eu/environment/waste/studies/pdf/POP_Waste_2011.pdf [accessed 28th November, 2011]

Creedon M, O'Leary E, Thistlethwaite G, Wenborn M & Whiting R, 2010. *Inventories of Persistent Organic Pollutants in Ireland 1990 and 1995–2006.* Environmental Protection Agency, Wexford

CSO, 2011. *Statistical yearbook of 2011.* Stationary Office, Dublin

CSO, 2010. *Measuring Ireland's progress.* Stationary Office, Dublin

DAFF, 2010. *2009 Pesticides Residues in Food.* [online] Available at http://www.pcs.agriculture.gov.ie/Docs/2009annualrep_PesticideResidues_English.pdf [accessed 5th July, 2011]

DAFF, 2009. *2008 Pesticides Residues in Food.* [online] Available at http://www.pcs.agriculture.gov.ie/Docs/2008annualrep_PesticideResidues_English.pdf [accessed 5th July, 2011]

DAFF, 2008a. *2007 Pesticides Residues in Food.* [online] Available at http://www.pcs.agriculture.gov.ie/Docs/PesticidesResiduesinFood2007(English).pdf [accessed 5th July, 2011]

DAFF, 2008b. *2006 Pesticides Residues in Food.* Department of Agriculture & Food, Pesticide Control Service, Dublin

DAFF, 2006a. *2005 Pesticides Residues in Food.* Department of Agriculture & Food, Pesticide Control Service, Dublin

DAFF, 2006b. *2004 Pesticides Residues in Food.* Department of Agriculture & Food, Pesticide Control Service, Dublin

DECNR, 2011. *Maximising Ireland's Energy Efficiency - The National Energy Efficiency Action Plan 2009 – 2020* [online] Available: http://www.dcenr.gov.ie/NR/rdonlyres/FC3D76AF-7FF1-483F-81CD-52DCB0C73097/0/NEEAP_full_launch_report.pdf [accessed 13th March 2012]

DECLG, 2012. Our Sustainable Future: A Framework for Sustainable Development for Ireland Available: http://www.environ.ie/en/Publications/Environment/Miscellaneous/FileDownLoad,30452,en.pdf [accessed 24th September 2012]

DEHLG, 2004. *Ireland National Climate Change Strategy 2007 – 2012* [online] Available at http://www.environ.ie/en/Publications/Environment/Atmosphere/FileDownLoad,1861,en.pdf [accessed 13th March 2012]

EC, 2007. *Community Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants, Commission Staff Working Document* [online] Available at http://ec.europa.eu/environment/pops/pdf/sec_2007_341.pdf [accessed 1st December, 2011]

EPA, 2012a. *Ireland Informative Inventory Report 2012 Air Pollutant Emissions In Ireland 1990–2010 Reported To The Secretariat Of The UN/ECE Convention On Long-Range Transboundary Air Pollution.* Environmental Protection Agency, Wexford

EPA, 2012b. *Ireland's Environment – An Assessment.* Environmental Protection Agency, Ireland. Available at http://www.epa.ie/irelandsenvironment/ [accessed 2nd July, 2012]

EPA, 2011a. *Environment in focus.* [online] Available at http://www.epa.ie/environmentinfocus/socio-economic/ [accessed 1st December, 2011]

EPA, 2011b. *Dioxin Levels in the Irish Environment Eight Assessment (Summer 2010) Based on Levels in Cows' Milk*. Environmental Protection Agency, Wexford

EPA, 2010a. *Dioxin Levels in the Irish Environment Seventh Assessment (Summer 2009) Based on Levels in Cows' Milk.* Environmental Protection Agency, Wexford

EPA, 2010b. *Water Quality in Ireland 2007-2009.* Office of Environmental Assessment, Environmental Protection Agency. Brunswick Press

EPA, 2009a. *Focus on Environmental Enforcement in Ireland. A report for the years 2006 – 2008.* Environmental Protection Agency, Wexford

EPA, 2009b. *Dioxin Levels in the Irish Environment Sixth Assessment (Summer 2008) Based on Levels in Cows' Milk.* Environmental Protection Agency, Wexford

EPA, 2008a. *State of the Environment Report.* Environmental Protection Agency, Wexford

EPA, 2008b. *Management Plan for Polychlorinated Biphenyls (PCBs) in Ireland Including a Code of Practice for the in-use management of PCBs and PCB containing equipment.* Environmental Protection Agency, Ireland

EPA, 2008c. *Dioxin Levels in the Irish Environment Fifth Assessment (Summer 2007) Based on Levels in Cows' Milk.* Environmental Protection Agency, Wexford

EPA, 2008d. *Dioxin Levels in the Irish Environment Fourth Assessment (Summer 2006) Based on Levels in Cows' Milk.* Environmental Protection Agency, Wexford

EPA, 2008e. *National Hazardous Waste Management Plan 2008-2012*, Environmental Protection Agency, Wexford

EPA, 2007. *Environmental Risk Assessment for Unregulated Waste Disposal Sites - Code of Practice.* Environmental Protection Agency, Wexford

EPA, 2005. *Dioxin Levels in the Irish Environment Third Assessment (Summer 2004) Based on Levels in Cows' Milk.* Environmental Protection Agency, Wexford

ESRI, 2011. *Irish Economy*. [online] Available at http://www.esri.ie/irish_economy/ [accessed 1st December, 2011]

FSAI, 2011. *Report on a Total Diet Study carried out by the Food Safety Authority of Ireland in the period 2001-2005* http://www.fsai.ie/WorkArea/DownloadAsset.aspx?id=11097

FSAI, 2010a. *Investigation into levels of chlorinated and brominated organic pollutants in carcass fat, offal, eggs and milk produced in Ireland.* Monitoring and Surveillance Series

FSAI, 2010b. *Investigation into levels of perfluoroalkylated substances (PFAs) in meat, offal, fish, eggs, milk and processed products* Report available on the FSAI Website, www.fsai.ie/surveillance/

FSAI, 2009. *Dioxins and PCBs in Food.* Toxicology Factsheet Series. Issue 1. 2009

FSAI 2008. I*nvestigation into Levels of Dioxins, Furans, PCBs in fish oil supplements, offal and milk* Report available on the FSAI Website, www.fsai.ie/surveillance/

FSAI 2006. *Report on surveillance of infant food for pesticide residues*. Report available on the FSAI Website, http://www.fsai.ie/uploadedFiles/infant_food_pesticides.pdf

FSAI, 2005. *Investigation into levels of dioxins, furans, PCBs and PBDEs in Irish food 2004.* Report available on the FSAI Website, www.fsai.ie/surveillance/

FSAI, 2004a. *Report on surveillance of infant food for pesticide residues*. Report available on the FSAI Website, http://www.fsai.ie/WorkArea/DownloadAsset.aspx?id=8266

FSAI, 2004b. *Investigation into Levels of Dioxins, Furans, PCBs and some elements in Battery, Free-Range, Barn and Organic Eggs*. Report available on the FSAI Website, www.fsai.ie/surveillance/

FSAI, 2002. *Investigation into levels of dioxins, furans and PCBs in farmed salmon, wild salmon, farmed trout and fish oil capsules*. Summary of Investigation available on FSAI Website: http://www.fsai.ie/monitoring_and_enforcement/monitoring/surveillance/dioxins_furans_pcbs.htm

Glennon, M., Scanlon, R. P., O'Connor, P.J (Geological Survey of Ireland), Finne, T.E., Andersson, M., Eggen, O., Jensen, H. K. B. and Ottesen, R.T. (Geological Survey of Norway), 2012. *SURGE Project. Geochemical baseline for heavy metals and organic pollutants in topsoils in the greater Dublin area.* Geological Survey of Ireland

McGovern E, Cronin M, Joyce E, McHugh B, 2011a. *An Assessment of Dangerous Substances in Water Framework Directive Transitional and Coastal Waters 2007-2009.* Marine Environment and Health Series, No. 38, 2011

McGovern E., McHugh B., O'Hea L., Joyce E., Tlustos C., and Glynn D, 2011b. *Assuring Seafood Safety: Contaminants and Residues in Irish Seafood 2004-2008.* Marine Institute. Special Report ISBN 978-1-902895-48-2 http://oar.marine.ie/handle/10793/706

McGrath D & McCormack R J, 1999. *The Significance of Heavy Metal and Organic Micropollutants in Soils.* Johnstown Castle Research Centre, Wexford

McHugh, B., Poole, R., Corcoran, J., Anninou, P., Boyle, B., Joyce, E., Foley, B. and McGovern, E., 2010. *The occurrence of persistent chlorinated and brominated organic contaminants in the European eel (Anguilla anguilla) in Irish waters.* Chemosphere. 79, (3), April 2010, 305- 313

Met Eireann, 2011. *Climate of Ireland.* [online] Available at http://www.met.ie/climate/climate-of-ireland.asp [accessed 1st December, 2011]

Nolan W, 2011. *Geography of Ireland.* [online] Available at http://www.gov.ie/en/essays/geography.html [Accessed 1st December, 2011]

O' Donovan V. J, O'Farrell J.K, O'Mahony P, Buckley F J, 2011. *Temporal trends in dioxin, furan and polychlorinated biphenyl concentrations in bovine milk from farms adjacent to industrial and chemical installations over a 15 year period.* Veterinary journal (London, England: 1997) 2011;190(2):e117-21

OECD, 2011. *Economic Survey of Ireland 2011.* Available at http://www.oecd.org/document/63/0,3746,en_33873108_33873500_48842623_1_1_1_1,00.html#information [accessed 1st December, 2011]

Oireachtas, 2012. *Media* factsheet. [online] Available at http://www.oireachtas.ie/parliament/mediazone/factsheet/ [accessed 3rd January, 2012]

Pozo, K., Harner, T., Lee, S. C., Wania, F., Muir, C.G., Jones, K.C.,2009. *Seasonally Resolved Concentrations of Persistent Organic Pollutants in the Global Atmosphere from the First Year of the GAPS Study*. Environmental Science & Technology 43 (3): 796-803

Pratt IS, Anderson WA, Crowley D, Daly SF, Evans RI, Fernandes AR, Fitzgerald M, Geary MP, Keane DP, Malisch R, McBride J, Morrison JJ, Reilly A, Tlustos C,2012. *Polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and polychlorinated biphenyls (PCBs) in breast milk of first-time Irish mothers: Impact of the 2008 dioxin incident in Ireland*. Chemosphere 88 (2012) 865–872

Tlustos C, McHugh B, Pratt I, Tyrrell L and E McGovern,2007. *Investigation into levels of dioxins, furans, polychlorinated biphenyls and brominated flame retardants in fishery produce in Ireland. Marine Environmental Health Series 26, 2006.* Report available on the FSAI Website, www.fsai.ie/surveillance/

TNO, 2008a. *Priority Action Substances in the South Eastern River Basin District Project: Summary report no 1.* [online] Available at http://www.serbd.com/documents/DS_Screening/Dangerous_Substances_Screening_Monitoring_Programme_TNO%20Report_Initial%20Sites.pdf [accessed 12th July, 2011]

TNO, 2008b. *Priority Action Substances in the South Eastern River Basin District Project: Summary report no 2.* [online] Available at http://www.serbd.com/documents/DS_Screening/Dangerous_Substances_Screening_Monitoring_Programme_TNO%20Report_Target%20Sites.pdf
[accessed 12th July, 2011]

UNEP, 2007a. *Risk management evaluation on hexabromobiphenyl.* Report of the Persistent Organic Pollutants Review Committee on the work of its third meeting. UNEP/POPS/POPRC.3/20/Add.3. Geneva, 19–23 November 2007

UNEP, 2006a. *Risk Profile on Commercial Pentabromodiphenyl Ether.* Report of the Persistent Organic Pollutants Review Committee on the work of its second meeting, UNEP/POPS/POPRC.2/17/Add.1. Geneva, 6-10 November 2006

UNEP, 2006b. *Risk profile on hexabromobiphenyl.* Report of the Persistent Organic Pollutants Review Committee on the work of its second meeting UNEP/POPS/POPRC.2/17/Add.3. Geneva, 6-10 November 2006

UNEP, 2006c. *Risk profile on perfluorooctane sulfonate.* Report of the Persistent Organic Pollutants Review Committee on the work of its second meeting, UNEP/POPS/POPRC.2/17/Add.5 Geneva, 6-10 November 2006

UNEP, 2005a. *Guidance for developing a National Implementation Plan for the Stockholm Convention.* UNEP Chemicals Geneva, Switzerland

UNEP, 2005b. *Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, Edition 5.2*. UNEP Chemicals Geneva, Switzerland

van Leeuwen R. FX and Malisch R, 2002. *Who Exposure Study on the levels of PCBs, PCDDS and PCDFs in Human Milk*

Wall P G, 2009. *Report of the Inter-Agency Review Group on the Dioxin Contamination Incident in Ireland in December 2008.* [online] Available at http://www.agriculture.gov.ie/media/migration/publications/2010/DioxinReport211209revised190110.pdf [accessed 12th July, 2011]

APPENDIX I – Glossary of terms

BAT	Best Available Techniques
BEP	Best Environmental Practice
BFR	Brominated Flame Retardants
CLRTAP	Convention on Long-Range Transboundary Air Pollution
COP	Conference of Parties
DoAFM	Department of Agriculture, Food and the Marine
DoECLG	Department of Environment, Community and Local Government
EPA	Environmental Protection Agency
EPER	European Pollutants Emissions Register
FSAI	Food Safety Authority of Ireland
GEF	Global Environment Facility
HCB	Hexachlorobenzene
HCH	Hexachlorocyclohexane
HSA	Health and Safety Authority
HSE	Health Service Executive
IMB	Irish Medicines Board
IPPC	Integrated Pollution Prevention and Control
I TEQ	International Toxic Equivalent Concentration
kg	kilograms
mg	milligrams
ng	nanogram
MSW	Municipal Solid Waste
OECD	Organisation for Economic Cooperation & Development
PAHs	Polycyclic aromatic hydrocarbons
PBBs	Polybrominated biphenyls
PBDEs	Polybrominated diphenyl Ethers
PBT	Persistent, Bioaccumulative and Toxic
PCBs	Polychlorinated biphenyls
PCDD	Polychlorinated dibenzo-p-dioxins (dioxins)
PCDF	Polychlorinated dibenzofurans (furans)
PeCB	Pentachlorobenzene
PFOS	Perfluorooctane sulfonic acid and its derivatives
PIC	Prior Informed Consent
pg	picogram
pgm^{-3}	picogram per cubic metre
POPs	Persistent Organic Pollutants
PRTR	Pollutant Release and Transfer Register
REACH	Registration, Evaluation and Authorisation of Chemicals
TDI	Tolerable daily intake

TEF	Toxic equivalency factor
TEQ	Toxic equivalent concentration
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environmental Programme
WHO	World Health Organization
WSSD	World Summit on Sustainable Development

Dioxins and PCBs

The term "dioxins" refers to a group of chemically and structurally related halogenated aromatic hydrocarbons, including 75 polychlorinated dibenzo-*p*-dioxin (PCDD) and 135 polychlorinated dibenzofuran (PCDF) congeners. Dioxins are widely distributed contaminants formed as unwanted by-products in a number of anthropogenic activities. The toxicity of individual dioxin and furan congeners differs considerably. From the 210 theoretically possible congeners, only those substituted in each of the 2-, 3-, 7- and 8-positions of the two aromatic rings are of toxicological concern. These 17 congeners exhibit a similar toxicological profile, with 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) the most toxic congener. Polychlorinated biphenyls (PCBs) are chlorinated aromatic hydrocarbons, which are synthesised by direct chlorination of biphenyl. Depending on the number of chlorine atom substituents (1-10) and their position on the two rings there are 209 theoretically possible congeners. PCBs can be divided into different groups according to their biochemical and toxicological properties. Non-*ortho* and mono-*ortho* substituted PCBs show toxicological properties that are similar to dioxins. They are therefore often termed 'dioxin-like PCBs'. Most other PCBs do not show dioxin-like toxicity. In order to be able to sum up the toxicity of the different congeners of concern (17 dioxins and 12 dioxin-like PCBs), Commission Regulation (EC) No 1881/2006 lays down the use of toxicity equivalency factors (TEFs) to facilitate risk assessment and regulatory control. The analytical results of all individual dioxin and dioxin-like PCB congeners should be expressed in terms of 2,3,7,8-TCDD toxic equivalents (TEQs) using the TEF values proposed by the World Health Organisation.

The six congeners often termed "indicator-PCB" or "marker-PCB" were not selected from a toxicological point of view, but were considered as indicators for the different PCB pattern in various sample types. This concerns technical mixtures as the main source of contamination as well as environmental and human samples where the pattern is significantly affected by biodegradation and photodegradation as well as bioaccumulation and metabolism. Sometimes investigations also include PCB 118, which is actually a dioxin like PCB, as a seventh congener into the group of indicator PCB.

Source: European Food Safety Authority:

http://www.efsa.europa.eu/fr/scdocs/doc/1385.pdf

http://www.efsa.europa.eu/en/efsajournal/doc/284.pdf

APPENDIX II – POP substances as described under the Stockholm Convention on POPs

Substance	Typical Application / Use
Aldrin	Pesticide used to kill termites, grasshoppers, corn rootworm, and other insect pests.
Chlordane	Control of termites and as a broad-spectrum insecticide on a range of agricultural crops.
Dieldrin	Control of termites and textile pests and the control of insect-borne diseases and insects living in agricultural soils.
Endrin	Insecticide used on crops such as cotton and grains. It is also used to control rodents such as mice and voles.
Heptachlor	Used to kill soil insects and termites, cotton insects, grasshoppers, other crop pests, and malaria-carrying mosquitoes.
Hexachlorobenzene	Kills fungi that affect food crops. It was widely used to control wheat bunt. A by-product of the manufacture of certain industrial chemicals and exists as an impurity in several pesticide formulations.
Mirex	Insecticide used mainly to combat fire ants and against other types of ants and termites. It has also been used as a fire retardant in plastics, rubber, and electrical goods.
Toxaphene	Insecticide used on cotton, cereal grains, fruits, nuts, and vegetables. It has also been used to control ticks and mites in livestock.
DDT	DDT was widely used to control disease, and it was sprayed on a variety of agricultural crops, especially cotton. DDT continues to be applied against mosquitoes in several countries to control malaria.
Chlordecone	A synthetic chlorinated organic compound, which was mainly used as an agricultural pesticide. It was first produced in 1951 and introduced commercially in 1958. Currently, no use or production of the chemical is reported.
Lindane	This was used as a insecticide for seed and soil treatment, foliar applications, tree and wood treatment and against ectoparasites in both veterinary and human applications.
Alpha hexachlorocyclo-hexane	Although the intentional use of alpha-HCH as an insecticide was phased out years ago, this chemical is still produced as unintentional by-product of lindane. For each ton of lindane produced, around 6-10 tons of the other isomers including alpha- and beta-HCH are created.
Beta hexachlorocyclo-hexane	Although the intentional use of beta-HCH as an insecticide was phased out years ago, this chemical is still produced as unintentional by-product of lindane. For each ton of lindane produced, around 6-10 tons of the other isomers including alpha- and beta-HCH are created.
Hexabromobiphenyl	An industrial chemical that has been used as a flame retardant, mainly in the 1970s. According to available information, hexabromobiphenyl is no longer

	produced or used in most countries.
Polychlorinated biphenyls (PCBs)	These compounds are used in industry as heat exchange fluids, in electric transformers and capacitors, and as additives in paint, carbonless copy paper, and plastics. Of the 209 different types of PCBs, 13 exhibit a dioxin-like toxicity.
Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOS-F)	PFOS is intentionally produced and an unintended degradation product of related anthropogenic chemicals. The current intentional use of PFOS is widespread and includes electric and electronic parts, use in semi-conductor manufacture, fire fighting foam, photo imaging, hydraulic fluids and textiles.
Technical endosulfan and its related isomers	Insecticide used to control crop pests, tsetse flies and ectoparasites of cattle and as a wood preservative. As a broad-spectrum insecticide, endosulfan is currently used to control a wide range of pests on a variety of crops including coffee, cotton, rice, sorghum and soy.
Tetrabromodiphenyl ether and pentabromodiphenyl ether	Used to inhibit or suppress combustion in organic materials and therefore are used as additive flame retardants. Tetra and Penta BDE are the main components of commercial pentabromodiphenyl ether
Hexabromodiphenyl ether and heptabromodiphenyl ether	Used as a Flame Retardant. Hexa and hepta BDE are the main components of commercial octabromodiphenyl ether.
Pentachlorobenzene (PeCB)	Used in PCB products, in dyestuff carriers, as a fungicide, a flame retardant and as a chemical intermediate e.g. previously for the production of quintozene. It is also produced unintentionally during combustion, thermal and industrial processes. It also present as impurities in products such as solvents or pesticides.
Dioxins / Furans	Produced unintentionally due to incomplete combustion, as well during the manufacture of pesticides and other chlorinated substances. They are emitted mostly from the burning of waste, and can be produced from automobile emissions and the burning of solid fuels peat, coal, and wood.

Source: www.pops.int

APPENDIX III – National Implementation Plan Consultation Submissions

Submissions were made in relation to the following areas:

- Various public authority roles, responsibilities and legislation relevant to POPs
- Monitoring of POPs in food, public health and the environment
- Information on pesticides
- Various concerns in relation to POPs such as adverse effects, accumulation of POPs in the Irish population
- Concerns related to waste incineration and combustion activities, and emissions of dioxins and furans
- Waste incineration as a net sink for POPs
- Request for industry representation on the POPs working group
- Request for information, education and guidance on POPs
- Recommended testing of sewage sludge to improve the accuracy of estimated releases of dioxins in sewage sludge
- Stockholm Convention and National implementation Plan should be taken into consideration during licencing and planning process
- Measures to reduce or eliminate releases of POPs
- Measures to manage POPs in WEEE plastics

APPENDIX IV – Key EU legislation concerning dioxins, furans and PCBs

Legislation	Key Aspects
Waste	
Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste	The Directive lays down measures to protect the environment and human health by preventing or reducing the adverse impacts due to the generation and management of waste. The Directive defines the Waste Hierarchy outlining the following options in order of priority: • Prevention – including reducing hazardous materials content in products; • Preparing for re-use; • Recycling; • Other recovery, e.g. energy recovery; and • Disposal.
Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste	The Directive aims to prevent or limit as far as practicable negative effects on the environment, particularly pollution by emissions into air, soil, surface water and groundwater and resulting risks to human health from incineration and co-incineration of waste. The Directive sets stringent operational conditions and technical requirements for waste incinerators. This Directive will be superseded by the Industrial Emissions Directive (Directive 2010/75/EU) from 2013.
Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles	The Directive requires hazardous materials and components (including those containing PCB) of end-of life vehicles be removed and segregated from the vehicle so as not to contaminate subsequent shredder waste.
Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)	The Directive requires Member States take necessary measures to ensure used PCB are disposed of as soon as possible and PCB-contaminated equipment with aggregate volumes greater than 5 dm^3 of PCB-contaminated materials with PCB concentrations greater than 500mgkg^{-1} is decontaminated or disposed of in an environmentally sound manner before December 31, 2010. Equipment containing aggregate volumes of PCB-contaminated materials greater than 5 dm^3 with PCB concentrations between 50mgkg^{-1} and 500mgkg^{-1} must be disposed of in an environmentally sound manner at the end of its useful life. Member States must also ensure inventories of equipment containing aggregate volumes greater than 5 dm^3 of PCB-contaminated materials with PCB concentrations greater than 50mgkg^{-1} are compiled and summaries of such inventories sent to the Commission.
Council Regulation (EEC) No 259/93 on the supervision and control of shipments of waste within, into and out of the European Community (as amended by Council Regulation (EC) No 120/97 and Commission Regulation (EC) No 2557/2001)	The Regulation set the requirements for the shipment of hazardous waste both within, into and out of the European Union and establishes a system of prior authorisation for the shipment of waste for disposal or for recovery in accordance with the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

Legislation	Key Aspects
Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)	The aim of the Directive is the protection of the environment and human health by the prevention or reduction of the adverse impacts of the generation and management of waste electrical and electronic equipment (WEEE) and by the reduction of the overall impacts of resource use and improving efficiency of such use. The Directive also requires WEEE to be treated appropriately, e.g. PCB-containing capacitors (in accordance with Council Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)).
Industrial Emissions	
Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions	The Directive aims to reduce the negative environmental impact due to certain industrial activities. Activities covered by the Directive are required to obtain a permit from the Member States' authorities (except for installations covered only by Chapter V that may be subject to derogation). The permits must be based on the application of best available techniques (BAT) and must include emission limit values for pollutants.
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. This directive will be replaced by 2010/75/EU above.
European Pollutant Release and Transfer Register	
Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register	The Regulation established an integrated pollution release and transfer register (European PRTR) in the form of a publicly accessible electronic database. Data on the principal emissions, including emissions of some POPs, to air, land, water and waste are collected and published every year. The first reporting year under the E-PRTR was 2007.
Water	
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 (as last amended by Directive 2009/90/EC)	The Directive establishes the framework for the protection of inland surface water, transitional waters, coastal waters and groundwaters and lays down emission limit values and environmental quality standards in receiving waters at EU level. Among other things, the Directive requires the European Parliament and the Council to adopt specific measures against pollution of waters by individual pollutants or pollutant groups. Currently dioxins and dioxin-like PCB are being considered for inclusion on the list of priority substances.
Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)	The Directive established a framework within which Member States shall take necessary measures to achieve or maintain good environmental status in marine environments, which includes the North-east Atlantic Ocean, by 2020. The strategy framework aims, among other things, to protect the marine environment from contamination due to pollutants, including priority substances listed in Directive 2000/60/EC.
Major Accident Hazards	
Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the	The Directive lays down rules for the prevention of major accidents which involve dangerous substances, including dioxins and furans, and the limitation of their consequences for human health and the environment, with a view to ensuring a high

Legislation	Key Aspects
control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC.	level of protection throughout the Union in a consistent and effective manner.
Feed and Food	
Commission Regulation 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs (as last amended by Regulation (EC) No 219/2012) Commission Regulation (EU) No 1259/2011 of 2 December 2011 amending Regulation (EC) No 1881/2006 as regards maximum levels for dioxins, dioxin-like PCBs and non-dioxin-like PCBs in foodstuffs	The Regulations aims to protect human health from food contamination by substances including certain POPs. The Regulation establishes maximum levels for dioxins and dioxin-like PCB 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 last amended by Commission Directive 2010/6/EU	The Directive aims to reduce the content of undesirable substances in products intended for animal feed by establishing maximum levels and action levels in animal feed.
Commission Regulation (EC) No 466/2001 of 8 March 2001 setting the maximum levels of certain contaminants in foodstuffs as amended by Regulations (EC) No 2375/2001 and Regulation (EC) No 199/2006	The Regulations set maximum levels for certain contaminants, including certain POPs in foodstuffs.
Commission Regulation (EU) No 252/2012 of 21 March 2012 laying down methods of sampling and analysis for the official control of dioxins and dioxin-like PCBs and non-dioxin-like PCBs in certain foodstuffs	The Regulation harmonises the sampling and analysis of certain contaminants in foodstuffs across the European Union and ensures comparability of the results.
Commission Directive 2002/70/EC of 26 July 2002 establishing requirements for the determination of levels of dioxins and dioxin-like PCBs in feeding stuffs as amended by Directive 2005/7/EC	The Directives establishes requirements for the determination of PCDD/PCDF and dioxin-like PCB in feeding stuffs

APPENDIX V – UNEP Toolkit Unintentional POP Source Sub-Categories

1. Waste incineration	6. Open burning
Municipal solid waste incineration	Biomass Burning - Forest fires
Hazardous waste incineration	Biomass Burning - Savannah burning
Medical waste incineration	Biomass Burning - Agriculture residue burning
Light-fraction shredder waste incineration	Waste burning, accidental fire
Sewage sludge incineration	Accidental Burning of Vehicles & Buildings
Waste wood and waste biomass Incineration	Burning of Farm plastics
Destruction of animal carcasses	Domestic Waste Burning, Wood Waste on Construction Sites and Domestic Bonfires
2. Ferrous and non-ferrous metal production	**7. Production and use of chemicals and consumer goods**
Iron ore sintering	Pulp and paper production
Coke production	Chemical industry
Iron and steel production and Foundries	Petroleum industry
Copper production	Textile production
Aluminium production	Leather refining
Lead production	**8. Miscellaneous**
Zinc production	Drying of biomass
Brass and bronze production	Crematoria
Magnesium production	Smoke houses
Other non-ferrous metal production	Dry cleaning
Shredders	Tobacco smoking
Thermal wire reclamation	**9. Disposal**
3.Power and Heat Generation	Landfills and waste dumps
Fossil fuel power plants	Sewage and sewage treatment
Biomass power plants	Open water dumping
Landfill, biogas combustion	Composting
Household heating and cooking (biomass)	Waste oil treatment
Domestic heating (fossil fuels)	**10. Identification of potential hot spots**
4.Production of mineral products	Production sites of chlorinated organics
Cement production	Production sites of chlorine
Lime production	Formulation sites of chlorinated phenols
Asphalt mixing	Application sites of chlorinated phenols
Glass production	Timber manufacture and treatment sites
Ceramic production	PCBs filled transformers and capacitors
Brick production	Dumps of wastes/residues from categories 1-9
5. Transport	Sites of relevant accidents
4 –Stroke engines	Kaolinite or ball clay sites
2- Stroke engines	Dredging of sediments
Diesel engines	
Heavy oil fired engines	

APPENDIX VI – Stockholm Convention Annex C Part II Source Category Controls

Source Categories	Controls
Waste incinerators, including co-incinerators of household, hazardous or medical waste or of sewage sludges	Nine chemical and pharmaceutical plants currently operate on-site waste incineration facilities for liquid wastes (including two that also accept solid waste), which are well managed and safely handle on-site waste streams. They are all controlled under their IPPC licences and are required to comply with the Waste Incineration Directive and are required to operate using Best Available Techniques. There is one operational municipal waste incinerator that treats residual municipal waste. It is operated under a Waste Licence and in accordance with the Waste Incineration Directive and is required to operate using Best Available Techniques. Two other licences have been issued for the operation of incinerators. The operation of these facilities has not commenced. There are 4 cement plants operating in Ireland. Only one of them is licenced for firing with hazardous waste and a variety of non-hazardous wastes (no firing with hazardous waste has yet taken place). Two other plants are licenced to fire using non-hazardous wastes including solid recovered fuel. Each of the plants is controlled under an IPPC licence with specific controls in accordance with the Waste Incineration Directive and is required to operate using Best Available Techniques.
Cement kilns firing hazardous waste	See above
Production of pulp using elemental chlorine or chemicals generating elemental chlorine for bleaching	There are no plants for the production of pulp in Ireland.
The following thermal processes in the metallurgical industry: **i) Secondary copper production** **ii) Sinter plants in the iron and steel industry** **iii) Secondary aluminium production** **iv) Secondary zinc production**	There are two plants in Ireland licensed for secondary aluminium production. They are controlled under their IPPC licences.

APPENDIX VII - Stockholm Convention Annex C Part III Source Category Controls

Source Categories	Controls
Open burning of waste, including burning of landfill sites	Specific regulations have been created in Ireland prohibiting the disposal of waste by burning. These regulations (SI 286 of 2009) provide for an approvals system for burning of certain uncontaminated wastes generated from agricultural practices.
Thermal processes in the metallurgical industry not mentioned in Part II	There is one small ferrous metal foundry and six hot dip galvanising plants operating in Ireland. In addition there are two plants that reform lead into lead sheeting for roofing and other applications and another three other plants that produce high precision metal products. There are also a number of boiler and tank production facilities. All of these facilities are licensed under the IPPC regime and are required to implement Best Available Techniques.
Residential combustion sources	The ban on the sale and marketing of bituminous coal in large Irish cities and towns has greatly reduced levels of particulate matter pollution in these areas since it was first introduced in the early 1990s. The recently introduced Air Pollution Act (Marketing, Sale, Distribution and Burning of Specified Fuels) Regulations 2012 (S.I. No. 326 of 2012) provide for expansions of the ban areas within most of the 20 cities and towns already covered by the smoky coal ban, and 7 new towns being included under the ban from May 2013 onwards. POPs emissions related to residential coal burning is associated with the level of particulate matter emitted. As part of the CAFE Directive (2008/50/EC), Ireland must reduce its average $PM_{2.5}$ background concentration by 10% by 2018 which will have the benefit of also reducing the emission of unintentional POPs.
Fossil fuel-fired utility and industrial boilers	Combustion installations with a rated thermal input equal to or greater than 50 MW are subject to the Large Combustion Plant Directive and will in the future be subject to the Industrial Emissions Directive. The majority of electricity generation from fossil fuel burning in Ireland is from natural gas combustion.
Firing installations for wood and other biomass fuel	The primary control on emissions from wood burning installations is to only permit only clean wood waste to be combusted as there is a risk of POPs generation from the combustion of contaminated wood. Where a company wishes to use contaminated wood a licence is required which requires compliance with the Waste Incineration Directive (2000/76/EC) as a waste incineration or co-incineration plant. Such combustion would be required to have controls in place to ensure that the dioxin emission limits as specified in the directive are met.

Source Categories	Controls
Specific chemical production processes releasing unintentionally formed persistent organic pollutants, especially production of chlorophenols and chloranil	There is no known production of chlorophenol or chloranil in Ireland.
Crematoria	There are three crematoria in Ireland operating four cremators. The Waste Incineration Directive does not apply and these facilities are not regulated under the Air Pollution Act. These facilities are liable to planning authorisation. One cremator has emissions abatement technology in place.
Motor vehicles, particularly those burning leaded gasoline	There are a number of relevant EU directives and regulations that set emission limits on vehicles including Regulations (EC) No. 715/2007 and Directive 2005/55/EC. **Additives in fuels and lubricants** – leaded fuel is no longer in regular use in Ireland and no halogenated additives are used. **Other control measures** – Every two years a car test is carried out on all cars over the age of 4 years which includes emissions testing to confirm that efficient combustion is taking place. Cars over the age of 10 years are tested annually.
Destruction of animal carcasses	Ireland has a number of facilities that render animal waste rather than animal carcasses. They produce meat and bone meal and this product is used as a fuel in cement and energy production.
Textile and leather dyeing (with chloranil) and finishing (with alkaline extraction)	There is no textile or leather dyeing with chloranil or textile or leather finishing with alkaline extraction in Ireland.
Shredder plants for the treatment of end of life vehicles	In Ireland there are four shredders plants permitted to process end of life vehicles, although no shredder is dedicated to vehicles. Currently three of these plants are operational. These facilities are currently permitted under the waste permit regulations. These waste permits require the depollution of vehicles to be shredded in line with the requirements of Directive 2000/53/EC on end of life vehicles. There is a new activity class under the IED which may bring these facilities into the EPA licencing regime.
Smouldering of copper cables	There is no authorised smouldering of copper cables known to occur in Ireland.
Waste oil refineries	There are no waste oil refineries in Ireland.