

NATIONAL PLAN FOR THE IMPLEMENTATION OF

**THE STOCKHOLM CONVENTION
on Persistent Organic Pollutants (POPs)**

adopted by the Council of Ministers on 4 January 2013

THE REPUBLIC OF POLAND

Warsaw 2012

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INTRODUCTION

Persistent organic pollutants (POPs) are chemical substances highly resistant to degradation in the environment, subject to bioaccumulation, especially in fat cells, which consequently has a negative impact on human and animal health, and the environment.

Persistent organic pollutants are steam volatile and this property is the cause of their transmission over long distances from sources of release. They accumulate in particular in Arctic and mountain regions where airborne POPs undergo condensation.

The increase in concentrations of these substances in the environment by the 1960s due to their use in pesticides and biocides made it necessary to take measures to withdraw them from production and use, which resulted in the Stockholm Convention on Persistent Organic Pollutants.

The Stockholm Convention, made in Stockholm on May 22, 2001 (Journal of Laws of 2009 No. 14, item. 76)¹, hereinafter referred to as "the Convention", is an international agreement concluded after three years of negotiations, conducted under the auspices of the United Nations Environment Programme (UNEP), in order to protect human health and the environment against persistent organic pollutants. The Convention entered into force 90 days after submission of ratification documents by 50 parties on 17 May 2004. Currently (as of May 1, 2012) the Convention has 177 Parties and 151 signatories [1], including the European Union.

Under the Act of 13 June 2008 to ratify the Stockholm Convention on Persistent Organic Pollutants, hereinafter referred to as "the Act on ratification of the Stockholm Convention", the Convention was ratified by the Polish President on 30 September 2008. The Convention entered into force in the Republic of Poland on 21 January 2009 under the government's statement of 2 December 2008 on the binding force of the Stockholm Convention on Persistent Organic Pollutants, signed in Stockholm on 22 May 2001 (Journal of Laws of 2009, No. 14, item 77).

Each Party is obliged, under Article 7 of the Convention, to draft a national plan to implement its obligations under the Convention, and to review and update it periodically.

In 2004, Poland has developed the *National Program for the Implementation of the Stockholm Convention* [2], under the GF/POL/01/004 *Enabling activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants* project, drawn up by the Institute of Environmental Protection in Warsaw and financed by the UNIDO.

The National Program for the Implementation of the Stockholm Convention was developed in accordance with the draft *Guidance for Developing a National Implementation Plan for the Stockholm Convention* [3].

Preparation of the plan of the implementation of the Convention in Poland used a financial mechanism provided for in the Convention, under which developing countries and countries with economies in transition can use assistance of the developed countries. Financial mechanism for the

¹ The updated English version of the Convention is available at:
<http://chm.pops.int/Convention/tabid/54/Default.aspx>.

Convention is ensured by GEF administered by the World Bank. Its first initiative was to award funds to several countries, including Poland, to deliver pilot projects aimed at facilitation of activities determining effective implementation of the Convention.

GEF decided to award funds to Poland to deliver the GF/POL/01/004 project in 2001. This project was implemented under contract No. 2001/369 signed between UNIDO, acting as the international coordinator of the GEF projects under the Convention, and the Institute of Environmental Protection. For coordination and professional supervision over the project, the Minister of Environment appointed the national Steering Committee, comprising representatives of relevant ministries (environment, health, labour, economy, agriculture, finance, foreign affairs and national defence), as well as representatives of science, industry and NGOs. The plan of 2004 has been approved by the Minister of Environment but has not been submitted to relevant authorities because Poland had not been a party to the Convention yet.

Next, after ratification of the Convention in 2009 in order to fulfil the obligations under Article 7 of the Convention, which obliges the Parties to draw up and submit to the Secretariat of the Convention and the European Commission national plans for implementation of the Stockholm Convention, the National Plan of Implementation of the Stockholm Convention was updated and submitted to the Secretariat of the Convention in January 2011. The document included, among others, a legal status analysis, results of monitoring and inventory of substances covered by the Convention's provisions and analysis of tasks as at 30 June 2010.

This document is an updated National Plan for Implementation of the Stockholm Convention due to the amendments to the Convention that entered into force on 26 August 2010 introducing 9 new substances to the Annexes to the Convention, and due to the amendment that entered into force on 29 October 2012 adding 1 new substance to Annex A of the Convention.

The primary objective of the NPISC (National Plan for Implementation of the Stockholm Convention) is to organize research and monitoring of the environmental condition in terms of pollution with POPs and hazards from POPs for humans and the environment. Continuous research and monitoring are the basis for taking actions to eliminate the POPs release sources, reduce the pollution volume and properly manage the existing waste. The scope of environmental condition research and control will change from time to time due to changes in the scope of the Convention and also due to the changing economic and social conditions, and scientific and technical progress.

1. CURRENT LEGAL STATUS AND TASKS OF THE PUBLIC ADMINISTRATION

1.1 Current legal status of POP handling

1.1.1 International agreements on persistent organic pollutants

In addition to the Convention, international agreements on persistent organic pollutants include:

- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, issued in Basel on 22 March 1989 (Journal of Laws, 1995 No. 19, item 88), hereinafter the "Basel Convention",
- The Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, signed in Rotterdam on 10 September 1998 (Journal of Laws of 2008 No. 158, item 990), hereinafter the "Rotterdam Convention",
- Protocol to the 1979 Convention on Long Range Transboundary Air Pollution on Persistent Organic Pollutants (POPs) (Official Journal EC L 81 of 19.3.2004 p. 37; Official Journal EU Special edition in Polish Chapter 11, vol. 50, p. 146), hereinafter the "Protocol on POPs".

1.1.2 Legislation in the European Union and the Republic of Poland

1.1.2.1 General requirements for chemicals

Changes made in recent years in the European Union legislation on chemicals are showing an increasingly strong trend toward abandonment of legislation in the rank of Directives and adoption of Regulations instead. Under the Treaty, Regulations are of general scope, are entirely binding and are directly applicable in all the Member States. Such effect converges legislative, executive and administrative provisions in the Member States and promotes formation of identical legal framework throughout the European Union market. Lack of the need to transpose the Regulations also shifts the burden of rulemaking from the level of national legislature to the level of the European legislature which in turn leads to reduction in the number of legal acts.

The basic legal act on chemicals in the European Union is the Regulation (EC) No. 1907/2006 of the European Parliament and the Council of 18 December 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 and Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (Official Journal EU L 136, 29.5.2007, p. 3, as amended), hereinafter the "REACH Regulation", and Regulation of the European Parliament and the Council (EC) No. 1272/2008 of 16 December 2008 on classification, labelling and packaging of substances and mixtures amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006 (Official Journal EU L 353, 31.12.2008, p. 1), hereinafter referred to as the „CLP Regulation”. To make provision for the European Union's strive to a single internal market, the policy on introducing restrictions in manufacturing and use in the European Union concerning some products – including chemicals – is conducted at the European level. REACH

Regulation is the legal instrument for assessment of the effect of chemicals on human health and environment in the Union, including a guideline for placing bans on their production and use. This regulation provides a harmonized approach to defining chemicals assessment criteria in terms of hazards for human health and the environment, such as stability and ability to bioaccumulate. A complementary legal act on this issue is the Regulation (EC) No. 1272/2008 regulating free flow of substances, mixtures and products within the EU, while also adopting harmonized criteria for classification of substances and mixtures and regulations concerning labelling and packing of hazardous substances and mixtures.

The European Chemicals Agency (ECHA) was established to effectively manage technical, scientific and administrative actions resulting from REACH and CLP Regulations. ECHA, among others, registers chemicals produced and imported in the area of the European Union in the amount of at least 1 ton a year, and manages the lists of classification and labelling of chemicals used in the EU.

Domestically, the act supplementing provisions of the above regulations is the Act of 25 February 2011 on chemical substances and their mixtures (Journal of Laws of 2011, No. 63, item 322), hereinafter referred to as the "Act on chemical substances".

Inclusion of new chemicals in the scope of the Convention's provisions entails the need to include them in the annexes to the Regulation (EC) No 850/2004 of the European Parliament and the Council of 29 April 2004 regarding persistent organic pollutants and amending Directive 79/117/EEC (Official Journal EC L 158, 30.04.2004, p. 7, as amended; Official Journal EU Special edition in Polish, Chapter 15, vol. 8, p. 465) – hereinafter referred to as "Regulation (EC) No 850/2004". This regulation implements the provisions of the Stockholm Convention and the Gothenburg Protocol in the area of the European Union.

1.1.2.1.1 Plant protection products

Regulation (EC) No 1107/2009 of the European Parliament and the Council of 21 October 2009 concerning the placing of plant protection products and repealing Council Directives 79/117/EEC and 91/414/EEC (Official Journal EU L 309, 24.11.2009, p. 1), hereinafter referred to as "Regulation (EC) No 1107/2009".

The regulation introduces bans on marketing and use of plant protection products containing certain active substances, including persistent organic pollutants.

In Poland, the act of 18 December 2003 on plant protection (Journal of Laws of 2008 No. 133, item 849, as amended) hereinafter referred to as the "Act on Plant Protection", is currently in force.

According to the law in force, marketing of a plant protection product requires authorisation of the minister competent for agriculture. Marketing authorisation can be granted only to these plant protection products which, if used correctly as intended, are not hazardous for human or animal health or the environment, in particular plant production products that do not contain active substances posing such a hazard or for which the European Commission issues a decision prohibiting their use in plant protection products. Under the above Regulation, plant protection products must not contain persistent organic pollutants.

1.1.2.1.2 Biocides

Act of 13 September 2002 on biocidal products (Journal Laws of 2007 No. 39, item 252, as amended), hereinafter referred to as the "Act on Biocidal Products", transposes into national law i.a. provisions of the Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market (Official Journal EC L 123 of 24.04.1998, p. 1; Official Journal EU Special edition in Polish Chapter 3, vol. 23, p. 3), hereinafter referred to as the "Directive 98/8/EC". The Act lays down conditions for the marketing and use of biocidal products and active substances used in biocidal products in the Republic of Poland, including the requirements for efficacy and safety of their use, as well as the rules of mutual recognition of marketing authorisations and entries into the register of low risk biocidal products between the Republic of Poland and other Member States of the European Union.

The Act aims at preventing hazards to human and animal health and to the environment which may be caused by biocidal products.

Biocides may be placed on the market and used in the territory of the Republic of Poland only if:

- a marketing authorisation had been issued,
- a temporary authorisation had been issued,
- a decision on the entry into the register of low risk biocidal products was issued,
- a marketing authorisation had been issued,

- and if the biocides are classified, packed and labelled in accordance with the requirements specified in the act.

The President of the Office for Registration of Medicinal Products, Medical Devices and Biocidal Products issues the authorisation and makes the entry into the register.

1.1.2.1.3 Persistent Organic Pollutants (POPs)

The issues concerning production, marketing and use of most persistent organic pollutant substances listed in the Convention were regulated as early as in the late 1970s by introducing bans on production and restrictions on use.

National law on persistent organic pollutant substances mainly implements the provisions of EU legislation relating to chemicals and waste management. The EU legislation in this area consists of a number of legal acts in the rank of directives, regulations and decisions issued by the European Union bodies.

In the territory of the European Union, provisions of the Convention have been introduced by Regulation (EC) No 850/2004. This regulation also includes requirements to be adopted in the Protocol on POPs.

Within the EU, also the Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) (Official Journal EC L 243,

24.9.1996, p. 31; Official Journal EU Special edition in Polish Chapter 15, vol. 3, p. 75), hereinafter referred to as the "Directive 96/59/EC", along with its accompanying decisions is in force.

The Directive is transposed into national legal regime on handling PCBs by the act of 27 April 2001 – Environmental Protection Law (Journal of Laws of 2008 No. 25, item 150, as amended), hereinafter referred to as the "Environmental Protection Law", and the regulations:

- of the Minister of Economy of 24 June 2002 on the requirements for the use and handling of substances posing a particular threat to the environment and the use and cleaning of the plant or equipment, which have been or are used for substances posing a particular threat to the environment (Journal of Laws no. 96, item 860), hereinafter referred to as the "Regulation on the requirements for the use and handling of substances posing a particular threat to the environment",
- of the Minister of Economy of 26 September 2002 on the determination of equipment, which could be used for substances posing a particular threat to the environment (Journal of Laws no. 173, item 1416), hereinafter the "Regulation on the determination of equipment, which could be used for substances posing a particular threat to the environment",
- of the Minister of Environment of 9 December 2003 on substances posing a particular hazard to the environment (Journal of Laws of 2003, No. 217, item 2141), hereinafter referred to as the "Regulation on substances posing a particular hazard to the environment".

Moreover, provisions concerning restrictions on production, marketing and use of some hazardous substances, mixtures and products are specified in the REACH Regulation.

In the transport of persistent organic pollutants, the provisions of international and national legal acts listed in Annex 2, items 1, 2, 22, 23, 26, 27, 36 and 52 apply.

1.1.2.1.4 Export and import of hazardous substances

Import of hazardous substances into the EU and export outside the territory of the EU are regulated by 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 (Official Journal EU L 204, 31.7.2008, p. 1), hereinafter referred to as the "Regulation (EC) No 689/2008".

Under this Regulation, the European Commission has been granted special powers to determine the types of chemicals that are banned from export outside the EU. On the basis of its authorisation, the Commission decides which chemicals are subject to prohibitions and restrictions in international trade. Pursuant to the binding regulations, the export of persistent organic pollutants listed in Annexes A and B to the Convention is prohibited.

1.1.2.2 General requirements for waste management

The legal act defining the requirements for waste management in the European Union is the Directive of the European Parliament and Council 2008/98/EC of 19 November 2008 on waste and repealing certain Directives (Official Journal EU L 312, 22.11.2008, p. 3), hereinafter referred to as the "Directive 2008/98/EC".

This Directive lays down measures to protect the environment and human health by preventing and reducing the negative impacts of generation and management of waste and improving efficiency of resource use. The Directive establishes the waste hierarchy, according to which national legislation should firstly require prevention of waste generation, and if it is not possible, preparation for reuse, recycling and other forms of recovery. Non-reusable wastes should be disposed. In accordance with the "polluter pays" principle, costs of waste management must be covered by the original waste producer or by current or previous holders of the waste. In this respect, Member States may adopt arrangements whereby the cost of waste management will be covered partially or entirely by the manufacturer of the product from which the waste originated from and that distributors of such products may share these costs.

The issues of operating and technical requirements for waste landfilling by providing resources, procedures and rules of conduct designed to prevent, as far as possible, negative effects of waste landfilling on the environment are regulated by the Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste.

In the transport of waste, including persistent organic pollutants, directly applicable are the provisions of Regulation (EC) No 1013/2006 of the European Parliament and the Council of 14 June 2006 on shipments of waste (Official Journal EU L 190, 12.7.2006, p. 1, as amended), hereinafter referred to as the "Regulation (EC) No 1013/2006". The regulation establishes control procedures and systems for the shipment of waste, depending on their origin, destination and route of shipment, the type of waste shipped and intended mode of dealing with waste at its destination, and applies to shipments between Member States, within the EU and to export and import of waste.

Specific recommendations regarding handling of persistent organic pollutant waste are also covered by Regulation (EC) No 850/2004 which defines methods of dealing with waste containing persistent organic pollutants.

In the Republic of Poland, waste management rules ensuring human life and health protection and environmental protection are defined in the Act of 27 April 2001 on waste (Journal of Laws of 2010 No. 185, item 1243, as amended) hereinafter referred to as "the Act on Waste," along with executive regulations.

Directions in waste management policy in Poland, including objectives in creating an integrated and adequate network of waste recovery and treatment plants and equipment meeting requirements defined in the environmental protection regulations, are specified in the national waste management plan updated every four years. The plan, adopted in the Resolution of the Council of Ministers No. 217 on the "National Waste Management Plan 2014 (Official Gazette No. 101, item 1183), sets targets for elimination of persistent organic pollutants from the market, including the gradual removal of equipment containing PCBs, disposal of waste containing PCBs in the country or abroad, and elimination of waste repositories that may contain persistent organic pollutants.

Recommended methods of dealing with waste oils, including those that may contain PCBs are defined in the Regulation of the Minister for Economy and Labour of 4 August 2004 on the detailed method of dealing with waste oils (Journal of Laws No 192, item 1968), hereinafter referred to as the "Regulation on the detailed method of dealing with waste oil".

Requirements concerning such issues as designation of competent authorities, included in Regulation (EC) No 1013/2006 on the international shipment of waste, are transposed to Polish legislation in the Act of 29 June 2007 on the international shipment of waste (Journal of Laws No 124, item 859, as amended), hereinafter referred to as the "Act on the international shipment of waste".

Legal act which supports the process of eliminating persistent organic pollutant waste from the market is the Environmental Protection Law. This Act lays down rules of handling POP-containing products, imposes restrictions and prohibitions on their use. Detailed provisions are included in the aforementioned executive acts:

- the Regulation on substances posing a particular threat to the environment which lists the substances classified as persistent organic pollutants,
- the Regulation on the determination of equipment which could use substances posing a particular threat to the environment, including a list of PCB-containing equipment,
- the Regulation on requirements for the use and handling of substances posing a particular threat to the environment, according to which the equipment containing PCBs should not be used longer than until 30 June 2010.

According to Regulation (EC) No 850/2004, waste containing persistent organic pollutants or contaminated with them are to be disposed of in a way ensuring destruction or irreversible transformation of POPs. However, these wastes may be recovered provided that persistent organic pollutants will not be recovered, recycled or reused as a result of the process.

National law in this scope – the Act on waste – defines detailed requirements for dealing with selected waste, including PCBs. The Act prohibits recovery of PCB waste, recommending their disposal through incineration in waste incinerators or using other processes causing their permanent degradation.

1.1.2.3 Emission requirements

Directive of the European Parliament and of the Council 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control – IED) (Official Journal EU L 334, 17.12.2010, p. 17), hereinafter referred to as the "IED Directive", sets out requirements for industrial plants, the functioning of which is particularly important from the environmental impact perspective. The purpose of this directive is to take comprehensive measures for integrated pollution prevention and reduction of environmental pollution caused by certain activities. The list of activities covered by the directive includes the sources of POPs release into the environment. The main pollutants include chlorine and its compounds, fluorine and its compounds, PCDDs and PCDFs. Running of plants listed in the directive requires obtaining permission. Permission to operate a plant may be granted subject to the application of the best available techniques (BATs), ensuring elimination or reduction of environmental pollution.

Pursuant to Regulation (EC) No 166/2006 of the European Parliament and the Council of 18 January 2006 on the establishment of a European Pollutant Release and Transfer, amending Council Directives 91/689/EEC and 96/61/EC (Official Journal EU L 33, 4.2.2006, p. 1), hereinafter referred to as the "Regulation (EC) No 166/2006", the obligation to monitor releases and emissions from the

plants which exceeded the threshold values for certain substances has been imposed. Managers of these plants are required to provide information about the release volume to relevant administration authorities. Based on this information, the European Pollution Release and Transfer Register (PRTR) [4] has been established, where the following threshold values have been adopted:

	Into the air [kg/year]	Into water [kg/year]
▪ hexachlorobenzene (HCB)	10	1
▪ PCDD/F (as TEQ)	0.0001	0.0001
▪ polychlorinated biphenyls (PCB)	0.1	0.1

The Environmental Protection Law introduces requirements of the Directive (EC) No. 2008/1/EC to the Polish legislation. The provisions contained in Title III, Section IV of the *Act on Permissions for the introduction of substances or energy into the environment* define the rules for granting permissions for economic activity. Prohibition on placing on the market and re-use of substances posing a particular threat to the environment is found in Article 160 of the Environment Protection Law act. The prohibition applies to PCBs and asbestos.

The Regulation on substances posing a particular threat to the environment lists the following substances posing a particular threat to the environment:

- aldrin (C₁₂H₈Cl₆),
- dieldrin (C₁₂H₈Cl₆O),
- endrin (C₁₂H₈Cl₆O),
- isodrin (C₁₂H₈Cl₆),
- DDT (C₁₄H₈Cl₅),
- hexachlorocyclohexane (HCH),
- lindane (γ-HCH).

As at May 1, 2012, these substances (except isodrin) are covered by the Convention.

The Regulation of the Council of Ministers of 9 November 2010 on projects that may significantly affect the environment (Journal of Laws No. 213, item 1397), hereinafter referred to as the "Regulation on the projects likely to significantly affect the environment", introduces to the Polish legislation a list of plants subject to the requirements of the Directive (EC) No 2008/1/EC.

The Act of 17 July 2009 on the management system for emissions of greenhouse gases and other substances (Journal of Laws No 130, item 1070, as amended), hereinafter the "Act on the management of emissions", ensures implementation of EC Regulation No 166/2006.

Regulation of the Minister of Environment of 22 April 2011 on the emission standards for installations (Journal of Laws No 95, item 558), hereinafter referred to as the "Regulation on emission standards of installation", sets emission standards for the introduction of gas or dust into the air for

industrial installations: combustion of fuels, including waste incineration and co-incineration, and installations using volatile organic pollutants (VOCs). The Regulation establishes the limit of dioxins and furans emissions from waste incineration and co-incineration and processes using VOCs in the amount of 0.1 TEQ ng/m³ of exhaust gases. Provisions of the Regulation do not apply to the sources, where combustion products are used for heating, drying or other treatment of objects or materials.

The Regulation of the Minister of Environment of 24 July 2006 on conditions to be met for the introduction of sewage into the water or soil, and on substances particularly harmful to the aquatic environment (Journal of Laws no. 137, item 984, as amended), hereinafter referred to as the "Regulation on the conditions to be met for the introduction of sewage into the water or soil", identifies the requirements for pollution limit values for treated wastewater.

Of persistent organic pollutants for which limits in the treated industrial waste water have been established, the Annex to the Regulation lists aldrin, dieldrin, endrin, HCH, HCB, DDT and PCBs.

Substances covered by the Convention belong to the group of substances that are particularly harmful, causing water pollution, which should be eliminated; thus, the regulation does not allow for their presence in waste water subject to treatment, except:

- HCB in industrial effluents from the following processes: HCB production and processing (up to 1 mg/l monthly average), production of perchlorethylene (PER) and tetrachloromethane by perchlorination (up to 1.5 mg/l monthly average), the production of trichlorethylene or perchlorethylene using other processes (up to 1 mg/l monthly average), as well as other industrial processes (up to 1 mg/l monthly average),
- PCDD/F in industrial effluents from treatment of waste gases from thermal waste transformation processes (up to 0.3 ng/l).

1.1.2.4 Requirements concerning maximum permissible concentrations of persistent organic pollutant substances in the environment and products

Table I and II show the limit values for persistent organic pollutant substances for specific elements of the environment and products, developed on the basis of the following legal acts:

- Regulation of the Minister of Health of 29 March 2007 on the quality of water intended for human consumption (Journal of Laws No. 61, item 417, as amended),
- Regulation of the Minister of Environment of 9 July 2011 for the classification of the condition of surface water bodies and environmental quality standards for the priority substances.
- Regulation of the Minister of Environment of 24 July 2006 on conditions to be met for the introduction of sewage into the water or soil, and on substances particularly harmful to the aquatic environment (Journal of Laws No 137, item 984, as amended),
- Regulation of the Minister of Environment of 9 September 2002 on standards for soil quality and soil quality standards (Journal of Laws No 165, item 1359),

- Regulation of the Minister of Environment of 16 April 2002 on the types and concentrations of substances that cause the output is contaminated (Journal of Laws No 55, item 498),
- Regulation of the Minister of Agriculture and Rural Development of 6 February 2012 on the content of hazardous substances in feed (Journal of Laws of 2012, item 230),
- Commission Regulation (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs (Official Journal EU L 364, 20.12.2006, p. 5, as amended),,
- Act of 16 December 2005 on products of animal origin (Journal of Laws of 2006, No 17, item 127, as amended),
- Regulation of the Minister of Agriculture and Rural Development of 28 July 2006 on how to deal with illicit substances, chemical and biological residues, medicinal products and radioactive contamination of animals and animal products (Journal of Laws of 2006, No 147, item 1067).

Wastes in which the concentration of a substance listed on the list of persistent organic pollutants is equal to or greater than those given in Table I are defined as POPs-containing waste (hazardous waste).

Table I. Concentration limits of POPs in waste

Name of the substance in the waste	Limit concentration
Aldrin	50 mg/kg
Chlordane	50 mg/kg
Chlordecone	50 mg/kg
Dieldrin	50 mg/kg
Endrin	50 mg/kg
Heptachlor	50 mg/kg
Hexabromobiphenyl	50 mg/kg
Hexachlorobenzene	50 mg/kg
Hexachlorocyclohexane, including lindane	50 mg/kg
Mirex	50 mg/kg
Toxaphene	50 mg/kg
Pentachlorobenzene	50 mg/kg
Polychlorinated biphenyls (PCBs)	50 mg/kg*
DDT (1,1,1-trichloro-2,2-di(4-chlorophenyl)ethane)	50 mg/kg
Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF)	15 µg/kg**
Total $\alpha\beta\gamma$ -HCH	50 mg/kg
Hexabromobiphenyl	50 mg/kg

* Concentration calculated according to European standards EN 12766-1 and EN-12766-2.

** Concentration calculated taking into account toxic equivalents (TEQs) of the compounds included in the substance.

Waste concentration limits were not specified for other substances included in the Stockholm Convention (PFOS and derivatives, polybrominated diphenyl ethers) due to the lack of comprehensive information about the amounts and concentrations in products and waste, and exposure scenarios.

Waste generated in present times contain POPs that are unwanted by-products. POP-containing waste have been divided by abundance into three groups²:

- Group A - waste in which, in rare cases, the POPs content exceeds the agreed limit value,
- Group B - waste in which, in many cases, the POPs content exceeds the agreed limit value,
- Group C - waste of uncertain risk, including due to the pollution level variability or uneven weight distribution of POPs in waste.

Waste can also be divided into groups by frequency of exceeding the POPs concentration limits:

Wastes containing PCDD/Fs. Concentrations of PCDD/Fs exceeding 10 µg/kg in less than 50% of installations were found for several types of waste: in the fly ash, residues from the purification of waste gases from secondary aluminium smelting, dust metals used in the process of secondary copper smelting, and in the residue after wet purification of exhaust gases from waste incineration plants. The concentrations exceeding 10 µg/kg were found in less than 10% of the tested installations, in flue gas cleaning waste from urban waste incineration plants, the flue dust from the home hearths and in ashes from biomass incineration.

Wastes containing PCBs. Excess concentrations of PCBs of 30 mg/kg were found in less than 50% of the tested installations for a small group of waste. These are oils with dielectric properties, hydraulic oils, equipment containing or contaminated with PCBs, waste adhesives and gaskets, cables and construction wastes contaminated with PCBs. In a few cases – less than 10% of the tested installations – the excess concerned mineral oils, "other waste from demolition", light fractions and dust from shredding motor vehicles.

POP pesticide waste. As these substances have been withdrawn from use, waste containing them are the remains of "waste repositories" – demolition waste in the form of concrete rubble and sometimes contaminated soil.

Other POP wastes. Polycyclic aromatic hydrocarbons (PAHs) are formed as by-products in combustion processes and are released into the air with dust emissions. They can be found in waste from purification of waste gases from thermal processes, in sediments from dredging of rainwater draining channels and rainwater sedimentation tanks, as well as in coke industry products and waste.

² European Commission, Brussels. Study to facilitate the implementation of certain waste related provisions of the Regulation on Persistent Organic Pollutants (POPs). Ref. ENV.A@/ETU/2004/0044. Final report, August 2004.

Table II. Maximum permissible concentrations of persistent organic pollutants in various elements of the environment and in products

Utilities or products	Maximum permissible concentration												
	Benzo[a]pyrene	HCB	PCBs	PCDD/Fs	Aldrin	Dieldrin	Endrin	Chlordane	DDT	Heptachlor	Hexachlorocyclohexane (HCH)		
											α	β	γ
WATER													
Potable [µg/l]	-	0.1*	-	-	0.03*	0.03*	0.1*	0.1*	0.1*	0.03*	0.1*	0.1*	0.1*
in streams, brooks, rivers and lakes and other natural and artificial water reservoirs [µg/l]	-	0.05**	-	-	0.01 (total including Isodrin)***			-	0.025***	-	0.04**		
in the internal, transitional waters and coastal sea waters [µg/l]	-	0.05**	-	-	0.005 (total including Isodrin)***			-	0.025***	-	0.02**		
WASTE WATER													
treated industrial effluents [mg/L]	-	0.003-3****	0	0	0	0	0	0	0	-	0	0	0
AIR													

In dust PM10	1ng/m ³	-	-	-	-	-	-	-	-	-	-	-	-
SOIL, GROUND													
protected areas [mg/kg s.m.]	-	-	0.02	-	0.0025	0.0005	0.001	-	0.0025	-	0.0025	0.001	0.000005
agricultural lands, forests, residential, recreational areas [mg/kg s.m.]	-	-	0.02	-	0.025	0.005	0.01	-	0.025	-	0.025	0.01	0.0005
industrial and traffic areas [mg/kg s.m.]	-	-	2	-	0.25	0.5	0.1	-	0.25	-	0.25	0.1	0.005
SEDIMENTS													
concentration of substances contaminating the yield [mg/kg]	-	-	≥ 0.3	-	-	-	-	-	-	-	-	-	-
FOOD													
grains [mg/kg]	-	0.01	-	-	0.01	0.01	0.01	0.02	0.05	0.01	Total 0.02	0.1	

fat contained in meat, meat products, meatoffal and animal fats [mg/kg]	0.002 (oils and fats (except cocoa butter) for direct human consumption or use as an ingredient in food products)	0.2	-	-	0.2	0.2	0.05	0.05	1	0.2	0.2	0.1	0.7 for poultry meat 2 for other types
vegetables and fruit [mg/kg]	-	0.01	-	-	0.01 – 0.03 depending on the product	0.01 – 0.03 depending on the product	0.01	0.01 – 0.05	0.05 - 1	0.01 – 0.02	0.01 – 0.5		
fish meat and fishery products and their derivatives, with the exception of eel	2.0-5.0 µg/kg of fresh mass (fish meat and fishery products)	-	-	3.5 pg/g of fresh mass	-	-	-	-	-	-	-	-	-
			6.5 pg/g of fresh mass										

* total of individual pesticides detected and quantified during the monitoring 0.5 µg/l

** maximum value of concentration

*** arithmetic mean of concentrations from water samples in a calendar year

**** maximum permissible daily average, depending on the type of production

1.2 Tasks of public administration and public bodies

The Minister of Economy is responsible for creation of improved conditions and legal basis of economic development, including elimination of the negative impact of hazardous substances, as well as POPs. The Minister of Economy is responsible for defining the requirements for the use and handling of substances posing a particular threat to the environment and determining equipment which could use substances posing a particular threat to the environment.

Controlling body for the use of equipment containing POPs and the timing of their withdrawal from service is the **technical inspection services**, acting in accordance with the Act of 21 December 2000 on technical inspection (Journal of Laws No. 122, item 1321, as amended).

The Minister of Health coordinates matters related to ensuring protection of human health, including the issue of POPs impact on human health.

The National Health Programme 2007-2015, prepared by the Ministry of Health, for the operating objective no. 6 *Reduction of exposure to harmful factors in the working and living environment and their health effects and improvement of sanitary condition of the country* provides for measures to reduce environmental pollution and public health measures to reduce the population's exposure to harmful environmental hazards and reduce their impact on health.

Inspector for Chemical Substances, under supervision of the Minister of Health, i.a. gathers data on hazardous mixtures or mixtures posing threat, and information provided by the European Chemicals Agency concerning the substances, provides data on hazardous substances and mixtures to medical and rescue services, cooperates with international and EU organisations within the scope of the substances and mixtures. It also acts as a body for cooperation with Member States, the European Commission, ECHA and as the National REACH and CLP Helpdesk Information Centre. Inspector for Chemical Substances is also responsible for the Good Laboratory Practice (GLP) in Poland.

The Chief Sanitary Inspector, who is subordinated to the Minister of Health, is responsible for exercising overall control of sanitary conditions in the country, including supervision of food retail trade in terms of compliance with the rules concerning conditions of manufacturing, transport, storage and retail sales of food, as well as supervision over the health quality of products imported from abroad (with the exception of food of animal origin).

The Chief Sanitary Inspector develops annual plans for monitoring and official control of food, including control of pesticide residues in food. The plan is sent to Voivodship Sanitary Inspectors who are required to supervise the process of planning and delivery of tasks specified in the annual food sampling and testing plan for the voivodship, and drawing up of relevant reports on plan implementation to the Chief Sanitary Inspectorate.

The national programme for testing food for pesticide residues combines the integrated monitoring of the European Union, the national monitoring and the planned official food control.

Coordination of environmental tasks is the responsibility of **the Minister of Environment** and it comprises:

- shaping the principles of waste management,

- achieving the reduction of contamination of individual elements of the environment,
- developing environmental quality standards,
- coordination of actions for the implementation of the best available techniques (BATs) and the best environmental practices (BEPs),
- determining the rules of environmental quality monitoring and of compliance with environmental protection regulations,
- representing Poland on the international forum in his areas of competence.

The Minister of Environment (in cooperation with other ministers) initiates and conducts legislative activities and supervises law enforcement in environmental protection. **The Chief Inspector of Environmental Protection**, subordinated to the Minister of Environment, and **combined services reporting to voivodes – voivodship inspectorates of environmental protection**, under territorial combined government administration are most of all responsible for the control of compliance with the law and administrative decisions concerning the use of the environment (including inspection of industrial sites), operational control of systems and equipment protecting the environment from pollution, control of compliance with regulations on packaging materials and waste packaging materials, control of compliance with regulations on recycling of withdrawn vehicles and waste electric and electronic equipment, as well as monitoring and assessment of the environmental condition (under the National Environment Monitoring System), including the transboundary shipments of waste and improvement of procedures and methods in this area, also applicable to POPs.

Financial support for environmental activities is provided by **the National Fund for Environmental Protection and Water Management** and voivodship funds for environmental protection and water management, which fund the research and development activities, expert opinions and investment projects related to the reduction of POPs into the environment and disposal of POPs according to environmental protection requirements. The **State Council for Environmental Protection** plays an opinion-giving and advisory role.

The Minister of Agriculture and Rural Development is responsible for implementing the government's policy on agriculture (including plant protection products), keeps a register of plant protection products and issues marketing authorisations for such products in Poland.

The responsibilities of **the State Veterinary Inspection**, reporting to the Minister of Agriculture and Rural Development, include i.a. supervision over safety of animal products, in particular: testing of slaughter animals and their meat, supervision on marketing of animals and animal by-products, monitoring of illicit substances, chemical and biological residues, residues of medicinal products and radioactive contaminations in animals, their secretions and excreta, tissues or organs, in animal products, in water for animals and in animal feed.

The Veterinary Inspectorate bodies supervise:

- slaughterhouses and cutting plants (meat of domestic hoofed animals, poultry, hares and rabbits, meat of farmed game animals),

- meat processing plants,
- game purchase centres and game processing plants,
- plants producing minced meat, raw meat products and mechanically separated meat (MSM),
- fish processing plants,
- milk collection points and dairy plants,
- egg plants,
- plants manufacturing, trading and using animal feeds,
- animal by-products processing plants and animal by-products and derivative products incineration plants.

The Veterinary Inspectorate bodies are:

- the Chief Veterinary Officer,
- voivodship veterinary officer, as the head of the voivodship veterinary inspectorate forming part of combined government administration in the voivodship,
- district veterinary officer, as the head of the district veterinary inspectorates forming part of non-combined government administration,
- border veterinary officer.

Tasks of the Inspectorate's bodies are performed by veterinarians and other employees of the Inspectorate, as well as veterinarians appointed to perform specific duties, and non-veterinarians appointed to perform specific auxiliary duties.

The body competent for preparing and supervising delivery of the residues control plan is the Chief Veterinary Officer. The plan is being developed in cooperation with **the National Veterinary Research Institute** in Puławy. Residue control tests are performed in the Institute's Puławy facility and in eight veterinary hygiene institutions (in Białystok, Gdańsk, Katowice, Łódź, Olsztyn, Poznań, Warsaw and Wrocław) and sent to the Chief Veterinary Officer and the European Commission. The tests to determine the amount of residues of organochlorine pesticides such as: aldrin, dieldrin, DDT, endrin, heptachlor, hexachlorobenzene, hexachlorohexane (α -HCH, β -HCH and γ -HCH isomers) and methoxychlorine in feeds are carried out in seven Veterinary Hygiene Institutions, with the Institute of Plant Protection – National Research Institute in Poznań acting as the Reference Laboratory.

The Chief Veterinary Officer sets out the general lines of action of the Veterinary Inspectorate and issues instructions specifying the manner of its conduct, including instructions for application of the EU regulations by the Inspectorate, as well as reviews and assesses epizootic situation, safety of animal products and veterinary requirements for their production.

The Chief Inspector of Plant Health and Seed Inspection, reporting to the Minister of Agriculture and Rural Development, oversees and controls, among others, correctness of trade and use of plant

protection products, and conducts research of plant protection product residues at the production stage in agricultural produce.

Official tests for plant protection product residues include:

- planned inspection – testing of agricultural produce samples according to the schedule developed by the Main Inspectorate of Plant Health and Seed Inspection,
- intervention inspection – testing of agricultural produce samples in cases of suspected use of plant protection products non-compliant with applicable legal regulations.

Tests for plant protection product residues are performed at the Central Laboratory of the Main Inspectorate of Plant Health and Seed Inspection in Toruń, Plant Protection Institute in Poznań and Research Institute of Pomology and Floriculture in Skierniewice.

Food safety in Poland is supervised, among others, by:

- The State Sanitary Inspectorate in terms of supervising health quality of foodstuffs of vegetable origin in production and supervising health quality of traded animal and vegetable foodstuffs,
- The Veterinary Inspectorate in terms of production of foods of animal origin,
- The Agricultural and Food Quality Inspection in terms of supervising quality of agricultural and food products in production and in trade, including ones exported abroad,
- The State Inspectorate of Plant Health and Seed Inspection in terms of correct application of plant protection products and monitoring of pesticide residues in agricultural products.

The Minister of Foreign Affairs coordinates international cooperation, including negotiating multilateral agreements, and is responsible for conducting their ratification procedures. The minister is also a political coordinator of GEF's operations in Poland.

The Minister of Finance is responsible for the state budget and supervises public finance and financial institutions.

The main tasks of **the Customs Service**, in addition to fiscal duties, include customs control of foreign trade and prevent smuggling and customs fraud. The Customs Service also exercises control over compliance with national and international regulations related to restrictions and prohibitions in foreign trade and over national customs policy instruments regulating the directions and volumes of foreign trade (e.g. monitoring implementation of tariff quotas).

Minister of Internal Affairs and Administration coordinates the actions taken by their subordinate units to improve safety. **Commander in Chief of the State Fire Service** supervises the activities of fire brigades in the control, exploratory, and rescue operations under the National Rescue and Fire Fighting System (including in the event of fire, accidents and accidents involving hazardous substances or waste).

The Minister of Transport, Construction and Maritime Economy is responsible for the development of the municipal and transport sector, including the National Environmental Policy, and takes legislative initiatives aimed i.a. at safe transportation of hazardous materials.

The minister competent for transport supervises hazardous waste transportation and the operations of units responsible for this transportation. The Chief Road Transport Inspector, reporting to the Minister of Transport, Construction and Maritime Economy, performs tasks within the scope of the transportation.

Controlling body for the use of equipment containing POPs and the timing of their withdrawal from service is the service of technical inspection, acting in accordance with the Act of 21 December 2000 on technical inspection (Journal of Laws No 122, item 1321, as amended), including the provisions of the Act of 19 August 2011 on transport of hazardous substances (Journal of Laws No 227, item 1367, as amended).

The National Labour Inspectorate has been set up to supervise and control compliance with the labour law, in particular of occupational health and safety regulations and principles. Inspections apply to all employing establishments, including those using hazardous substances. The National Labour Inspectorate reports directly to the Sejm (lower house of the Parliament).

Supervision over commercial quality of products is exercised by **the Trade Inspectorate** reporting to the President of the Office of Competition and Consumer Protection.

Results of statistical surveys conducted and collected in the public statistics are made available by **the Central Statistical Office**. Data on environmental protection have been published since 1972 in the form of annual publications of the CSO's *Protecting the environment series* (these figures do not include all the POPs covered by the Convention).

2. TO-DATE ACTIVITIES IMPLEMENTING THE STOCKHOLM CONVENTION

2.1 Substances covered by the Convention

Article 3 of the Convention sets out the following requirements to the Parties thereto:

- to eliminate from production and use, import and export of substances listed in Annex A (except for importing or exporting with the aim of safe disposal),
- to restrict production and use of substances listed in Annex B.

Annexes A *Elimination* and B *Restriction* to the Convention set out detailed exemptions from the production or use prohibition for substances listed therein. Responsibilities of the Parties to the Convention that use these exemptions are set out in Article 3 item 2 and Article 4 of the Convention.

Annex C *Unintentional Production* to the Convention lists persistent organic pollutants generated as by-products of specific processes. Responsibilities of the Parties to the Convention in relation to "unintentional production" are defined in Article 5 of the Convention.

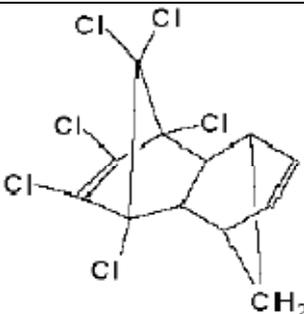
Article 6 of the Convention sets out measures to reduce or eliminate releases from POPs-containing stocks and waste, including recommendations for waste management.

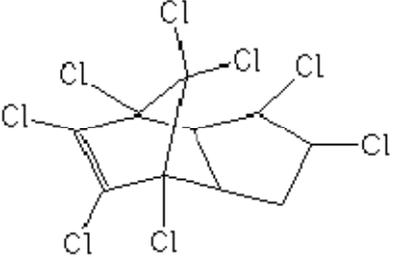
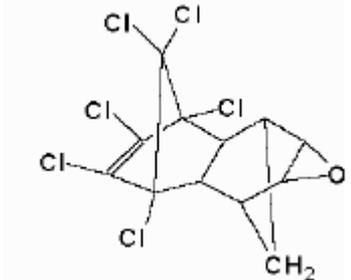
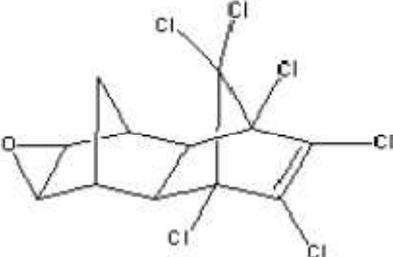
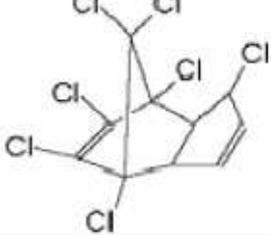
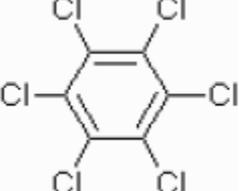
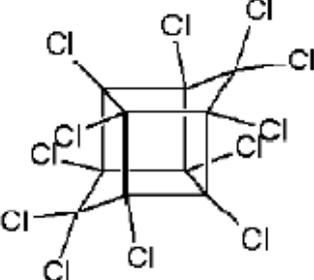
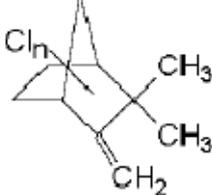
2.1.1 Releases from intentional production

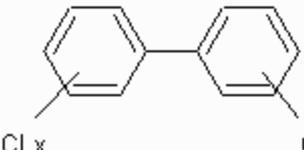
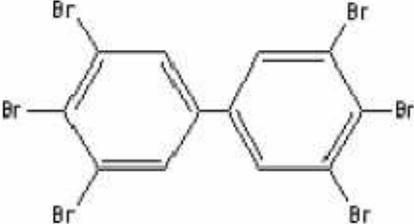
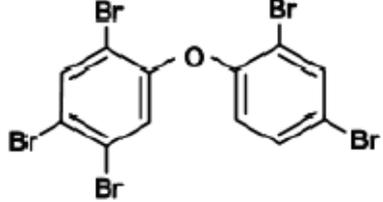
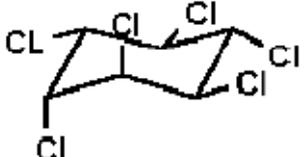
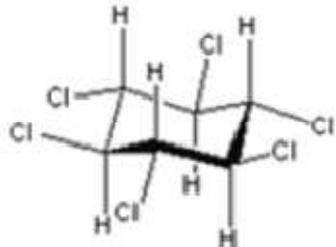
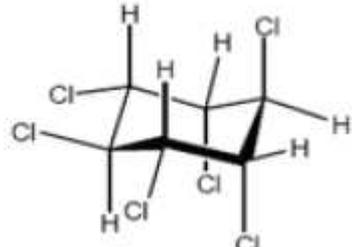
2.1.1.1 Substances listed in Annex A

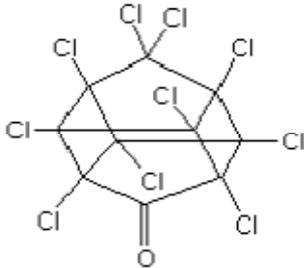
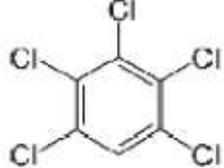
Annex A to the Convention lists the chemicals covered by the production and use prohibition. This list, according to Article 22 of the Convention, may be modified upon decision of the Conference of the Parties. The list of substances that are currently listed in Annex A to the Convention is shown in Table III.

Table III. Substances covered by Annex A to the Convention.

Name of substance	CAS No	Structural formula	Date of listing (entering into force)
Aldrin 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4-endo-exo-5,8-dimethanonaphthalene	309-00-2	 The image shows the chemical structure of Aldrin, which is a hexachloro-cyclohexene derivative. It consists of a bicyclic system with six chlorine atoms (Cl) and one methylene group (CH2). The structure is a hexachloro-cyclohexene derivative, specifically 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4-endo-exo-5,8-dimethanonaphthalene.	2001 (2004)

<p>Chlordane 1,2,4,5,6,7,8,8-Octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindan</p>	57-74-9		2001 (2004)
<p>Dieldrin 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo-exo-5,8-dimethanonaphthalene</p>	60-57-1		2001 (2004)
<p>Endrin 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo,endo-5,8-dimethanonaphthalene</p>	72-20-8		2001 (2004)
<p>Heptachlor 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene</p>	72-44-8		2001 (2004)
<p>Hexachlorobenzene (HCB) 1,2,3,4,5,6-hexachlorobenzene</p>	118-74-1		2001 (2004)
<p>Mirex dodecachloropentacyclo[5.2.1.0^{2,6}.0^{3,9}.0^{5,8}]decane</p>	2385-85-5		2001 (2004)
<p>Toxaphene</p>	8001-35-2		2001 (2004)

Polychlorinated biphenyls (PCBs)	more than 200 chemical compounds		2001 (2004)
Hexabromobiphenyl (HBB)	36355-01-8		2009 (2010)
Hexabromodiphenyl ether Heptabromodiphenyl ether (C-octaBDE)	68631-49-2 207122-15-4 446255-22-7 207122-16-5		2009 (2010)
Tetrabromodiphenyl ether Pentabromodiphenyl ether (C-pentaBDE)	5436-43-1 60348-60-9		2009 (2010)
α -hexachlorocyclohexane	319-84-6		2009 (2010)
β -hexachlorocyclohexane	319-85-7		2009 (2010)
γ -hexachlorocyclohexane (lindane)	58-89-9		2009 (2010)

Chlordecone	145-50-0		2009 (2010)
Pentachlorobenzene (PeCB)	608-93-5		2009 (2010)

As of 1 May 2012, Annex A lists 17 items – pesticidal substances and industrial chemicals.

The trade and use of the substances listed in Annex A in Poland is subject to the provisions of the Regulation (EC) No 850/2004. The Regulation absolutely prohibits the production, placing on the market and use of chlordane, hexachlorocyclohexanes, dieldrin, endrin, heptachlor, hexachlorobenzene, chlordecone, aldrin, pentachlorobenzene, mirex, toxaphene, and hexabromobiphenyl. For the other substances exemptions are provided which do not exceed the scope of derogations adopted in the Convention.

The specific exemptions adopted in the Regulation (EC) No 850/2004 are presented in Table IV.

Table IV. The substances for which exemptions from the prohibition are provided in the Regulation (EC) No 850/2004

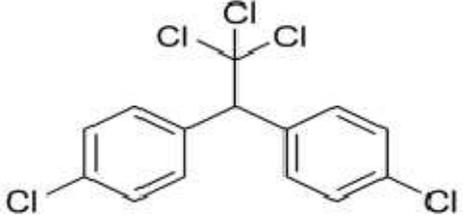
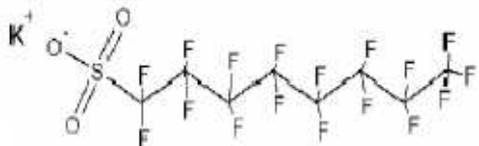
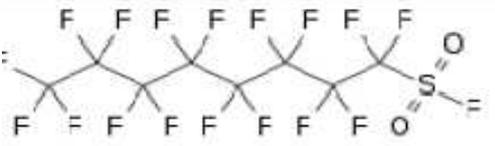
Substance	Specific exemption on intermediate use or other specification
Tetrabromodiphenyl ether $C_{12}H_6Br_4O$	<ul style="list-style-type: none"> – Occurring as an unintentional trace contaminant with the concentration of tetrabromodiphenyl ether equal to or below 10 mg/kg (0.001 % by weight) when it occurs in the substances, preparations, articles or as a constituent of the flame-retarded parts of articles. – By way of derogation the production, placing on the market and use of the following shall be allowed: <ul style="list-style-type: none"> a) articles and preparations containing concentrations below 0.1 % of tetrabromodiphenyl ether by weight when produced partially or fully from recycled materials or materials from waste prepared for re-use; b) electrical and electronic equipment within the scope of Directive 2002/95/EC of the European Parliament and of the Council.

<p>Pentabromodiphenyl ether C₁₂H₅Br₅O</p>	<ul style="list-style-type: none"> – Occurring as an unintentional trace contaminant with the concentration of pentabromodiphenyl ether equal to or below 10 mg/kg (0.001 % by weight) when it occurs in the substances, preparations, articles or as a constituent of the flame-retarded parts of articles. – By way of derogation the production, placing on the market and use of the following shall be allowed: <ul style="list-style-type: none"> a) articles and preparations containing concentrations below 0.1 % of pentabromodiphenyl ether by weight when produced partially or fully from recycled materials or materials from waste prepared for re-use; b) electrical and electronic equipment within the scope of Directive 2002/95/EC of the European Parliament and of the Council.
<p>Hexabromodiphenyl ether C₁₂H₄Br₆O</p>	<ul style="list-style-type: none"> – Occurring as an unintentional trace contaminant with the concentration of hexabromodiphenyl ether equal to or below 10 mg/kg (0.001 % by weight) when it occurs in the substances, preparations, articles or as a constituent of the flame-retarded parts of articles. – By way of derogation the production, placing on the market and use of the following shall be allowed: <ul style="list-style-type: none"> a) articles and preparations containing concentrations below 0.1 % of hexabromodiphenyl ether by weight when produced partially or fully from recycled materials or materials from waste prepared for re-use; b) electrical and electronic equipment within the scope of Directive 2002/95/EC of the European Parliament and of the Council.
<p>Heptabromodiphenyl ether C₁₂H₃Br₇O</p>	<ul style="list-style-type: none"> – Occurring as an unintentional trace contaminant with the concentration of heptabromodiphenyl ether equal to or below 10 mg/kg (0.001 % by weight) when it occurs in the substances, preparations, articles or as a constituent of the flame-retarded parts of articles. – By way of derogation the production, placing on the market and use of the following shall be allowed: <ul style="list-style-type: none"> a) articles and preparations containing concentrations below 0.1 % of heptabromodiphenyl ether by weight when produced partially or fully from recycled materials or materials from waste prepared for re-use; b) electrical and electronic equipment within the scope of Directive 2002/95/EC of the European Parliament and of the Council.
<p>Polychlorinated biphenyls (PCB)</p>	<p>Without prejudice to the provisions of Directive 96/59/EC, articles already in use on 26 August 2010 are allowed to be used.</p>

2.1.1.2 Substances listed in Annex B

As of 1 May 2012, Annex B lists two items: one is DDT, the other is perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF). For both substances the allowed use and specific exemptions regarding the prohibition of use are specified. The list of substances that are currently present in the Annex to the Convention is shown in Table V.

Table V. List of substances in the Annex B of the Stockholm Convention

Name of substance	CAS No	Structural formula	Date of listing (entering into force)
DDT (1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane)	50-29-3		2001 (2004)
Perfluorooctane sulfonic acid (PFOS) and its salts	1763-23-1		2009 (2010)
Perfluorooctane sulfonyl fluoride (PFOSF)	307-35-7		2009(2010)

The trade and use of the substances listed in Annex B in Poland is subject to the provisions of the Regulation (EC) No 850/2004. The Regulation absolutely prohibits the production, placing on the market and use of DDT. For the other substances exemptions are provided which do not exceed the scope of derogations adopted in the Convention.

The specific derogations adopted in the Regulation (EC) No 850/2004 are presented in Table VI.

Table VI. Specific derogations adopted in the Regulation (EC) No 850/2004

Substance	Specific exemption on intermediate use or other specification
Perfluorooctane sulfonic acid and its derivatives (PFOS) C ₈ F ₁₇ SO ₂ X (X = OH, metal salt (O-M +), halide, amide, and other derivatives including polymers)	<ol style="list-style-type: none"> 1. Occurring as an unintentional trace contaminant with the concentration of PFOS equal to or below 10 mg/kg (0.001 % by weight) when it occurs in the substances or preparations. 2. Occurring as an unintentional trace contaminant in semi-finished products or articles, or parts thereof, if the concentration of PFOS is lower than 0.1 % by weight calculated with reference to the mass of structurally or micro-structurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is lower than 1 µg/m² of the coated material. 3. If the quantity released into the environment is minimised, production and placing on the market is allowed for the following specific uses provided that Member States report to the Commission every four years on progress made to eliminate PFOS: <ol style="list-style-type: none"> a) until 26 August 2015, wetting agents for use in controlled electroplating systems; b) photoresists or anti reflective coatings for photolithography processes;

	<p>c) photographic coatings applied to films, papers, or printing plates;</p> <p>d) mist suppressants for non-decorative hard chromium (VI) plating in closed loop systems;</p> <p>e) hydraulic fluids for aviation.</p> <p>Where derogations in points (a) to (e) above concern the production or use in an installation within the scope of Directive 2008/1/EC of the European Parliament and of the Council, the relevant best available techniques for the prevention and minimisation of emissions of PFOS described in the information published by the Commission pursuant to Article 17(2), second subparagraph, of Directive 2008/1/EC shall apply. As soon as new information on details of uses and safer alternative substances or technologies for the uses in points (b) to (e) becomes available, the Commission shall review the derogations in the second subparagraph so that:</p> <p>(i) the uses of PFOS will be phased out as soon as the use of safer alternatives is technically and economically feasible,</p> <p>(ii) a derogation can only be continued for essential uses for which safer alternatives do not exist and where the efforts undertaken to find safer alternatives have been reported on,</p> <p>(iii) releases of PFOS into the environment have been minimised by applying best available techniques.</p>
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2.1.2 Releases from unintentional production

As of 1 May 2012, Annex C listed the following as unintended products covered by the requirements of the Convention:

- Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDDs/PCDFs),
- hexachlorobenzene (HCB),
- polychlorinated biphenyls (PCBs),
- pentachlorobenzene (PeCB).

Persistent organic pollutants are produced as by-products in various anthropogenic processes – primarily in industrial or household combustion processes, in metallurgy (ore roasting and secondary production of metals), chemical industry (halogen compounds chemistry) or during waste incineration. POPs may occur as pollutants in waste gases from technical processes used in the industry, in waste water, as well as in the main product – in every place where halogen and organic compounds are found in raw materials and the process is conducted in higher temperatures.

Article 5 of the Convention obliges the Parties to take measures to reduce or eliminate releases of chemicals listed in Annex C from anthropogenic sources. Action plan in this area should be incorporated into the National Plan for Implementation of the Stockholm Convention (Article 7).

In order to identify the sources of persistent organic pollutant substances generated as products of unintentional production, the *Inventory of Dioxin and Furans Releases in Poland* [5] has been delivered in 2002, which:

- located the plants covered by the guidelines of the *Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases*,
- defined the levels of emission factors typical of Polish production facilities,
- estimated emissions from these plants,
- determined the activity of individual plants.

The obtained results were used to estimate PCDD/F, HCB and PCB releases and emissions into the environment for the purposes of the National Plan for Implementation of the Stockholm Convention.

In 2002, also the *National strategy to protect the environment from persistent organic pollutants*, adopted by the Council of Ministers was developed, which discussed the key lines of action to reduce emissions of persistent organic pollutants. It was updated in 2006 to make provision for the approach outlined in the *Community Strategy for dioxins, furans and polychlorinated biphenyls* of 2001.

Actions have also been taken to determine the type of sources of persistent organic pollutant substances generated as products of unintentional production: on an annual basis, the National Administrator of the Emissions Trading Scheme – the National Centre for Emission Balancing and Management (KASHUE-KOBIZE) takes up an inventory of emissions of persistent organic pollutant substances (the inventory covers PCDD/Fs, HCBs, PCBs) into the air.

In terms of reducing emissions of POPs generated as unintentional products, the *Inventory of Dioxin and Furans Releases in Poland* [5] identified emission reduction measures divided into measures reducing generation of dioxins and furans and measures determinant for reduction of their releases to the environment.

Recent years have also seen the following measures to reduce POP emissions:

- legal regulations have been introduced for an integrated pollution prevention and control (IPPC), dioxin and furan emission standards have been adopted for plants incinerating or co-incinerating waste, and the use of the best available techniques (BATs) has been recommended, in particular for plants carrying out processes leading to POP releases,
- increasingly efficient systems for reducing emissions of air pollutants (increasingly effective sorption systems of exhaust gases treatment) are being implemented,
- combustion processes, in particular in individual furnaces, undergo gradual modernization and treatment of exhaust gases from coal-fired boiler houses is improving, with small, high-efficiency oil- or gas-fired boiler houses being built,
- communes and districts implement programmes to reduce low emissions, consisting in reduction of emissions of hazardous substances into the atmosphere by comprehensive

elimination of existing, inefficient heating sources and introducing environmentally friendly, energy-efficient heating devices.

Pursuant to the Environmental Protection Law, government and local government bodies should incorporate the environmental protection and sustainable development principles into their strategies, plans, policies and programmes (Article 8). Therefore, executive bodies of voivodship, district and commune administration prepare, respectively, regional, district and communal environmental protection programmes to implement the national environmental policy (Article 17). In addition to this, the voivodship government draws up air protection programmes (Article 91) having the force of a local law, providing for a manner of ensuring the best possible air quality by:

- maintaining air pollutant levels below or, as a minimum, at the permissible levels,
- reducing air pollutant levels to, as a minimum, permissible levels, if they are not complied with (Article 85).

A particularly important task, as indicated in the Act, should be the application of the best available techniques (BATs) in the case of plants being new sources of emissions, especially of the substances listed in Annex C. The introduction of BATs in these sources of emissions should take place as soon as possible, no later than 4 years from the date the Convention enters into force for that Party (Article 5 d), that is until 21 January 2013 in Poland's case. Another important task is also the recommendation to use the best environmental practices (BEPs).

According to the information of the Ministry of the Environment [6] on the integrated permissions held by establishments running plants subject to this obligation, as of 30 June 2012 there were 3430 IPPC plants identified in the country, of which 2575 were operated.

The list of plants covered by Regulation (EC) No 166/2006 includes all plants requiring an integrated permission and additionally the following types of activities:

- coal pulverizers with capacity of more than 1 tonne/hour,
- plants manufacturing coal products and solid smokeless fuel,
- underground mining and related activities,
- surface mining and quarries with area of actual excavation activity exceeding 25 hectares,
- municipal waste water treatment plants serving more than 100,000 p.e.,
- independently operated effluent treatment plants which serve one or more activities listed in Annex I to Regulation (EC) No 166/2006, with a capacity exceeding 10,000 m³ per day.

Industrial sites, equipped with plants releasing POPs into the environment, are obliged to control volumes of such releases and send this information to the National Pollutant Release and Transfer Register run by the Chief Inspectorate for Environmental Protection.

In 2006, Poland provided the European Commission with data on emissions for 2004 from facilities covered by the IPPC Directive³ and reporting under the EPER. They are available at the Community website about EPER⁴. In order to collect these data, sources and volumes of emissions have been identified, including emissions of PCDD/Fs and HCB into the air.

The total emission of **dioxins** and **furans** in 2009 was 392,680 mg TEQ, and in 2010 – 420,634 mg TEQ. Shares of individual types of emission sources in 2010 are presented in Figure I.

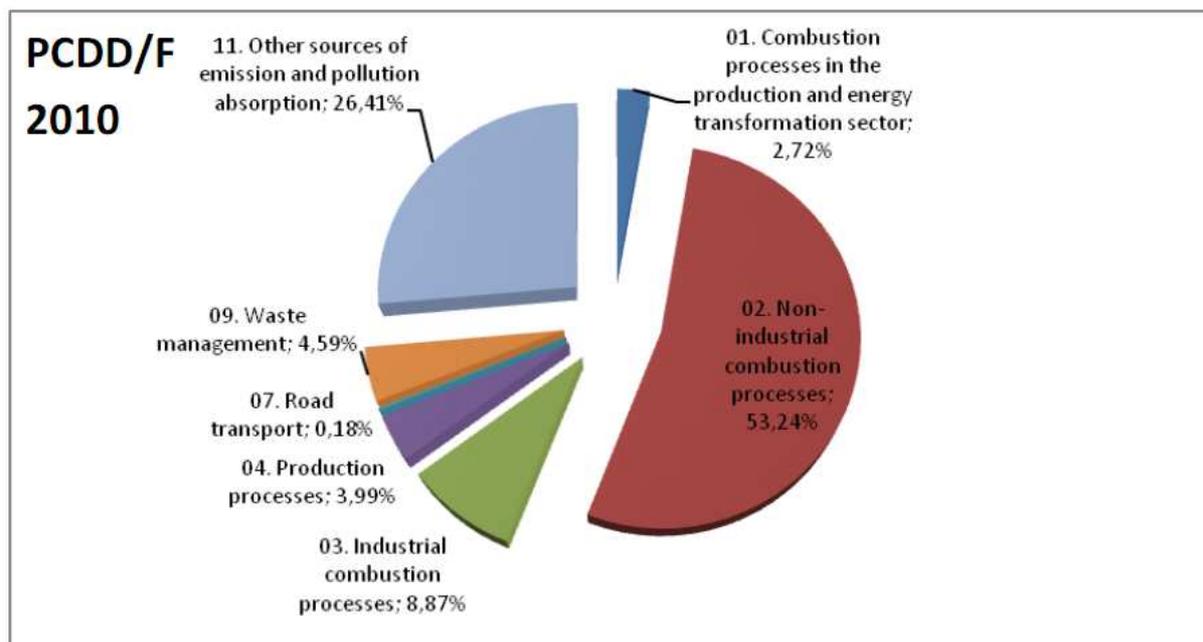


Fig. I. PCDD/F emissions into the air in 2010 [7]

Municipal and housing sector has a dominant share in PCDD/F emissions as the main fuel used in this sector is hard coal (annual consumption of 9 million tonnes). With household furnace emissions at the rate of 18 mg TEQ PCDD/F/Gg of carbon, this is equivalent to emission of 224 g TEQ i.e. 53.24% share in total volume released into the air countrywide.

Also other emission and pollution absorption sources have a significant share, e.g. fires of landfills, buildings or cars, as well as forest fires, or smoking cigarettes.

The estimation of **HCB** emission in 2008 was 9.73 kg, in 2009 – 9.58 kg, and in 2010 – 11.43 kg. The shares of individual HCB emission sources in 2010 are presented in Figure II.

³ Substituted by the Directive 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control - IED)

⁴ <http://eper.ec.europa.eu/eper>

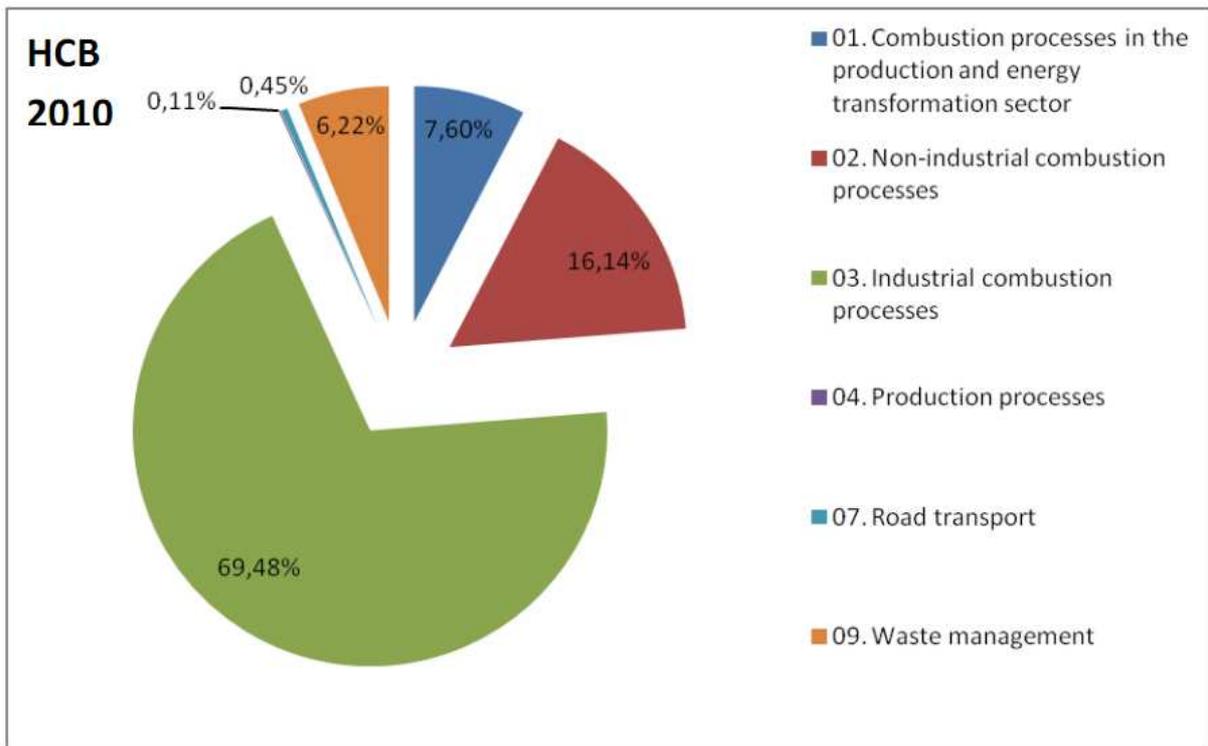


Fig. II. HCB emissions into the air in 2010 [7]

In HCB emission, industrial processes, mainly of metal ore roasting and secondary copper smelting, play the dominant role. Also household furnaces fired with hard coal are a major source of emissions.

PCB emissions in 2008 are estimated at 668.15 kg, in 2009 – 663.47 kg, and in 2010 – 748.93 kg. Shares of individual sources of PCB emission in 2010 are presented in Figure III.

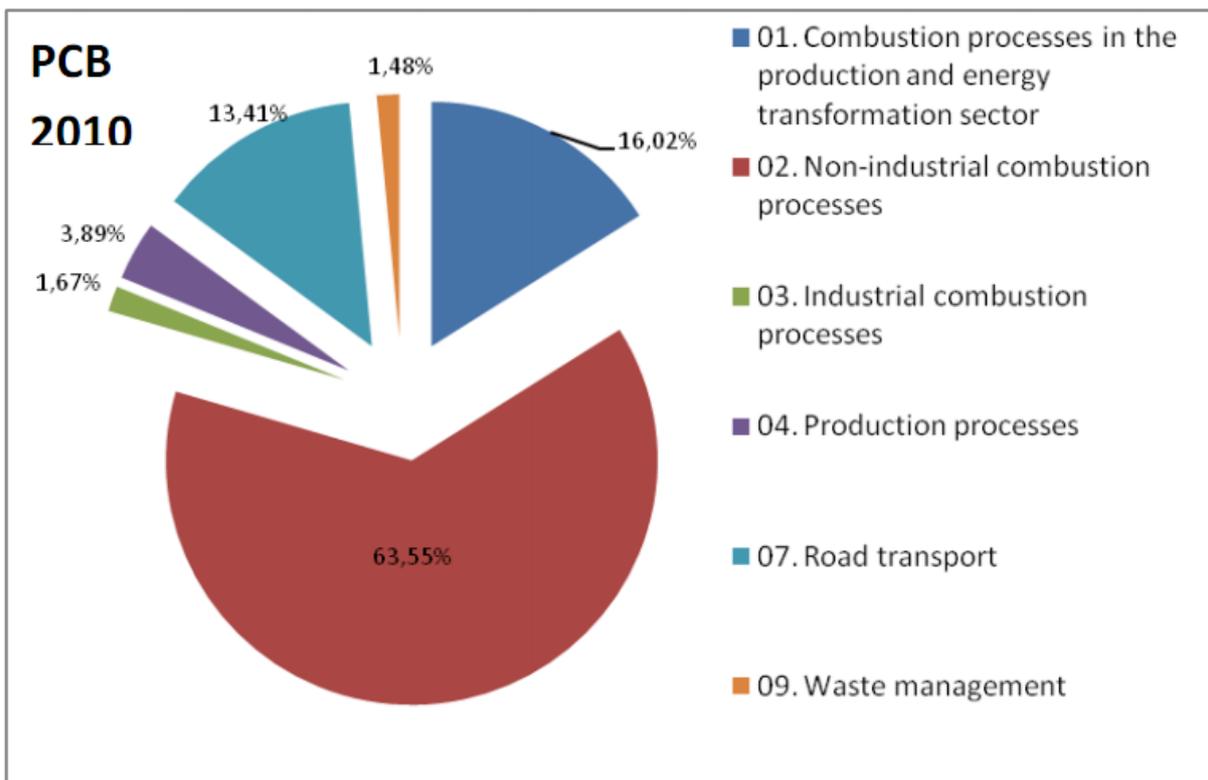


Fig. III. PCB emissions into the air in 2010 [7]

As in the case of PCDD/F emissions, the municipal and housing sector is the main source of emissions. Also in this case, fuels used in household furnaces, mainly hard coal, are the main source. These issues are regulated by the Act of 10 April 1997 – the Energy Law (Journal of Laws of 2006 No. 89, item 625, as amended), while the direction of the changes is set by the Notice of the Minister of Economy of 21 December 2009 on the state energy policy until 2030, Annex *Polish Energy Policy until 2030*.

Also emissions from the power generation and transformation sector have a major share in PCB release into the environment. In the future, following the withdrawal of PCBs from use, it is anticipated that the release volume of this substance will drop significantly.

It should be noted that in assessment of emission volumes from individual sources emission volume factors are used that require continuous updating due to technological changes and fuel quality improvements. Also estimates as to frequency of incidents (e.g. the number of waste landfill fires and the release volumes adopted for such incidents) or estimates of releases from electric appliances (capacitors) may raise some doubts. In spite of this, emissions from household furnaces in total emissions of all pollutants listed in Annex C to the Convention still have undoubtedly the dominant share.

The main source of dioxin emissions into the air from fuel combustion processes is the housing sector using individual furnaces and heating boilers fired with coal fuels and biomass and using kitchen furnaces fired with such fuels to prepare meals and drinking water. The problem of PCDD/F emissions from these sources is important not only due to their share in total dioxins and furans emissions in Poland (over 36%) but also due to the generally inadequate waste incineration and co-incineration conditions in furnaces and ovens.

Apart from this sector, the largest PCDD/F emissions into the air can be found in metallurgical processes, in particular during iron ore roasting and oxygen conversion of steel, and in secondary aluminium production. The last process uses substances particularly strongly affecting PCDD/F emissions.

Minimal emissions of PCDD/Fs, HCB and PCBs in Polish total emissions are generated in the regeneration of gasoline conversion catalysts in the refinery industry.

Professional and industrial power generation is subject to special control of environmental protection regulations requiring the use of protective equipment, and in particular dust removal and flue gas desulphurisation processes which largely eliminates PCDD/F releases into the air.

Releases into residues (fly ash) have not been inventoried to date. In this case, however, no protective equipment can be used nor these releases reduced, as combustion processes are conducted in optimum conditions.

Pentachlorobenzene is emitted as a by-product of incomplete combustion. The generation of PeCB as a by-product of the combustion processes is associated with the generation of HCB and PCDD/F, therefore, actions taken in order to reduce emissions of these substances will contribute to a significant reduction of the released pentachlorobenzene.

The national Pollutant Release and Transfer Register (PRTR) managed according to the Regulation (EC) No 166/2006 of the European Parliament and of the Council lists pentachlorobenzene as a substance covered by reporting obligation, however in the years 2007-2011 no PeCB emissions over the threshold (1 kg/year) were reported for any of the establishments running plants listed in the Register.

2.1.3 Releases from stockpiles and waste

There are no stockpiles of POP-containing products in Poland. Measures taken in Poland to withdraw and dispose of the existing waste materials containing POPs - these are the plant protection products withdrawn from use and PCB-containing oils in electrical equipment - according to the Act of 27 July 2001 introducing the Environmental Protection Law, the act on waste and amending certain acts (Journal of Laws No. 100, item 1085, as amended), planning documents e.g. the *National Waste Management Plan 2014* and the *National Environmental Policy in 2009-2012 with a view to 2016*, were intended to lead to their disposal in 2010 and are not discussed in this document. According to the information concerning the end of 2010, in Poland 8 waste repositories remained to be removed, and in regard to the remaining amount of PCBs there were 801,676 tonnes of waste containing more than 5 dm³ PCBs.

Industrial wastes containing POPs can be found on the landfill of Organika-Azot site in Jaworzno (the Śląskie voivodship) and on grounds owned by the town of Jaworzno. This site has in the past been producing DDT and plant protection products containing imported POPs. "Rudna Góra" Central Waste Landfill includes land of the "Organika-Azot" S.A. site.

In Organika-Azot Chemical Plant in the years 1947-1980 78,950 Mg of DDT was produced and in the years 1965-1982 about 4450 Mg Lindan-Gamatox was produced (containing minimum 98% of the γ -HCH isomer). There is no data on the quantities of plant protection products manufactured using other POPs. It is estimated that the amounts of POPs stored at the landfill and in the soil at the site and its vicinity (based on maximum permissible losses in the process – 2%) could reach $78,950 \times 0.02 = 1,600$ Mg of DDT metabolites and 20 Mg of HCB [8]. According to the archives available in the plants, for each tonne of Lindane produced 8.2-15 Mg of waste inactive HCH isomers was generated (mainly α -HCH and β -HCH doped with γ -HCH and other isomers) as solid and semi-fluid waste, of which some (30%, about 300 Mg/year) was converted into TCB and the rest went into the soil. The amount of about 10 Mg HCH waste per tonne of Lindane produced is closer to the actual value, since the listed amount of HCH waste deposited in Jaworzno is 42,200 Mg. It is assumed that at the Central Waste Landfill "Rudna Góra" about 23.400 Mg HCH is stored, however, all stored waste (162.202 Mg) should be regarded as containing POPs. On other lands belonging to the municipality of Jaworzno about 18.800 Mg of inactive HCH isomers was deposited.

As of April 2009, the drainage water from the excavation and the eluates from the waste landfill site belonging to the Organika-Azot plant are pumped to the on-site mechanical-chemical waste treatment plant and after the treatment are discharged into Wąwolnica stream. The analyses of the untreated eluates showed the presence of p,p'-DDT (7-12 $\mu\text{g/l}$), o,p'-DDT (0.95-9.2 $\mu\text{g/l}$), DDD (4-11 $\mu\text{g/l}$) and also HCH isomers (570-821 $\mu\text{g/l}$), tetradifon (5.6-9.0 $\mu\text{g/l}$) and free cyanides (0.1-0.55 $\mu\text{g/l}$). The on-site mechanical-chemical waste treatment plant was upgraded in the years 2003-2004.

Currently the treatment process is complemented by coagulation with flocculation, filtration with gravel filters and carbon adsorbers. Sewage sludge is dewatered in the filter press.

The reduction of environmental impact of the landfilled waste requires top priority measures in order to [9]:

- shut off the access of rain water and groundwater to the landfilled waste, also in these areas of the plant where high soil contamination has been found,
- commission the bio- and phytoremediation plants to reduce the POPs penetration,
- start monitoring of water quality in the neighbouring water uptakes.

The waste landfill site belonging to the Organika-Azot plant is under continuous supervision of the environmental protection institutions and inspection authorities. The tasks aimed to improve the situation are defined in the Environmental Protection Programme for the Śląskie Voivodship until 2013 with a perspective to 2018 and in the Waste Management Plan for the Śląskie Voivodship and in the Waste Management Plan for Jaworzno township for 2008-2011 with a perspective to 2012-2018.

2.2 Information exchange

Poland (including, among others, the Ministry of Environment as the *contact point*) shares information with the Secretariat of the Convention and the European Union, sending opinions on the documents, Poland's positions and any data or information needed in day-to-day operations of the competent authorities for the Convention. Whenever possible Poland also exchanges information with non-EU countries.

In addition, Poland takes part in discussion meetings of the European Council and European Commission bodies and working groups on issues covered by the Convention.

2.3 Public information, awareness and education

Public information on persistent organic pollutants plays, at a basic level, an educational role for the public. Promoting information on POP-related issues and on implementation progress of this plan is the responsibility of the Environmental Information Centre (CIOŚ). The Centre, being the source of information, by sharing data on POPs is actively propagating them among the decision-makers and the public.

The factors currently facilitating the raising of public awareness are among others:

- Running information sections on websites of the Ministry of Environment (www.mos.gov.pl) Specialist websites that are aimed at informing employees of local and government administration of the current legislation and practice in assessing the hazard of the release of POPs into the environment Websites on waste handling (e.g. <http://odpady.net.pl>), on dioxins (e.g. <http://www.dioksyny.eu/>) Information for businesses concerning chemicals management is also available in the national REACH and CLP helpdesk (<http://reach.gov.pl/home>)

- The materials on the inventory of POP emission into the air available at www.kashue.pl; some data on POP are disseminated through the publication "Ochrona środowiska" ("Environmental protection") (available on the website of the Central Statistical Office <http://www.stat.gov.pl>)
- Organization conferences, also the annual international Conference on *Dioxins in the industry and environment* held by EMIPRO sp. z o.o. and the Laboratory for Trace Organic Analyses of the Cracow University of Technology
- Participation of employees of ministries, inspectorates, local government administration and institutes in meetings and conferences on waste and POPs
- Training for employees of ministries and institutes on POPs
- Distribution of information leaflets and brochures (e.g. on proper PCB handling) by nongovernmental environmental organizations.
- Involving representatives of the industry in discussions on preparation of Poland's positions for meetings of the European Council and European Commissions bodies and of working groups.

2.4 Research, development, and monitoring

2.4.1 Research and development

The Institute of Environmental Protection – National Research Institute (the former Environmental Protection Institute⁵) implemented the tasks under the Stockholm Convention in the years 2003-2010. The Institute also comprises KASHUE-KOBIZE – the National Administrator of the Emissions Trading Scheme – the National Centre for Emission Balancing and Management which carries out, among others, the inventory of pollutant emissions, including POPs, into the air.

The Polish Geological Institute –National Research Institute in Warsaw conducts the inventory of POPs in soil and ground waters and made the inventory of POP-containing waste plant protection products (waste repositories) withdrawn from use.

The Institute for Ecology of Industrial Areas in Katowice is conducting research on POP releases into the environment, and the **Maritime Branch of the Institute of Meteorology and Water Management** tests POP concentrations in river water, bottoms and aquatic organisms.

The National Institute of Public Health - National Institute of Hygiene in Warsaw, supervised by the Minister of Health, conducts research on human exposure to environmental POP levels and risk assessment, and gives opinions to the Ministry of Health on POP impact on humans; the Institute of Occupational Medicine in Łódź and the Institute of Occupational Medicine and Environmental Health

⁵ On 7 October 2010 the Environmental Protection Institute gained the status of the National Research Institute under the regulation of the Council of Ministers of 13 September 2010 on the national research institute status for the Environmental Protection Institute (Journal of Laws No 172, item 1165).

in Sosnowiec conduct research on hazards from environmental pollution to human health, in particular in industrial areas.

The Central Institute for Labour Protection is responsible for conducting research on the impact of harmful factors, including POPs, on people in their workplace.

The Industrial Chemistry Research Institute conducts research and development works in the field of process safety in the chemical industry, emissions of POPs and POPs content in products.

The Institute of Industrial Organic Chemistry conducts research and development on the synthesis of plant protection products, chemical safety, transport of hazardous materials and chemical plant protection products.

The National Veterinary Institute - National Research Institute in Puławy conducts scientific research on health protection and preventing infectious animal diseases, including zoonoses as well as hygiene and toxicology of food of animal origin and animal feeds. With regard to recent issues, it analyses POP abundance through monitoring and analytical research, carries out risk assessments and provides advice and expertise to the Ministry of Agriculture.

The Institute of Plant Protection conducts research and development works on the use of plant protection products. The Sośnicowice Branch of the Institute of Plant Protection conducts research and development works on elimination of plant protection product residues (including waste repositories).

The Institute for Ferrous Metallurgy deals with the methodology of research and elimination technologies for waste generated in the metallurgical industry and conducts research on hazardous substances emissions generated during processing and combustion processes in ferrous metallurgy.

The Institute of Non-Ferrous Metals conducts research on emissions of hazardous substances, including POPs, from manufacture and processing of non-ferrous metals.

The Maritime Institute in Gdańsk for many years has been conducting research and development works concerning POPs (PCB and PAH analyses) in the sediments at the bottom of the Baltic Sea, port sediments and waste.

The Laboratory for Trace Organic Analyses of the Cracow University of Technology determines, pursuant to the accreditation granted by the PCA, the levels of: dioxins and furans – PCDD/Fs, polychlorinated biphenyls – PCBs, including 12 dioxin-like dl-PCBs (WHO-PCBs), polybrominated diphenyl ethers (PBDEs) and other brominated flame retardants, organochlorine pesticides, PAHs in food and feeds, the environment and technical products, as well as dioxins and PCBs in food products, processed foods, animal feeds and technical products.

2.4.2 Monitoring results

Currently, the data on levels of persistent organic pollutant substances covered by the Convention in the individual environmental components are gathered by various institutions such as:

- Chief Inspectorate for Environmental Protection (GIOŚ)

- voivodship inspectorates for environmental protection (WIOŚ)
- The Institute of Environmental Protection – National Research Institute (IOŚ) – the National Administrator of the Emissions Trading Scheme – National Centre for Emissions Balancing and Management (KASHUE-KOBIZE)
- Polish Geological Institute - National Research Institute (PIG-PIB)
- the Institute of Meteorology and Water Management (IMGW)
- Veterinary Inspection (IW)
- the National Veterinary Institute - National Research Institute (PIWet-PIB)
- the State Sanitary Inspection (PIS)
- the Agricultural and Food Quality Inspection (IJHARS)
- the Main Inspectorate of Plant Health and Seed Inspection (PIORiN).

Air measurement results obtained under the National Environmental Monitoring and by other participants of the air quality assessment system are gathered regularly in provincial databases run by the voivodship inspectorates and sent periodically to the national JPOAT database on the server of the Chief Inspectorate of Environmental Protection. GIOŚ is currently working on a database for air within the Ekoinfonet database (JPOAT 2.0).

In order to monitor the quality of Poland's flowing water all voivodship environmental protection inspectorates and the GIOŚ run two databases to collect, verify and process results of water quality tests (JAWO and AQUA databases). These two databases do not ensure complete data collection. GIOŚ is currently working on a database for water within the Ekoinfonet database.

The public OSADY website supervised by the Chief Inspector of Environmental Protection and featured on his website presents the publicly available data on tests of river and lake water alluvia performed by Polish Geological Institute under the National Environmental Monitoring subsystem "Monitoring quality of inland surface waters".

CELAB database – a national system enabling the collection and management of data on laboratory test results conducted as a part of duties of the Veterinary Inspectorate's bodies – gathers data including information on samples, sampling methods and sites and the conducted laboratory tests. The data are recorded in the Central Database located at the National Veterinary Institute – National Research Institute in Puławy. The system collects data from sixteen Veterinary Hygiene Institutions, their branches, independent labs, private laboratories approved by the Chief Veterinary Officer and from laboratories of PIW-PIB in Puławy which is the system administrator. The system became operational as of 1 January 2007, however, the data on tests have not yet been fully entered into the system. Access to the data stored in the Central Database through a web application is limited to registered users from laboratories of veterinary hygiene institutions and PIW-PIB in Puławy, authorised staff of the Veterinary Inspectorate's bodies and authorised staff of the Ministry of Agriculture and Rural Development.

The National Plan for Implementation of the Stockholm Convention additionally presents data on abundance of polycyclic aromatic hydrocarbons (PAHs) and HCH isomers in individual environment components.

2.4.2.1 Air

Monitoring and assessment of air quality are carried out under the National Environmental Monitoring in the *Air quality monitoring* subsystem. Testing and assessment of the level of substances in the air are the responsibilities of voivodship environmental protection inspectors. The basic level for delivery of this task is the voivodship covering a number of zones. The list of measurement stations participating in the system, scope of measurements for individual stations and scope of other complementary tests are defined by the voivodship environmental protection inspector in consultation with the units operating the measurement stations – as a part of voivodship environmental monitoring programmes based on the results of the preliminary assessment of air quality in the zones. Apart from the obligatory measurement programme covering substances for which permissible levels, target levels and long-term target levels have been defined, and substances covered by special programmes, the voivodship environmental protection inspector may include other substances in the voivodship environmental monitoring programme taking into consideration specific pollution sources located in the voivodship. In such cases, studies are locally based and their results are not used in the classification of zones.

Based on the test results, voivodship environmental protection inspectorates carry out annual assessments of air quality in the voivodships. After the submission of the results to the Chief Inspectorate, a comprehensive assessment of air quality in Poland is developed.

Of POP substances, only benzo[a]pyrene (B(a)P) is monitored as a representative of the polycyclic aromatic hydrocarbons (PAHs) for which the Regulation of the Minister of Environment of 3 March 2008 on levels of certain substances in the air (Journal of Laws No. 47, item 281), hereinafter the "Regulation on the levels of certain substances in the air", specifies the target level in the air, for the protection of human health, to 1 ng/m³ (the total content in PM₁₀ particulate matter).

The 2007 assessment has been performed in the new layout of zones in the country. As of 2008, the annual air quality assessment has been extended to include also benzo[a]pyrene in PM₁₀.

Monitoring of benzo[a]pyrene in PM₁₀ was started in 2007. Moreover, since 2008 a number of polycyclic aromatic hydrocarbons: benzo[a]anthracene, benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, indeno[1,2,3-cd]pyrene and dibenzo[a,h]anthracene in PM₁₀, have been monitored in selected urban stations.

Average annual concentrations were calculated in 2010 for 105 sites. The B(a)P content in PM₁₀ was determined in daily samples (daily or periodic measurements) or in samples appropriate for a longer period of content averaging (weekly, fortnightly, monthly).

In most sites (80 of 105), average annual concentrations of B(a)P exceeded the target level of 1 ng/m³ [10].

Benzo[a]pyrene shows a marked seasonal variation of concentrations – daily B(a)P concentrations in the heating season were frequently much higher than in other times of the year. Permissible average

annual concentrations (target level) were nearly always exceeded due to increased concentrations in the winter period.

The most frequently quoted reason for exceeding the target concentration values were: the impact of emissions related to individual heating of buildings, and, to a much smaller extent, the impact of emissions related to vehicle traffic in the city centres with intense traffic, and adverse weather conditions in the analysed period. However, the target level for B(a)P concentration in the air is very tight, and difficult to achieve not only in Polish conditions.

2.4.2.2 Waters

2.4.2.2.1 River and lake waters

River, reservoir, and lake waters along with the transitional waters and coastal waters are tested under the National Environmental Monitoring in the Monitoring of inland surface waters subsystem. The monitoring is conducted based on the identified so-called water bodies, which should be understood as separate and significant components of surface water, constituting the basic unit of water management. In the years 2010-2012 the surveys and assessments of the condition of river water bodies were conducted as the first part of the six-year water management period (2010-2015). In this period the condition of the river water bodies was studied using three types of monitoring [11,14]:

- diagnostic monitoring, the main aim of which is to provide the general assessment of the surface water of every catchment area and sub-basin in the river basin and to facilitate the evaluation of the long-term variations in natural conditions,
- operational monitoring, implemented in order to determine the condition of the water bodies that were identified (using the diagnostic monitoring data) as being at risk of not achieving the environmental objectives, and to assess the changes in this condition as a result of the implementation of the remedial measures indicated in the national water and environmental programme, and
- research monitoring.

The following measurement programmes are implemented in the control measurement site belonging to the above mentioned network:

- diagnostic monitoring (MD),
- operational monitoring implemented in the operational control measurement sites (MO),
- operational monitoring of water sensitive to the contamination with nitrogen compounds from agriculture implemented in the operational control measurement sites (MORO),
- operational monitoring of water enabling the assessment of the risk of water eutrophication from municipal sources, implemented in the operational control measurement sites (MOEU),
- operational monitoring of the inland water constituting the life environment for fish in natural conditions, implemented in special control measurement sites (MORY),

- operational monitoring of surface waters used as a source of potable water for inhabitants, implemented in special control measurement sites (MOPI),
- operational monitoring of waters qualified as recreational waters, in particular for bathing, implemented in special control measurement sites (MORE),
- operational monitoring regarding the presence in the water body or bodies' area(s) of ecosystems dependent on the quality of water, including the protection areas for habitats and species directly depending on water, implemented in special control measurement sites (MONA),
- operational monitoring implemented in special control measurement sites for purposes other than indicated above, including these associated with the obligations under international agreements (MOIN),
- research monitoring (MB).

The testing frequency may vary and depends on the purpose of the control measurement site:

- in the case of the diagnostic sites a unified measurement range is applicable, covering a full list of biological parameters (measurement frequency 1-8 times per year, depending on the indicator and the type of the river), physicochemical parameters (including the indicators of thermal conditions, oxygenation, organic pollutants, salinity, acidification and biogenic substances; measurement frequency 1-12 times per year), and chemical substances (including persistent organic pollutant substances). Till the end of 2012 all diagnostic control measurement sites of the rivers will have been tested during one annual period (starting in 2011);
- in the case of operational sites, the measurement range was separately determined for each site, depending on the specific pressure. The operational control measurement sites located in the surface water bodies where a pollutant source is or was located with the potential to release substances particularly harmful for the aquatic environment, specifically priority substances, or the substances for which the diagnostic monitoring showed that the amount of one of these substances exceeds the permissible concentration, are tested for these substances annually. In the years 2010-2012 all operational control measurement sites of the rivers will have been tested during one annual period;
- in the case of the special operational monitoring sites – depending on the purpose of the given site. In the case of water intended for fish living in the natural conditions, the monitoring under the special sites network covers mainly the water bodies for which there is a risk of not achieving the environmental objectives. Every site set for this purpose will be tested at least once in 3 years. The special sites for the assessment of water intended as a source of potable water for the inhabitants will be tested every year in the duration of the voivodship environmental monitoring programmes;
- in the case of the research control measurement sites the programme was established according to the reasons for implementing the research monitoring.

The summary results of the three-year programme will be available in 2013 and published in the next version of this document. Table VII presents the information on the number of the control measurement sites and the type of programmes implemented in them.

Table VII. Control measurement sites in the years 2010-2012.

		Σ	Rivers		Reservoirs*		Lakes*		Transitional water		Coastal water	
			MD	MO	MD	MD	MD	MO	MD	MO	MD	MO
1	Zachodnio-Pomorskie	206	47	136	0	0	30	44	8	12	6	6
2	Pomorskie	212	33	118	0	0	42	57	5	10	8	9
3	Warmińsko-Mazurskie	204	19	105	1	1	47	89	3	9	0	0
4	Lubuskie	201	17	104	1	1	36	96	0	0	0	0
5	Wielkopolskie	311	27	206	0	6	19	97	0	0	0	0
6	Kujawsko - Pomorskie	269	35	134	17	17	108	110	0	0	0	0
7	Mazowieckie	169	36	155	2	2	11	11	0	0	0	0
8	Podlaskie	120	24	69	2	3	20	39	0	0	0	0
9	Łódzkie	130	24	108	4	6	0	0	0	0	0	0
10	Świętokrzyskie	53	22	49	1	2	0	0	0	0	0	0
11	Lubelskie	150	32	128	1	2	9	18	0	0	0	0
12	Opolskie	73	14	63	4	4	0	0	0	0	0	0
13	Śląskie	201	29	158	7	9	0	0	0	0	0	0
14	Dolnośląskie	191	28	161	8	9	0	0	0	0	0	0
15	Małopolskie	136	28	120	4	6	0	0	0	0	0	0
16	Podkarpackie	105	26	95	2	3	0	0	0	0	0	0
	Σ	2731	441	1909	54	71	322	561	16	31	14	15

* without sites located at the tributaries and outlets

Source: Chief Inspectorate for Environmental Protection in Poland

POP substances are tested in water bodies of rivers and lakes in the network of diagnostic, operating and research monitoring sites.

Overall in 2008, voivodship environmental protection inspectorates tested 1689 control measurement sites in the river water quality monitoring network and 226 control measurement sites in lakes.

As a part of chemical monitoring, tests for substances particularly harmful for the lake aquatic environment were started in 2008 (priority substances, specific synthetic and non-synthetic pollutants).

As a part of the monitoring, the following persistent organic pollutant substances are tested: aldrin, endrin, dieldrin, γ -HCH, total and p, p'-DDT, p, p'-DDE, p, p'-DDD, endosulfan I and endosulfan II, HCB, total PCBs, PAHs.

The available monitoring data include only the measurement sites located in rivers.

Of the tested organochlorine pesticides, the largest concentrations in 2008 were noted for γ -HCH – average γ -HCH concentration in waters of individual Regional Water Management Boards amounted to 0.001 – 0.01 $\mu\text{g/l}$.

The average concentration of **total DDT** in waters of individual Regional Water Management Boards was from below the detection threshold in the waters of Gdańsk and Gliwice regions to 0.006 $\mu\text{g/l}$ in the Wrocław region.

The waters managed by Gliwice Regional Water Management Board had an average aldrin concentration of 0.612 $\mu\text{g/l}$. In other Regional Board regions, average aldrin concentrations did not exceed 0.003 $\mu\text{g/l}$.

Average concentrations of **dieldrin** in water did not exceed 0.001 $\mu\text{g/l}$.

Average concentration of **endosulfan** was the highest in the Poznań region (0.005 $\mu\text{g/l}$), while in other regions it did not exceed 0.003 $\mu\text{g/l}$.

2.4.2.2.2 The Baltic Sea waters

Regular testing of the Baltic marine environment has been carried out since 1979, and since 1991 under the National Environmental Monitoring. Since 1998, the measurement programme has been implemented according to HELCOM's recommendations as an integrated COMBINE Baltic Monitoring Programme. The obtained test results are compiled in the oceanographic database and then submitted regularly to HELCOM's data bank.

They include monitoring of the deep water zone (7 research stations in the area of the Gotland Basin, Bornholm Deep and Gdańsk Deep) and a complementary testing programme for the coastal zone, bays and lagoons (17 research stations in the area of Gdańsk and Pomorska Bays, Vistula and Szczecin Lagoons). The programme also includes determination of the levels of persistent organic pollutants such as aldrin, dieldrin, DDT and other.

Also Baltic Sea shallow water zone is monitored by voivodship environmental protection inspectorates in Szczecin, Gdańsk and Olsztyn under *Measure Tests and assessment of transitional and coastal waters*, resulting from implementation of Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000 establishing a framework for the Community action in the field of water policy (Official Journal EC L 327, 22.12.2000, p. 1; Official Journal EU Special edition in Polish, Chapter 15, vol. 5, p. 275), comprising:

- transitional water monitoring (31 control measurement sites);
- monitoring of coastal waters in the zone of up to one nautical mile (15 control measurement sites).

Tests for POP substances in the Vistula Lagoon waters (transitional waters) under the National Environmental Monitoring were started in 2008 [12]. Water samples were taken from 9 measurement sites. The scope of water quality testing in the Vistula Lagoon for POP substances included: the sum of aldrin, dieldrin, endrin (and isodrin), total DDT and p,p'-DDT, benzo[a]pyrene,

the sum of benzo[b]fluoranthene and benzo[k]fluoranthene, the sum of benzo[g,h,i]perylene and indeno[1,2,3-cd]pyrene.

Average concentrations of **p,p'-DDT** and total **DDT** were 0.0008 and 0.001 µg/l, respectively.

No **aldrin**, **dieldrin** and **endrin** were found in the samples taken.

The maximum concentration of **benzo[a]pyrene** was 0.005 µg/l. No **benzo[b]fluoranthene** and **benzo[k]fluoranthene**, nor **benzo[g,h,i]perylene** and **indeno[1,2,3-cd]pyrene** was found.

Tests of transitional waters (incl. the Szczecin Lagoon) and coastal waters in the Zachodniopomorskie voivodship carried out as a part of diagnostic monitoring in 18 sites (6 sites in coastal and 12 sites in transitional waters) in 2008 did not include any POP substances [12].

2.4.2.3 Bottom sediments

Tests of bottom sediments of rivers and lakes in Poland, carried out under the National Environmental Monitoring since 1990, are aimed at the observation of the contents of persistent organic pollutants (PAHs, PCBs, organochlorine pesticides) in contemporary sediments forming in the rivers and lakes, as well as the observation of their changes over time. Tests of river and lake water sediments are performed under the *Monitoring quality of surface waters* subsystem by Polish Geological Institute – National Research Institute. Direct supervision over the testing programme delivery is ensured by the Chief Inspectorate for Environmental Protection.

The scope of chemical determinations covers persistent organic pollutants (POPs), including:

- 17 polycyclic aromatic hydrocarbons (PAHs) – acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, benzo[e]pyrene, perylene, indeno[1,2,3-cd]pyrene, dibenzo[a,h]anthracene, benzo[g,h,i]perylene (tested since 1998);
- 7 congeners of polychlorinated biphenyls (PCBs) – PCB 28, PCB 52, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180 (tested since 2004);
- 13 organochlorine pesticides – α -HCH, β -HCH, γ -HCH, δ -HCH, heptachlor, aldrin, heptachlor epoxide, dieldrin, p,p'-DDE, p,p'-DDD, p,p'-DDT, endrin and endrin aldehyde (tested since 2004).

The chemical determinations of elements, PAHs, PCBs, and chloroorganic pesticides are performed in the accredited Central Chemical Laboratory of the Polish Geological Institute – National Research Institute, accreditation certificate AB 283 issued by Polish Centre for Accreditation.

2.4.2.3.1 River sediments

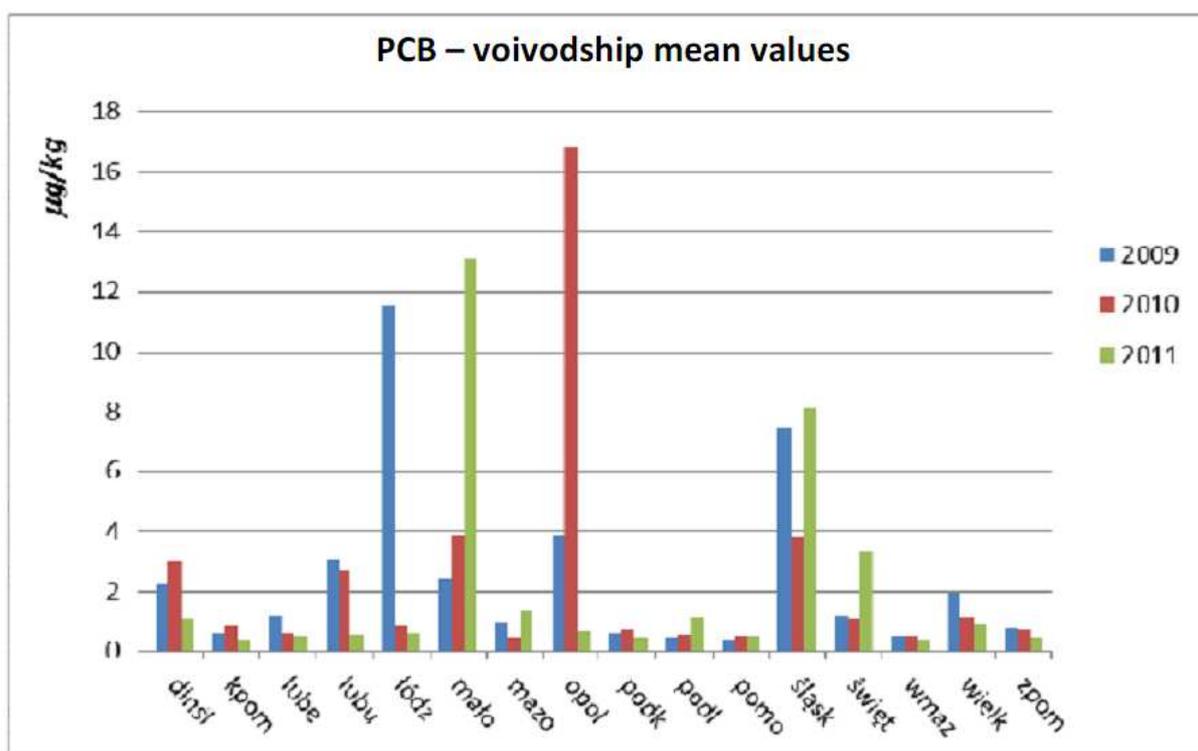
The observation sites are located in:

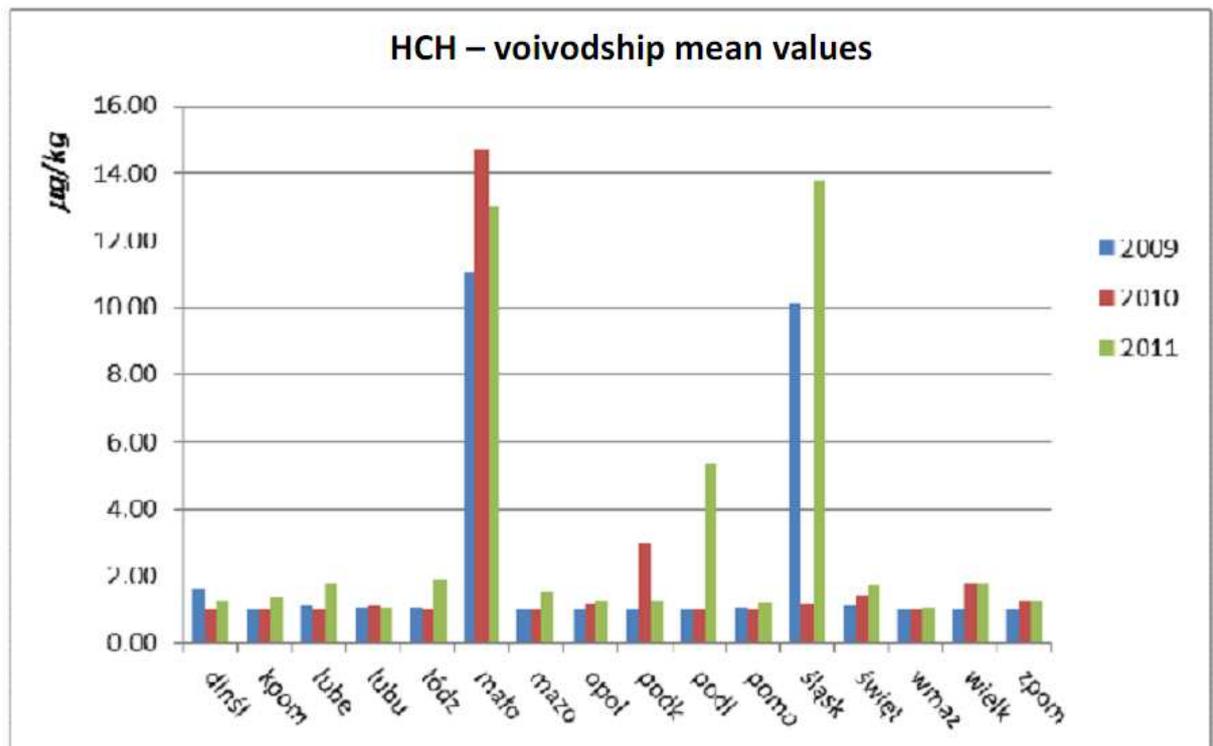
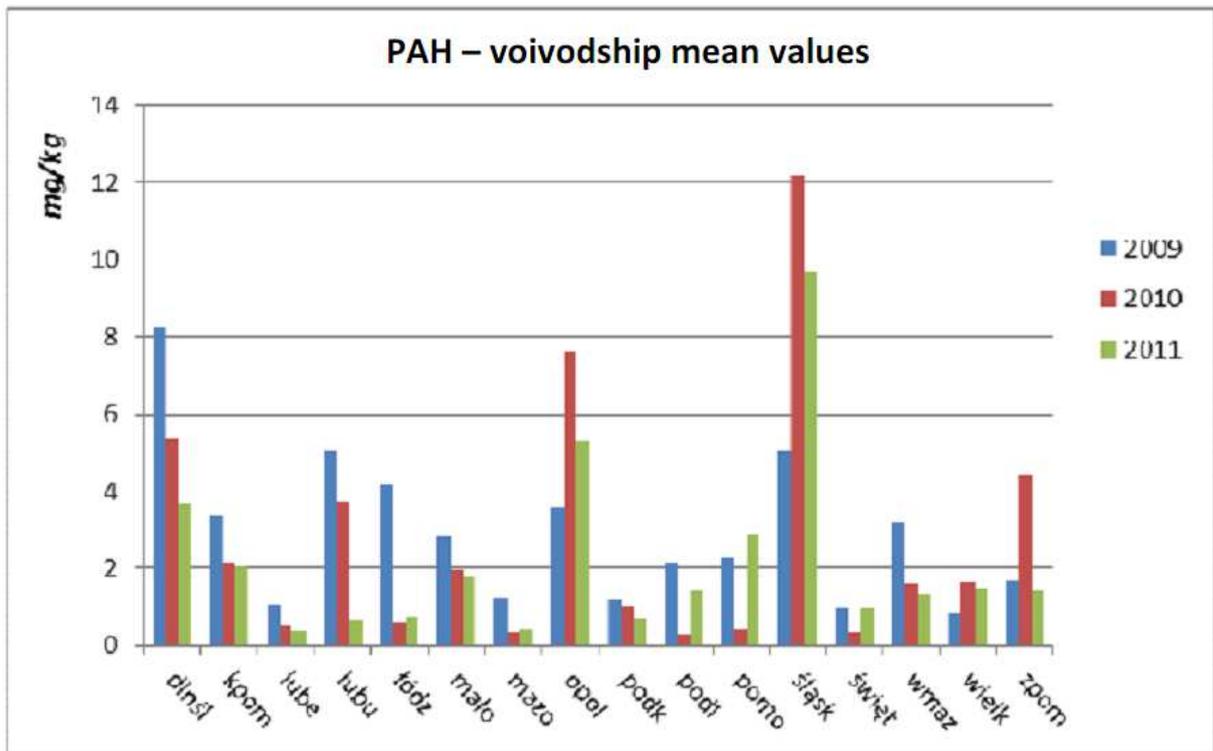
- at the river basin closure, in mouths of rivers longer than 60 km (since 2010, longer than 50 km);

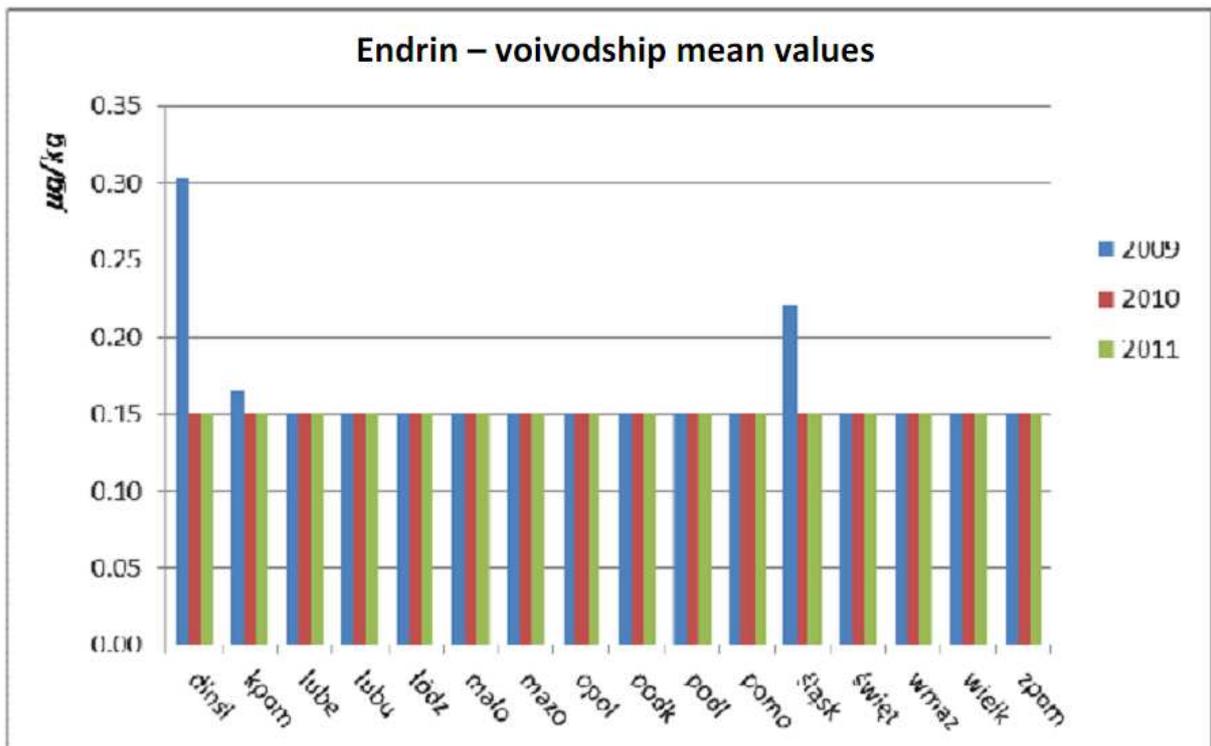
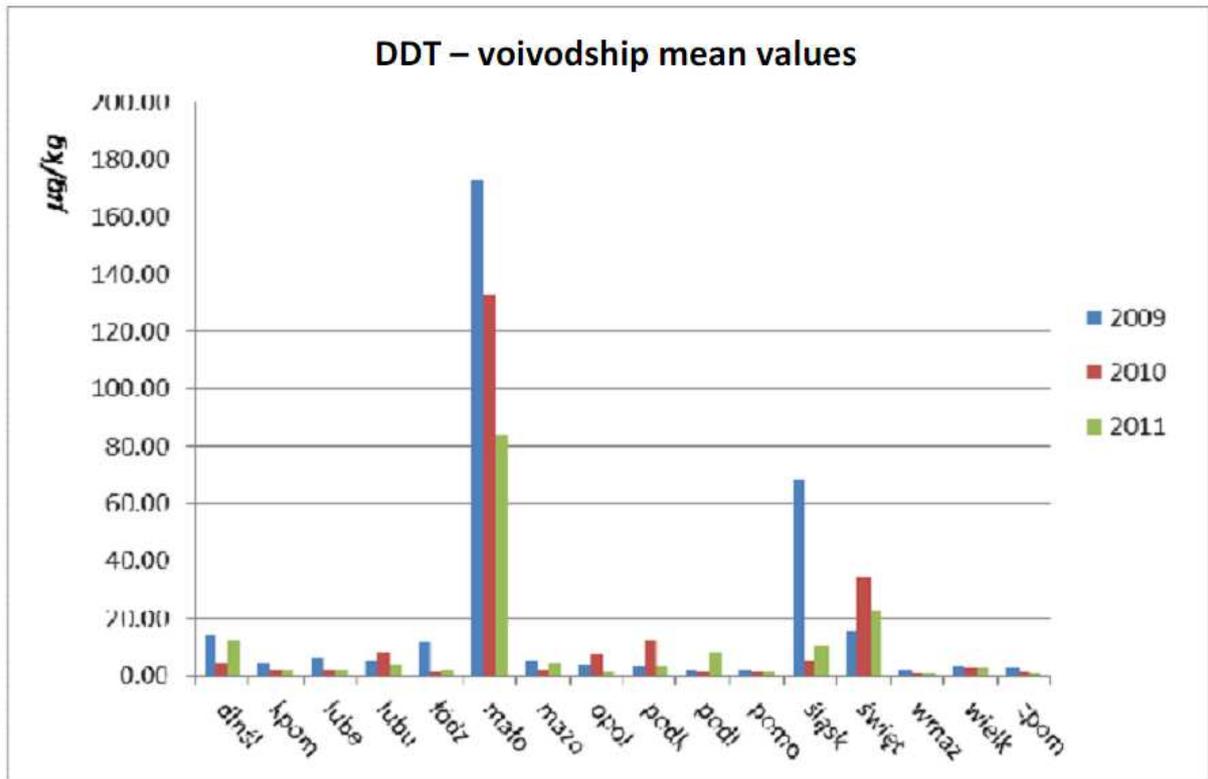
- at the river basin closure, in mouths of rivers shorter than 60 km (since 2010, shorter than 50 km) if waste water from large urban centres or industrial plants are discharged into them;
- in sites distributed along the course of rivers longer than 100 km, located at closure of individual river basin (e.g. Vistula, Odra, Warta, Narew, Bug, Pilica, San and Proсна):
 - downstream from mouths of water courses and rivers longer than 50 km;
 - downstream of major cities or towns with industrial plants;
- on rivers longer than 50 km flowing into or out of Poland.

The observation network is divided into basic monitoring sites (80 sites till 2009) where sediments for tests are sampled annually, and operating monitoring sites where sediments are tested once in three years (221 sites till 2009).

Figure IV shows the changes in geometric mean concentrations of persistent organic pollutants covered by the Convention, tested as a part of monitoring in river sediments in each voivodship in the years 2009-2011.







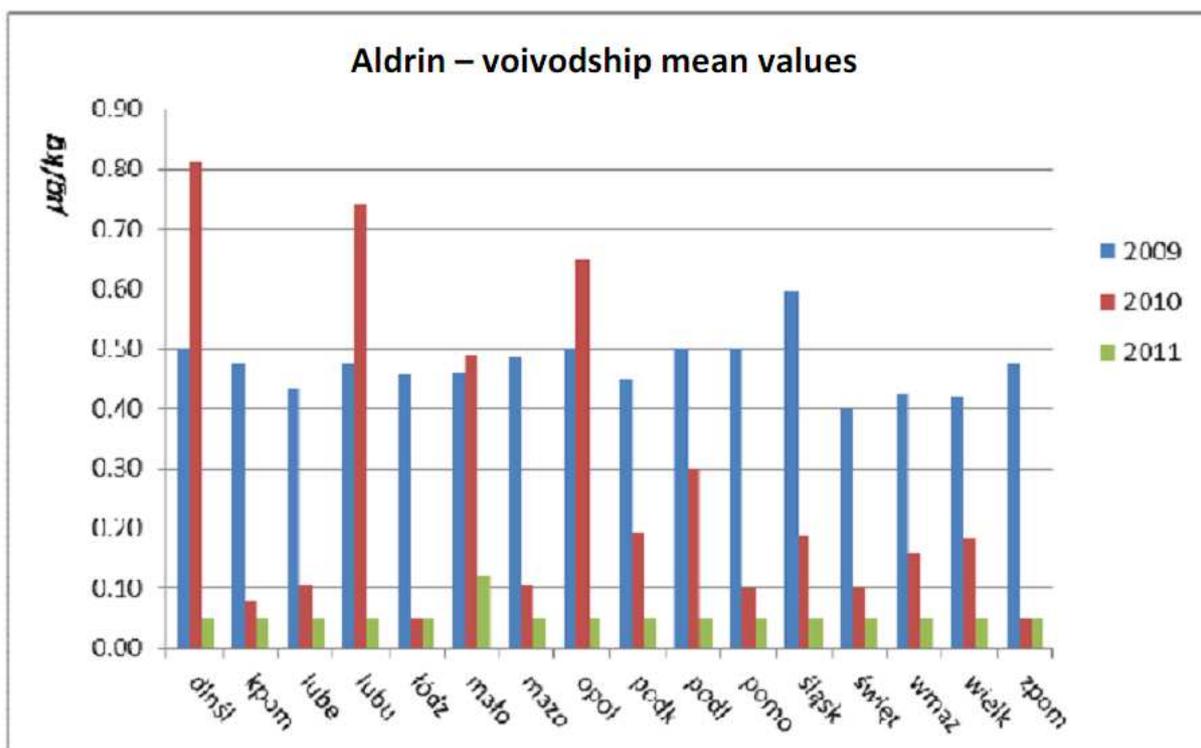


Fig. IV. Change in concentrations of POPs covered by the Convention in river sediments tested in each voivodship in the years 2009-2011

In the tests conducted under the National Environmental Monitoring in 2009-2011, the content of the sum of determined **PCB** congeners in the tested sediments was in the range <math><0.1</math> to 356.6 $\mu\text{g}/\text{kg}$ (the highest value was observed in the Uszwica_Wola Przemyskowska site in Małopolskie voivodship in 2011). In general, in 2011 geometric mean PCB content higher than the detection limit was found in sediment samples collected in Małopolskie, Śląskie and Świętokrzyskie voivodships.

In tested river sediments, the content of **HCH isomers**: α -HCH, β -HCH, γ -HCH (lindane), δ -HCH, was between 1.0 and 210.6 $\mu\text{g}/\text{kg}$ (the highest value was observed in the Wisła-Grabie site in 2009). The highest concentrations of these compounds were found in sediments in Śląskie and Małopolskie voivodships. In many locations, γ -HCH was found in concentration at which an adverse impact on aquatic life is observed ($>1.38 \mu\text{g}/\text{kg}$).

The presence of **DDT** and its metabolites was observed in nearly all tested sediment samples with the concentration between 0.4 and 3941 $\mu\text{g}/\text{kg}$. The highest concentrations were found in sediments collected from the Wisła-Grabie site – 2145 $\mu\text{g}/\text{kg}$ in 2011 and 3941 $\mu\text{g}/\text{kg}$ in 2009, and in many of the tested samples the concentration of DDT exceeded the value above which an adverse impact on aquatic organisms is observed (1.19 $\mu\text{g}/\text{kg}$).

The concentrations of **endrin** above the detection limit in the years 2009-2011 were found in sediments taken from the measurement sites within the Dolnośląskie, Śląskie and Kujawsko-Pomorskie voivodships (the highest value of 3.5 $\mu\text{g}/\text{kg}$ was observed in the Odra_Ścinawa site in 2009).

Concentration of **aldrin** in sediments above the detection limit was found, among others, in the sediments collected from measurement sites in almost all voivodships in 2009 and 2010 (the highest value of 17 µg/kg was observed in Dolnośląskie voivodship, in the Bystrzyca_Wrocław control site in 2010).

Endosulfan I and **endosulfan II** in a concentration above the detection limit was observed in few measurement sites – the highest value of 18.0 µg/kg was observed in the measurement point Wisła_Grabie in 2009.

The presence of **heptachlor** or heptachlor epoxide above the detection limit was found only in some measurement sites, however the concentrations were such that no adverse impact on aquatic organisms would be observed.

The highest concentrations of PAHs listed by US EPA in sediments in the individual voivodships in 2009-2011 were found in the sediments of the control sites at Odra and Pilawa rivers (the highest value of 134 178 mg/kg was observed in the Odra_Chałupki site in 2010).

2.4.2.3.2 Lake sediments

The tests of lake water sediments are performed in lakes designated annually by the Inspectorate for Environmental Protection from among lakes in the regional monitoring network (every year sediments from 100-150 different lakes are tested) and in 10 benchmark lakes of the national lake monitoring network (23 lakes since 2009). Tests in the lakes in the regional network are performed every few years, mostly every five years, while in the benchmark lakes in the national lake monitoring network it is every 2 years.

Persistent organic pollutants are tested in selected monitoring sites.

In the tests conducted under the National Environmental Monitoring in 2009-2011 [16], the content determination of the sum of **PCBs** in lake sediments showed the presence of these substances in many control sites (the highest value of 50.7 µg/kg was observed in 2010 in the Grzymiśławskie lake in Wielkopolskie voivodship).

The presence of HCH isomers was found in the sediments of many lakes – the highest geometric mean concentrations of these substances in sediments was observed in Lubuskie and Wielkopolskie voivodships (the highest value of 60.7 µg/kg was observed in 2010 in the sediments of Lubiakówko lake in Lubuskie voivodship, consisting mainly of α-HCH isomer). By 2011, however, much lower concentrations of HCH were observed.

The **DDT** metabolites were present in the majority of the sediment samples. The highest value of the sum of DDT, 602 µg/kg in 2011, was significantly different from other measurements and was observed only once in the sediments of Człuchowskie lake in Pomorskie voivodship. The geometric means of the concentrations of the sum of DDT were the highest in Pomorskie and Lubuskie voivodships, while in the other voivodships the values remained below 25 µg/kg.

The high content of the sum of 15 **PAHs** listed by US EPA, exceeding 10 mg/kg, was found among others in the sediments of the lakes in Pomorskie, Zachodniopomorskie and Lubuskie voivodships. The highest observed value was 53.4 mg/kg, found in 2009 in the sediments of Człuchowskie lake in

Pomorskie voivodship. In comparison, the concentrations observed in the sediments of the same lake in 2011, while still high, were more than 10 times lower than the maximum observed value.

In general, lake sediments are characterized by a higher content of PAHs than river sediments due to a very large proportion of organic material in lake sediments.

2.4.2.3.3 The Baltic Sea sediments

Baltic Sea sediments are tested as a part of the National Environmental Monitoring every five years [13].

In 2007, as a part of the National Environmental Monitoring, sediments from the Gdańsk Deep, the Vistula Lagoon and the Gotland Deep were tested (Table VIII). Of POP substances, the following were tested:

- seven PCB congeners (PCB 28, PCB 52, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180);
- three HCH isomers (α -HCH, β -HCH, γ -HCH);
- HCB;
- DDT (o,p'-DDT, p,p'-DDT) and its two metabolites (p,p'-DDE and p,p'-DDD).

Table VIII. Metadata from marine stations [15]

Station	Longitude	Latitude
P1 – Gdańsk Deep	19.33	54.83
KW – Vistula Lagoon	19.58	54.37
P140 – Gotland Deep	18.40	55.56

In all surveyed locations, HCB was found in lowest concentrations (the lowest concentration was recorded in the sediments of the Gdańsk Deep – 3.38 $\mu\text{g}/\text{kg DM}$, and the highest in the sediments of the Vistula Lagoon – 64 $\mu\text{g}/\text{kg DM}$). Concentrations of the sum of seven PCB congeners in all tested sediments were comparable (from 3.17 $\mu\text{g}/\text{kg DM}$ in sediments from the Gotland Deep to 5.01 $\mu\text{g}/\text{kg DM}$ in sediments from the Vistula Lagoon). In the case of the sum of HCH and the sum of DDT, the lowest concentrations were found in the sediments from the Vistula Lagoon (1.01 and 1.31 $\mu\text{g}/\text{kg DM}$, respectively). The highest concentrations of the sum of HCH were found in the sediments from the Gdańsk Deep (5.66 $\mu\text{g}/\text{kg DM}$), and of the sum of DDT – in the sediments from the Gotland Deep (9.44 $\mu\text{g}/\text{kg DM}$).

2.4.2.4 Soil

In Poland no regular monitoring of concentration of persistent organic pollutant substances in soil is conducted (except for benzo[a]pyrene).

In October 2002, a PCB content survey of soils in Poland has been carried out [18]. Soil samples were taken from agricultural, urban and industrial areas, including former PCB production areas, in sites at least 200 m away from the nearest road. Location of sampling sites is shown in Figure V.

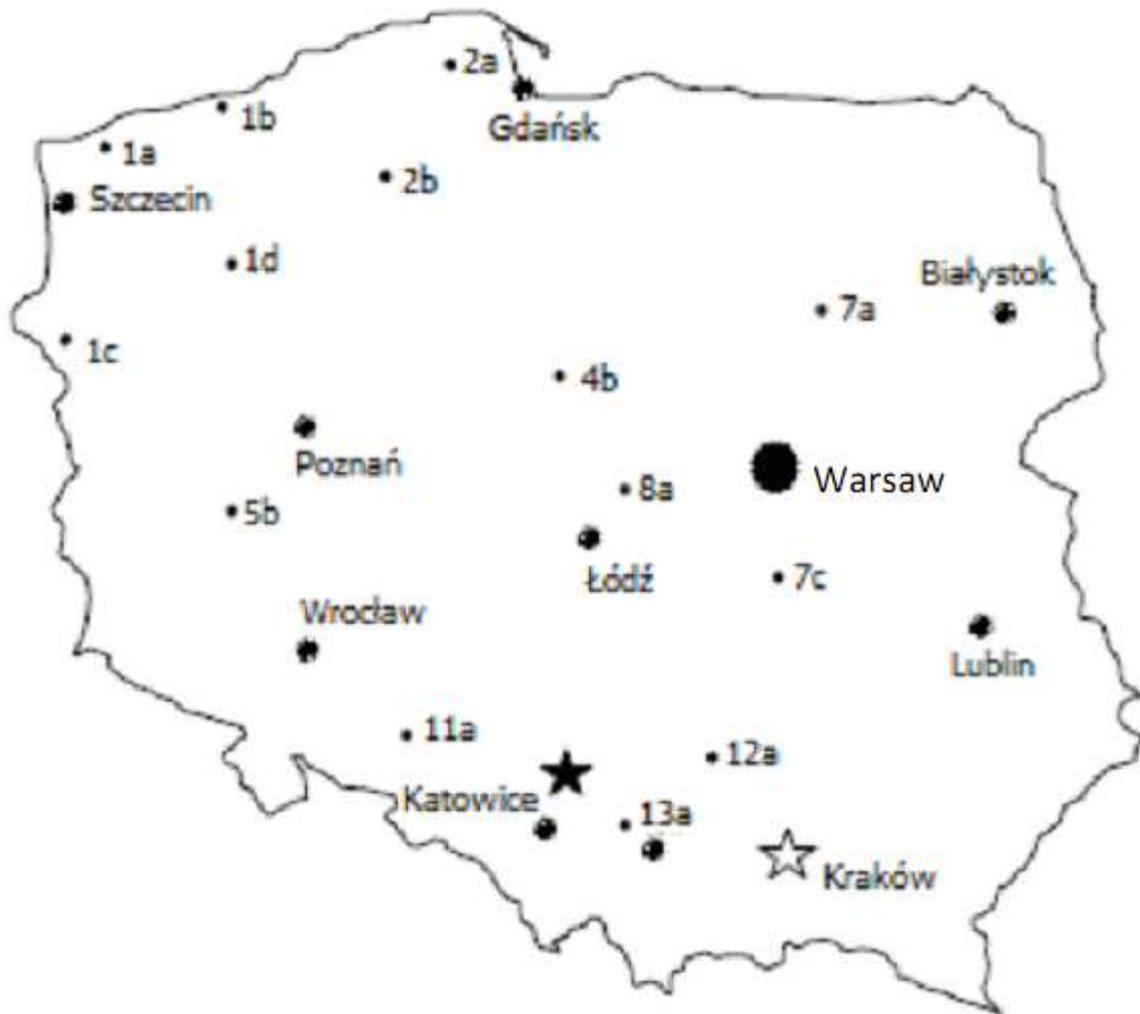


Fig. V. Location of soil sampling points and location of former Chlorofen (filled star) and Tarnol (unfilled star) production facilities [18]

Figure VI shows concentrations of sum PCBs in soils sampled in individual measurement sites:

- vicinity of former Polish PCB production or use facilities - sites 11a, 12a, 13a,
- industrial and densely populated central Poland's regions - sites 4b, 8a,
- agricultural areas - site 7a.

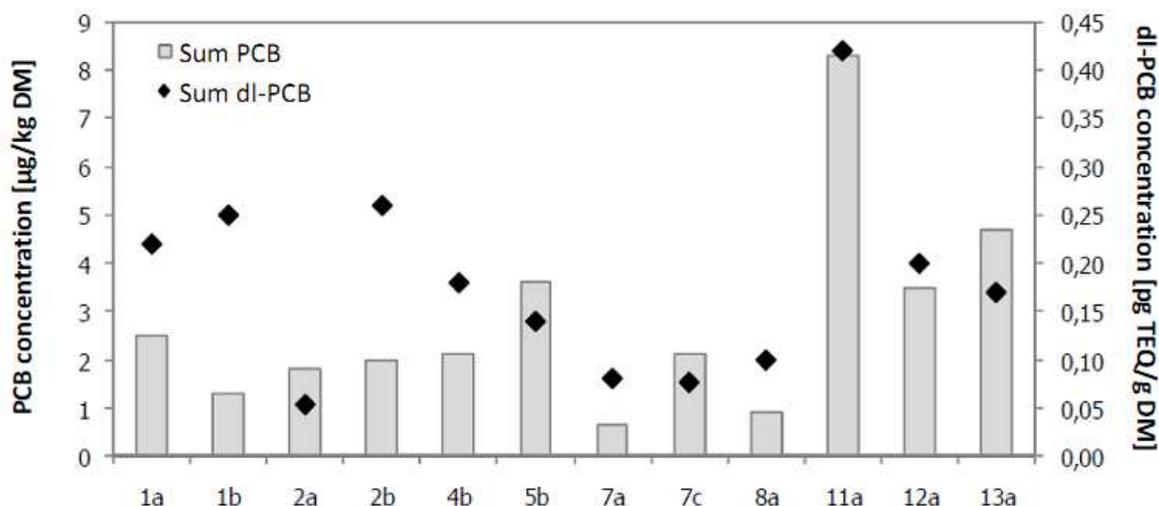


Fig. VI. Concentrations of sum PCBs and dl-PCBs in soils from individual sampling sites [18]

In the tested soil samples, total concentration of sum PCB was between 0.67 to 8.3 µg/kg DM. Increased levels of sum PCBs in soils are mostly associated with urban areas. The highest sum PCB concentrations were found in the former PCB production or use facilities (in site 12a - 3.5 µg/kg DM, in site 13a - 4.7 µg/kg DM, in site 11a - 8.3 µg/kg DM), which was more than 10 times higher than in soils from agricultural areas (0.67 µg/kg DM). The dl-PCB concentrations ranged from 0.077 to 0.42 µg TEQ/g DM.

In 2009, the Institute of Environmental Protection conducted tests of PCB content in soils and plants from areas of diverse type of use [61].

Soils were sampled for tests from:

- the areas of the Forest Experimental Station in Rogów, in the Łódzkie voivodship, Brzeziny district;
- from agricultural land in the village of Granica, the Mazowieckie voivodship, Pruszków district;
- from industrial areas where equipment using oils with PCB were produced – former ZWAR facility in Warsaw;
- from areas along the transport routes (the Lublin route, the Poznań route, and the Gdańsk route) sampled in various distances from the road (0 m, 5 m, 10 m, 20 m, 50 m, 100 m, and 200 m).

The content of sum PCB in forest soils ranged from 0.11 µg/kg DM of soil in parent rock of lessive soil to 15.057 µg/kg DM. The highest sum PCB concentrations were noted in the A level: from 1.775 µg/kg DM to 15.057 µg/kg DM.

Sum PCB in soils from agricultural land ranged from 0.201 µg/kg DM of soil in parent rock to 5.741 µg/kg DM of A-level soil. The highest sum PCB concentrations were found in two profiles: 5.741 µg/kg DM and 5.357 µg/kg DM.

In both soil profiles from industrial areas the distribution of sum PCB over depth was similar: concentrations would grow from 270.9 µg/kg DM in the 0-3 cm layer to the maximum in the 3-5 cm layer: 431.5 µg/kg DM and 436.8 µg/kg DM, and then decrease to 301.5 µg/kg DM and to 160.4 µg/kg DM in the 5-10 cm layers and to much lower values in deeper soil layers.

2.4.2.5 Sludge

In Poland there is currently no regular monitoring of concentration of persistent organic pollutant substances in sludge.

In the years 1998-2007, the Institute of Environmental Protection in Warsaw conducted tests for presence of potentially toxic substances in sewage sludge [19, 20]. Tested sludge came from fifteen (in cycles I and II of tests) and then ten (in cycle III of tests) municipal waste water treatment plants in Poland, of various capacities and technologies used, from different regions of the country.

The study was conducted in 1998-2007, in three consecutive cycles. In each treatment plant in the years 1998/99 were tested (cycle I) ten sludge samples, moreover in 2001/2002 (cycle II) five samples and in 2007 (cycle III) two samples were tested.

In addition to the core indicators (pH, dry matter, organic matter), the tests included seven congeners of polychlorinated biphenyls (PCB 28, 52, 101, 118, 138, 153 and 180) and sixteen polycyclic aromatic hydrocarbons, listed by US EPA (naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, dibenzo[a,h]anthracene, benzo[g,h,i]perylene, indeno[1,2,3-cd]pyrene).

Figure VII shows the average content of seven PCB congeners in sewage sludge from waste water treatment plants in the consecutive cycles of measurement.

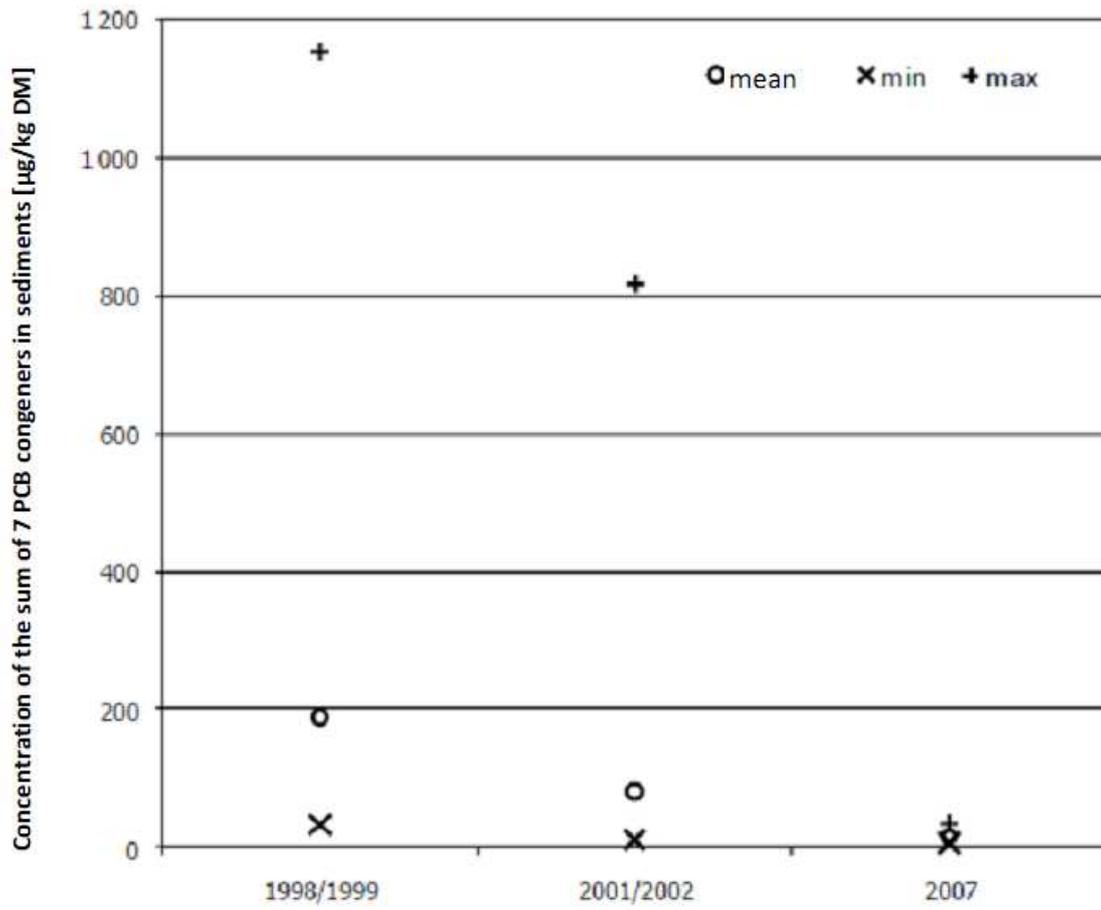


Fig. VII. Change in concentration of the sum of 7 PCB congeners in sludge in the years 1998-2007 [19, 20]

Test results indicate a steady decline of concentration of the seven PCB congeners in sludge in the analysed years.

Figure VIII shows a histogram of the total content of seven PCB congeners in sludge from ten waste water treatment plants in all cycles over the years 1998-2007.

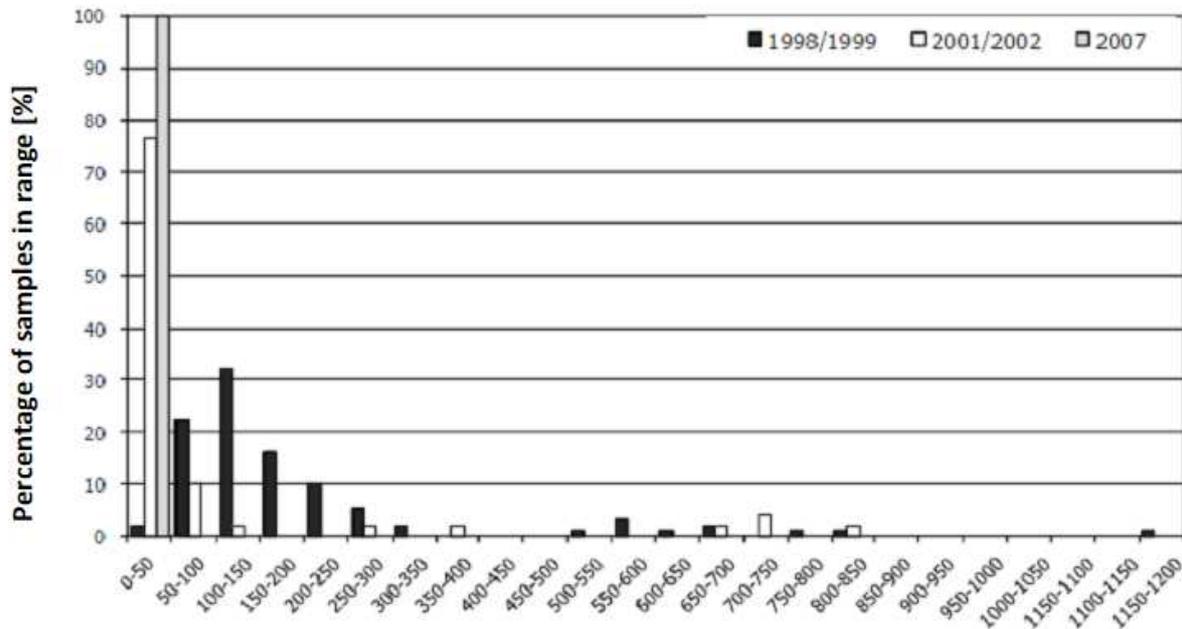


Fig. VIII. Histogram of the concentration of the sum of 7 PCB congeners in sludge in the years 1998-2007 [19, 20]

Analysis of test results show a clear decline in the concentration of 7 PCB congeners in the tested sludge – over 10 years, average concentrations dropped by nearly 12 times (from 189.5 to 15.8 µg/kg DM) [20].

For many years, benzo[a]pyrene was the indicator of environmental risk from PAHs, its standard was set out in legal regulations, however in the recent years the "PAH lists" containing from 6 to 16 compounds, for which determination of their levels in the environment is recommended, have been developed. The proposed EU Sludge Directive provides for sum PAH 11 with permissible concentration in sludge of 6 mg/kg DM. Of the sixteen hydrocarbons tested by the Institute of Environmental Protection, ten are included in the 11 PAHs regulated by the Directive (benzo[j]fluoranthene is missing).

Figures IX and XI show the average content of the sum of 16 and 10 PAHs in sludge from waste water treatment plants tested in successive measurement cycles, and Figures X and XII show histograms of sum of 16 PAHs content in sludge from ten waste water treatment plants tested in all cycles in the years 1998-2007.

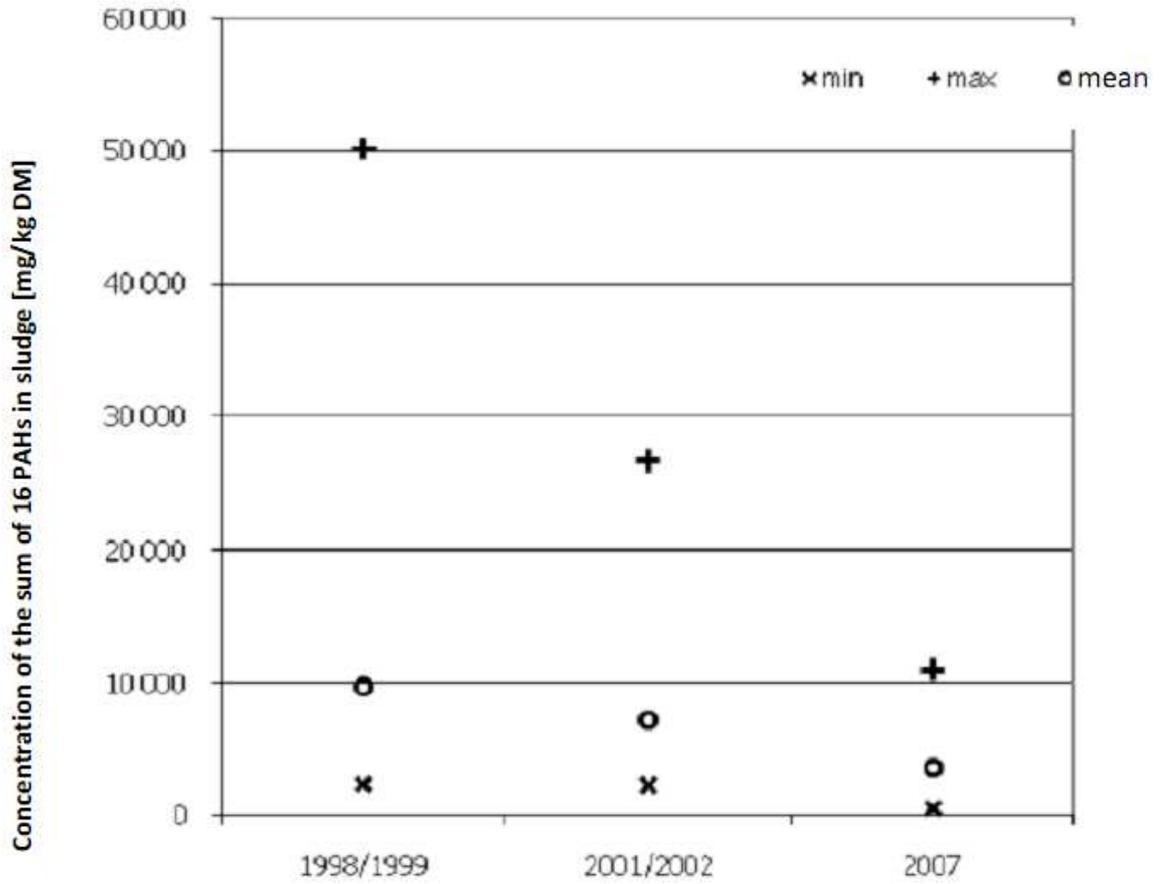


Fig. IX. Change in concentration of the sum of 16 PAHs in sludge in the years 1998-2007 [20]

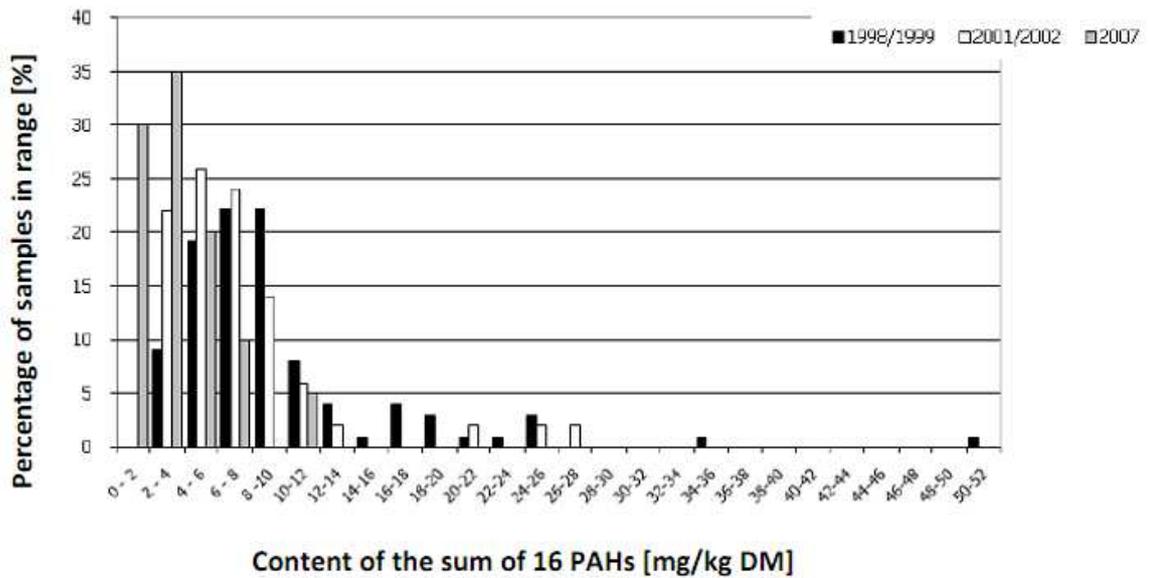


Fig. X. Histogram of the sum of 16 PAHs in sludge tested in 1998-2007 [20]

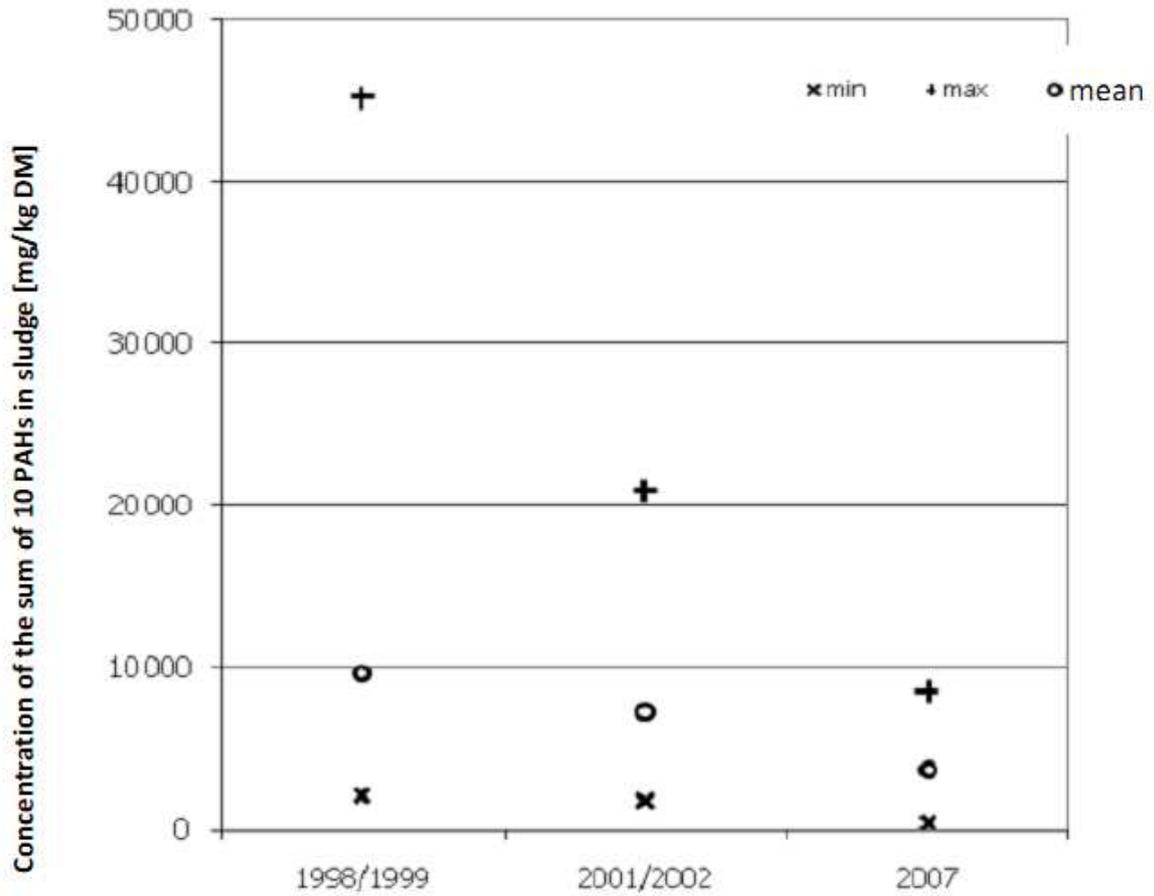


Fig. XI. Change in concentration of the sum of 10 PAHs in sludge in the years 1998-2007 [20]

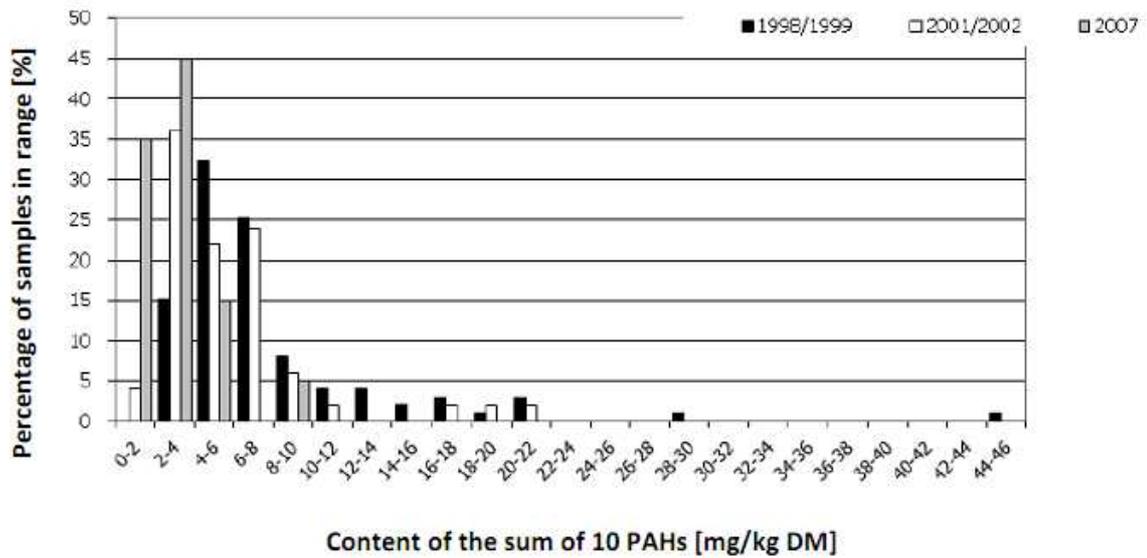


Fig. XII. Histogram of the sum of 10 PAHs in sludge tested in 1998-2007 [20]

The test result analysis of PAH in sludge from ten treatment plants show the decrease in the content of these compounds in sludge tested in successive measurement cycles [20]:

- the average content of the sum of 16 PAHs decreased more than 2-fold (from 9.6 to 3.7 mg/kg of DM);
- the average content of the sum of 10 PAH decreased more than 3-fold (from 7.9 to 2.8 mg/kg DM);

Figure XII shows the average content of benzo[a]pyrene in sludge from wastewater treatment plants tested in successive measurement cycles, and Figure XIV shows the histogram of the benzo[a]pyrene content in sludge from ten wastewater treatment plants tested in all cycles in the years 1998-2007.

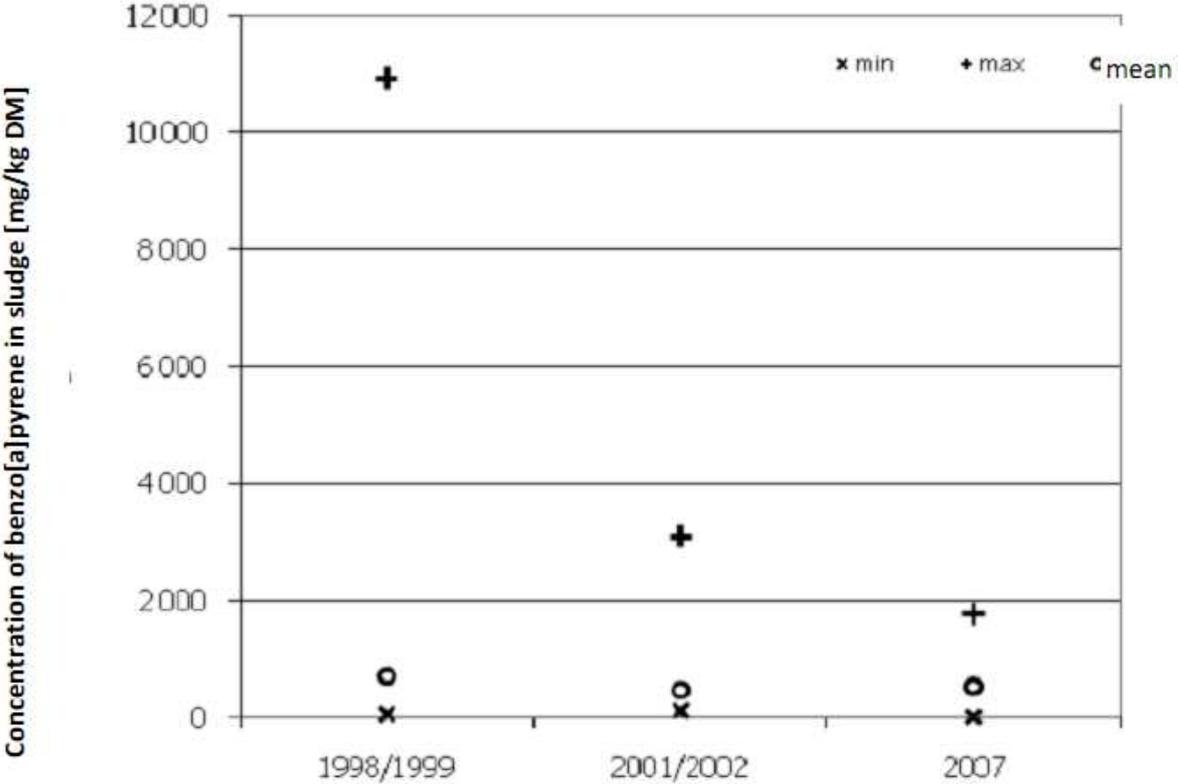


Fig. XIII. Change in concentration of benzo[a]pyrene in sludge in the years 1998-2007 [20]

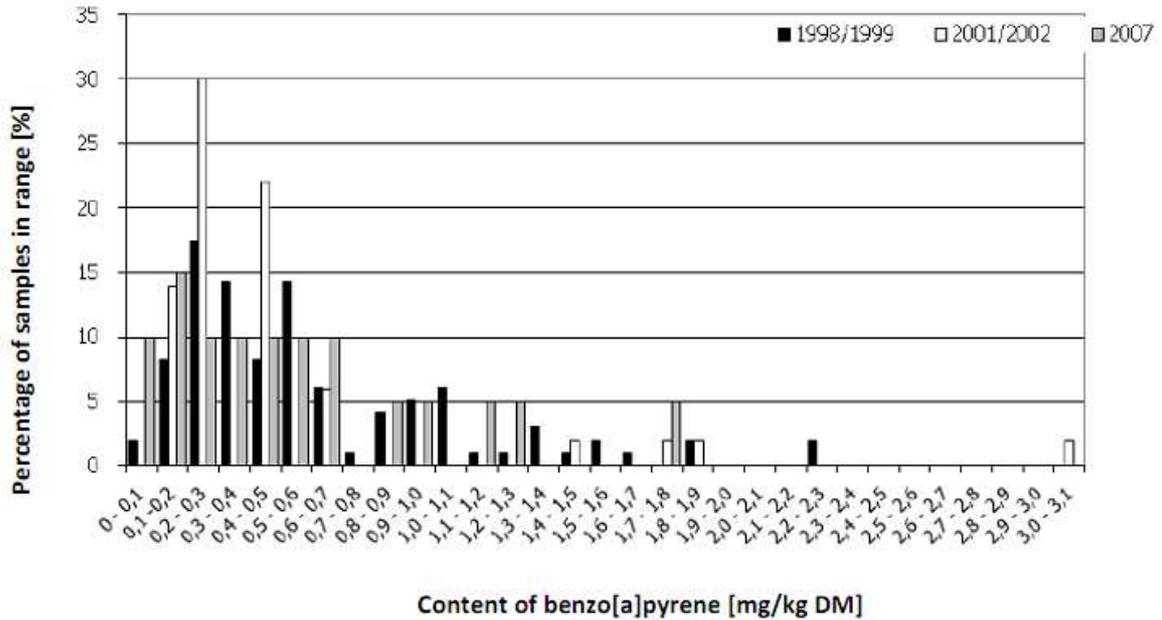


Fig. XIV. Histogram of benzo(a)pyrene in the sludge tested in 1998-2007 [20]

Analysis of test results of benzo[a]pyrene in sediments from ten sewage treatment plants show that the average and maximum content of benzo[a]pyrene decreased in the second cycle of testing and the average content increased again in the third cycle [20].

2.4.2.6 Food

The following foodstuff is examined in Poland:

- food of animal origin (e.g. meat, milk, eggs, fish, honey),
- vegetables, e.g. cauliflower, peppers, tomatoes,
- fruits, e.g. bananas, grapes, apples,
- grains, e.g. wheat, oats, rye,
- other, e.g. orange juice, apple juice/beverages,
- foods for infants and young children.

As part of monitoring and official food control for pesticide residues, the following organochlorine compounds are examined: aldrin, dieldrin, chlordane, DDT, endrin, heptachlor, hexachlorocyclohexane (as defined by the residue), lindane and hexachlorobenzene.

Veterinary Inspection takes testing samples from pigs, cattle, horses, sheep, poultry (hens, chickens, turkeys, ducks, geese), fish, rabbits, wild game and samples of cow milk, eggs and honey. In terms of persistent organic pollutants, the tests include determining the contents of:

- organochlorine pesticides – DDT and its metabolites, α -HCH, β -HCH, γ -HCH, HCB, aldrin, dieldrin, chlordane, endrin, endosulfan, heptachlor;

- 7 congeners of polychlorinated biphenyls – PCB 28, PCB 52, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180.

In addition, since 2006, a national screening program for dioxins, furans, dioxin-like polychlorinated biphenyls (dl-PCBs) and non dioxin-like PCBs (ndl-PCBs) in animals and foods of animal origin (a total of 29 congeners of dioxin-like compounds) is conducted with the aim to:

- detect cases of exceeding the permissible levels of dioxins, furans, dioxin-like polychlorinated biphenyls (dl-PCB) and non dioxin-like PCBs in animals and foods of animal origin as set out in the Regulation (EC) No 1881/2006 of the Commission of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs (EU Official Journal L 364 of 20.12.2006, p. 5, as amended),
- explore and reveal the reasons for the development and the occurrence of the cases of exceeding the permissible levels of dioxins, furans, dioxin-like PCBs and non dioxin-like PCBs in food products of animal origin in order to protect public health,
- control food products of animal origin in order to determine compliance with the requirements of veterinary legislation.

The principles of the programme are compiled annually by the Chief Veterinary Officer and determine the number of samples to be taken in each province to carry out the tests.

Food samples for testing to determine the content of dioxins, furans and dioxin-like PCB compounds are collected from all over the country, in accordance with the Instructions issued annually by the Chief Veterinary Officer.

2.4.2.6.1 Raw materials and plant products

Organochlorine compounds (aldrin, dieldrin, chlordane, DDT, endrin and heptachlor) are identified in food samples of plant origin tested within a coordinated monitoring and official food control systems in terms of pesticide residues, carried out by the laboratories of the State Sanitary Inspection in Poland since 2004.

Table IX shows the number of fruit, vegetable and cereal samples taken between 2004 and 2008.

Table IX. The number of fruit, vegetable and cereal samples taken between 2004 and 2008 [21].

Year	Number of samples	
	Vegetables and fruits	Cereals
2004	581	104
2005	893	150
2006	1062	151
2007	1046	156
2008	1154	150

Tables X – XIV present the results of tests carried out in 2004-2008 for organochlorine pesticide residues in products of vegetable origin as a part of monitor studies and official control of food of plant origin for pesticide residues.

Table X. The test results of DDT residues in products of plant origin in the period of 2004-2008 [22]

Year	Vegetables and fruits			Cereals		
	Number of samples	Number of samples with residues	Highest Score [mg/kg]	Number of samples	Number of samples with residues	Highest Score [mg/kg]
2004	83	7	0.002	70	6	0.018
2005	266	18	0.018	100	0	n/a
2006	711	0	0.050*	151	0	0.050*
2007	859	0	0.050*	151	0	0.050*
2008	985	0	0.050*	150	0	0.050*

Table XI. The test results of aldrin and dieldrin residues (only aldrin until the end of 2006) in products of plant origin in the period of 2004-2008 [22]

Year	Vegetables and fruits			Cereals		
	Number of samples	Number of samples with residues	Highest Score [mg/kg]	Number of samples	Number of samples with residues	Highest Score [mg/kg]
2004	25	6	0.004	97	0	n/a
2005	318	18	0.009	150	0	n/a
2006	721	0	0.010*	151	0	0.010*
2007	877	0	0.010*	151	0	0.010*
2008	981	0	0.010*	110	0	0.010*

Table XII. The test results of chlordane residues in products of plant origin in the period of 2004-2008 [22]

Year	Vegetables and fruits			Cereals		
	Number of samples	Number of samples with residues	Highest Score [mg/kg]	Number of samples	Number of samples with residues	Highest Score [mg/kg]
2004	0	n/a	n/a	0	n/a	n/a
2005	0	n/a	n/a	0	n/a	n/a
2006	0	n/a	n/a	51	0	0.01*
2007	0	n/a	n/a	51	0	0.02*
2008	318	0	0.01*	110	0	0.02*

Table XII. The test results of endrin residues in products of plant origin in the period of 2004-2008 [22]

Year	Vegetables and fruits			Cereals		
	Number of samples	Number of samples with residues	Highest Score [mg/kg]	Number of samples	Number of samples with residues	Highest Score [mg/kg]
2004	28	6	0.007	60	4	0.004
2005	233	8	0.030	110	0	n/a
2006	58	0	0.010*	101	0	0.010*
2007	122	0	0.010*	101	0	0.010*
2008	791	0	0.010*	110	0	0.010*

Table XIV. The test results of heptachlor residues in products of plant origin in the period of 2004-2008 [22]

Year	Vegetables and fruits			Cereals		
	Number of samples	Number of samples with residues	Highest Score [mg/kg]	Number of samples	Number of samples with residues	Highest Score [mg/kg]
2004	20	5	0.001	97	23	0.006
2005	268	11	0.004	100	1	0.002
2006	703	0	0.010*	101	0	0.010*
2007	937	0	0.010*	101	0	0.010*
2008	973	0	0.010*	150	0	0.010*

*Reporting Level means the lowest level of residues which should be presented in numerical form. It may correspond to the limit of quantification, or be above that level due to the reduction of costs, if the values of maximum acceptable residue levels (MRLs) allow.

The monitoring carried out by the State Sanitary Inspection also determined other organochlorine compounds, including hexachlorocyclohexane (as defined by the residue), lindane and hexachlorobenzene, however, their presence in foods of plant origin was only occasionally detected.

The evaluation of these results allows to assume that the level of tested compounds in foods of plant origin is below the current value of maximum residue levels (MRLs) established by the European Parliament and the Council at the default level equal to the limit of qualification. The identifications of residues of organochlorine compounds in some samples, listed in the tables above, are the result of the adoption of the very low limits of quantification by some laboratories of the Voivodship Sanitary-Epidemiological Stations. Adoption of the so-called reporting levels in subsequent years, which were recommended by the European Commission, had an impact on the research field by eliminating area irrelevant from the standpoint of safety for the consumer.

2.4.2.6.2 Raw materials and products of animal origin

Table XV presents the test results of **PCB** residues in domestic and imported products of animal origin carried out in the period of 2005-2009 under the *National Programme for screening for prohibited substances and residues of chemical, biological and medicinal products in animals and foods of animal origin*.

Table XV. The test results of PCB residues in animal products surveyed in the period of 2005-2009 [23]

	Number of samples					Number of non-compliant results (NC)				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Test results of domestic products of animal origin										
Cattle	165	151	157	167	175	0	0	0	0	0
Pigs	265	261	271	289	272	0	0	0	0	0
Sheep/goats	20	20	20	21	20	0	0	0	0	0
Horses	30	30	37	34	32	0	0	0	0	0
Rabbits	20	19	20	21	20	0	0	0	0	0
Fish	71	66	61	59	71	0	0	0	0	0
Chickens	145	154	160	183	193	0	0	0	0	0
Turkeys	42	40	37	39	47	0	0	0	0	0
Geese	35	37	34	36	38	0	0	0	0	0
Ducks	29	24	28	27	29	0	0	0	0	0
Milk	135	120	123	131	114	0	0	0	0	0
Eggs	98	102	129	133	150	0	0	0	0	0
Honey	15	18	12	16	15	0	0	0	0	0
Farmed game animals	0	2	4	7	4	0	0	0	0	0
Wild game	82	83	80	89	104	0	0	0	7	0
Test results of imported products of animal origin										
	Number of samples					Number of non-compliant results (NC)				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Cattle	1	0	2	3	2	0	0	0	0	0
Pigs	20	15	6	2	1	0	0	0	0	0
Poultry	3	4	5	0	0	0	0	0	0	0
Fish	90	87	64	81	103	0	0	0	0	0
Honey	1	0	1	1	3	0	0	0	0	0
Sheep	0	0	1	0	0	0	0	0	0	0
Eggs	0	0	3	0	0	0	0	0	0	0

In 2008, PCB residues were commonly observed in the tested samples (> 50% of samples), but their concentrations were mostly at the level of hundredths and thousandths of mg / kg, which is a few percent of the limited values [24].

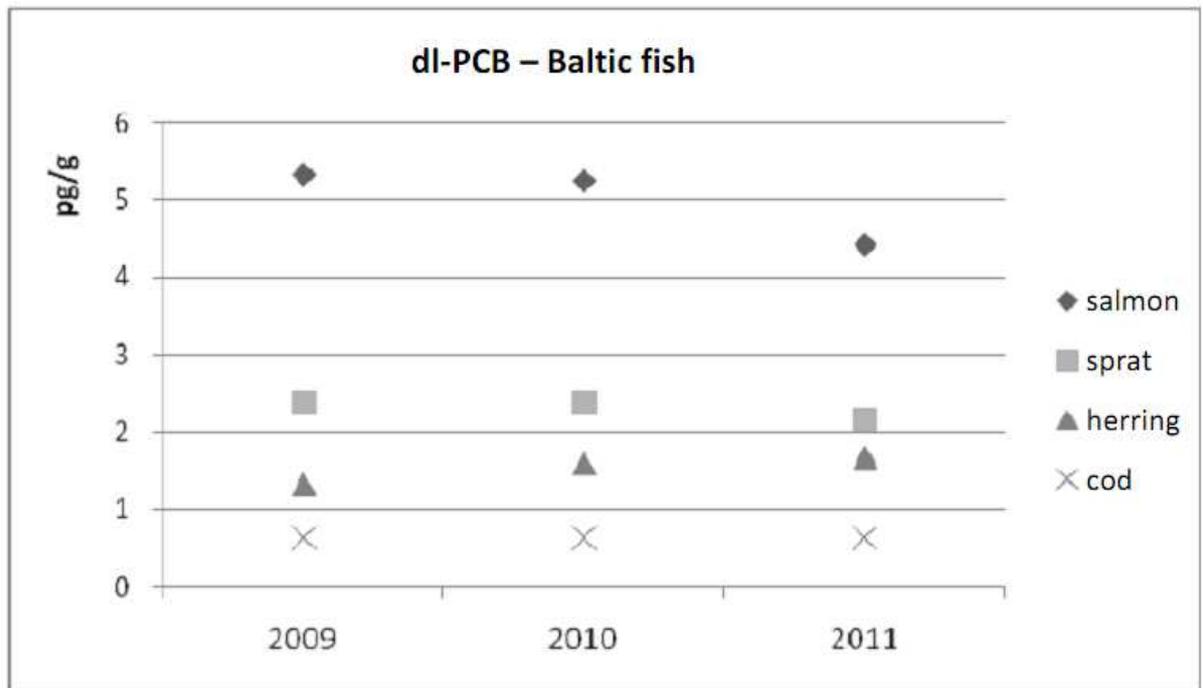
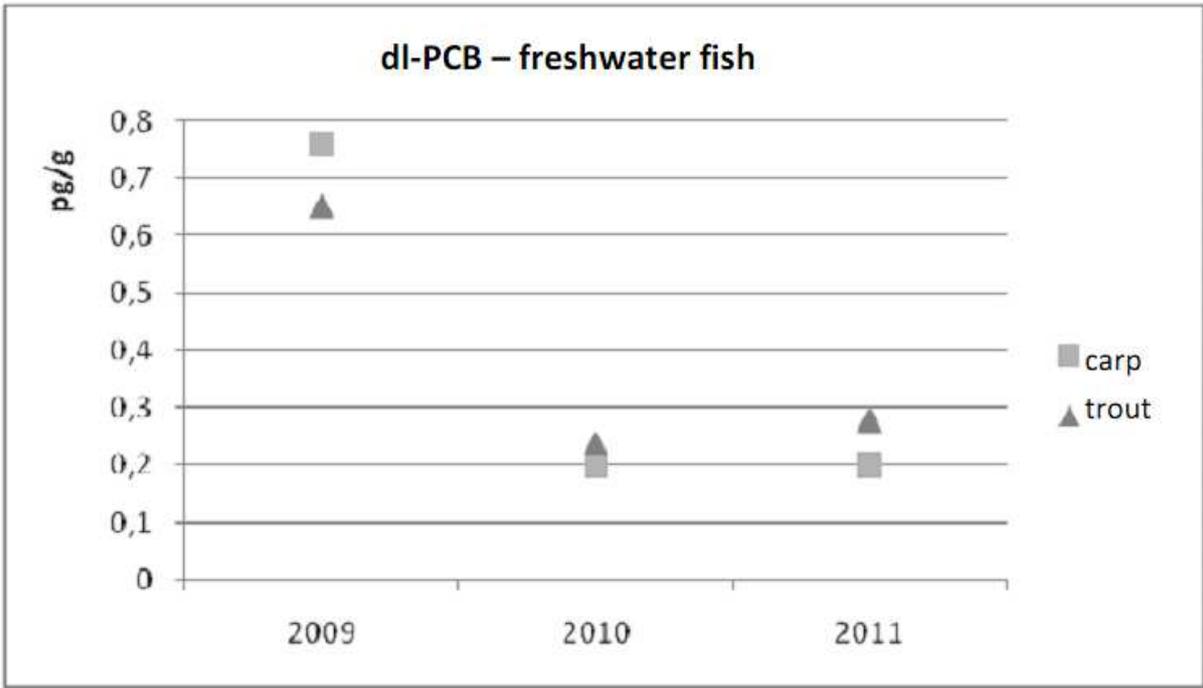
During the analysed period, only in 2008 the concentrations of PCB congeners were at 0.6 mg/kg in the fat of boars (the lowest score was 533 mg/kg of fat and the highest 690 mg/kg fat).

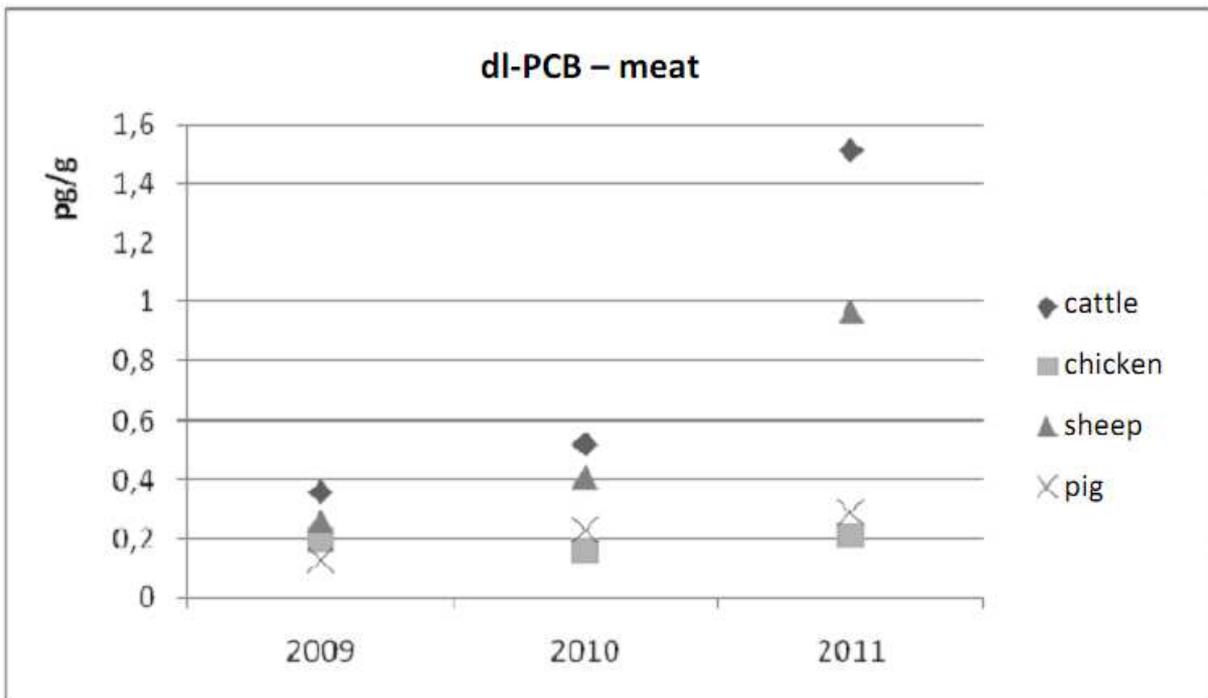
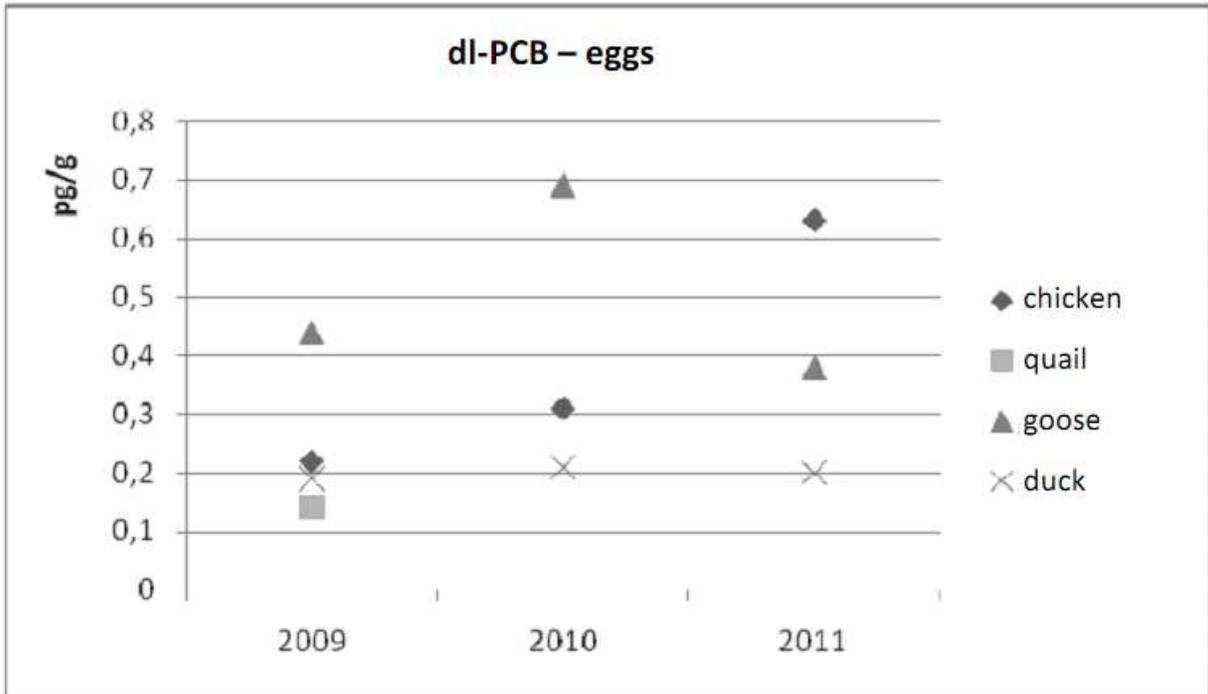
Table XVI shows the test results of the PCDD/PCDF/dl-PCB residues in food samples tested in 2009-2011 under the *Control tests for dioxins, furans, dioxin-like polychlorinated biphenyls (dl-PCBs) and non dioxin-like polychlorinated biphenyls (ndl-PCB) in animals and animal products.*

Table XVI. The test results of PCDD/PCDF/dl-PCB residues in food samples surveyed in the period of 2009-2011

	Number of samples			Number of non-compliant results (NC)		
	2009	2010	2011	2009	2010	2011
Test results of domestic products of animal origin						
Cattle	6	6	5	0	0	0
Pigs	10	6	5	0	0	0
Sheep/goats	3	4	3	0	0	0
Fish	35	58	44	3	4	1
Freshwater fish	10	10	10	0	0	0
Chickens	6	6	7	0	0	0
Milk	16	7	7	0	0	0
Goat milk	3	10	10	0	0	0
Chicken eggs	14	10	10	1	0	3
Quail eggs	4			0		
Goose eggs	2	2	2	0	0	0
Duck eggs	2	2	2	0	0	0
Wild game	3	4	4	0	1	0

Figure XV shows the levels of dioxin-like polychlorinated biphenyls (dl-PCBs) in food samples tested in 2009-2011 under the *Control tests for dioxins, furans, dioxin-like polychlorinated biphenyls (dl-PCBs) in animals and animal products.* The sum of 12 congeners of dl-PCBs was determined; the results are presented in the WHO-TEQ.





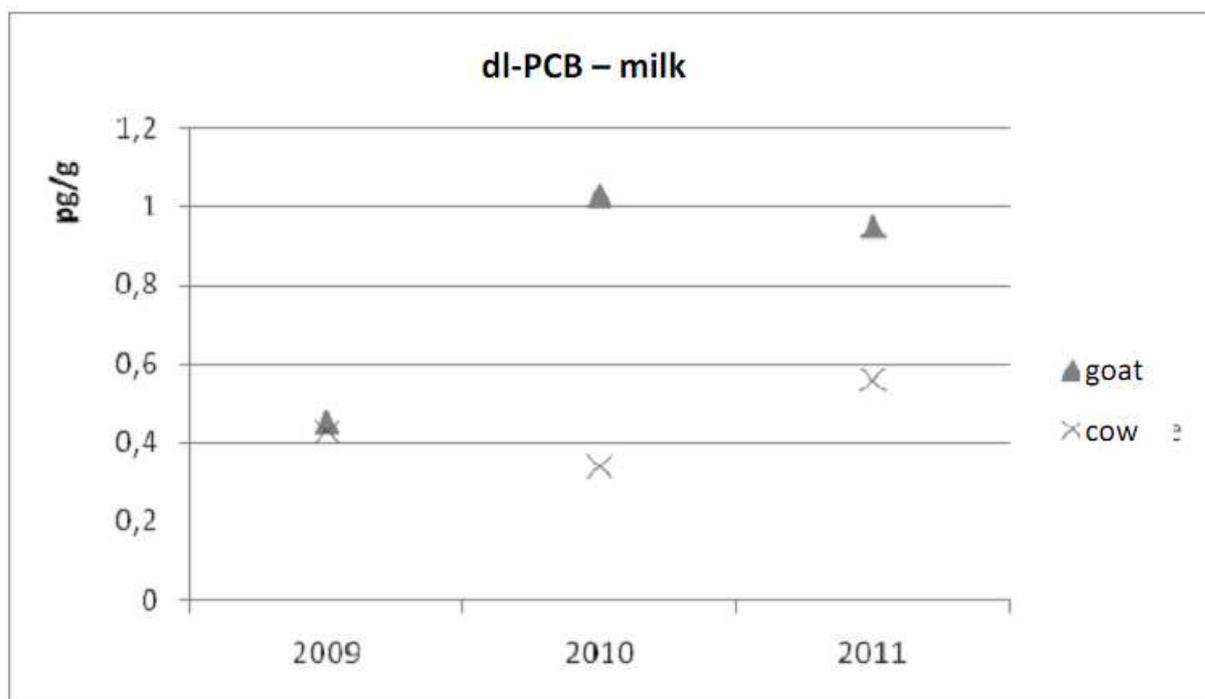


Fig. XV. Changes in the total concentration of dl-PCBs in animal products in the period of 2009-2011 (for fish, the contents are given in pg WHO-TEQ/g of fresh weight, and for other products in pg WHO-TEQ/g of fat).

The analysis of the data reveals that in the case of eggs tested in the period of 2009-2011, the average content of dl-PCBs ranged from 0.19 to 0.69 pg WHO-PCB-TEQ/g of fat. In these years, no clear trend for the contents of dl-PCBs in eggs was marked.

In the case of meat, the average content of dl-PCBs ranged between 0.13 and 2.21 of pg WHO-PCB-TEQ/g of fat in the period of 2009-2011. The meat of pigs and chickens was characterized by the lowest and constant contents of dl-PCBs (0.13-0.43 pg WHO-PCB-TEQ/g of fat and 0.16-0.21 pg WHO-PCB/TEQ/g of fat, respectively), while for the cattle meat the highest values were observed (1.51 pg WHO-PCB-TEQ/g of fat in 2011). In 2009-2011, an increase in dl-PCB concentrations in meat of cattle and sheep was observed.

The content of dl-PCB in milk in 2009 was similar for both types of milk: about 0.4 pg WHO-PCB-TEQ/g of fat, in the subsequent years, however, the content of dl-PCB in goat milk increased to about 1.03 and 0.95 pg WHO- PCB-TEQ/g of fat in 2010 and 2011, respectively.

With regard to fish, the highest concentrations of dl-PCBs was reported in marine fish (in 2009, as much as 5.33 pg WHO-PCB-TEQ/g of fresh weight of salmon was observed). In farmed fish – carp and trout – the dl-PCB contents in 2009 were 0.76 and 0.65 pg WHO-PCB-TEQ/g of fresh weight respectively, while in the subsequent years a decrease in dl-PCBs content to 0.2 pg WHO-PCB-TEQ/g fresh mass of carp was observed.

Since 2010, the content of ndl-PCB in samples is also determined (for 6 congeners – PCB 28, 52, 101, 138, 153, 180). In 2010, the highest concentration of ndl-PCB was observed in salmon (on average,

about 40.18 ± 11.64 ng/g) and in 2011 – in salmon and brown trout (about 32.38 ± 14.71 ng/g). Both annual averages are much lower than the limit value of 75 ng/g suggested by the Commission.

Figure XVI presents changes in the total content of PCBs in the muscle tissue of fish from the southern Baltic in the period of 1997-2006. The following fish were tested: herring, sprat, flounder and cod caught during research cruises on the following fisheries: Szczecin Bay (PB), Kołobrzeg-Darłowo (KD), Ustka-Łeba (UL), Władysławowo (W), Gulf of Gdańsk (GG) and Bornholm station (B), the Gdańsk Deep (GD) as well as salmon purchased from fishermen.

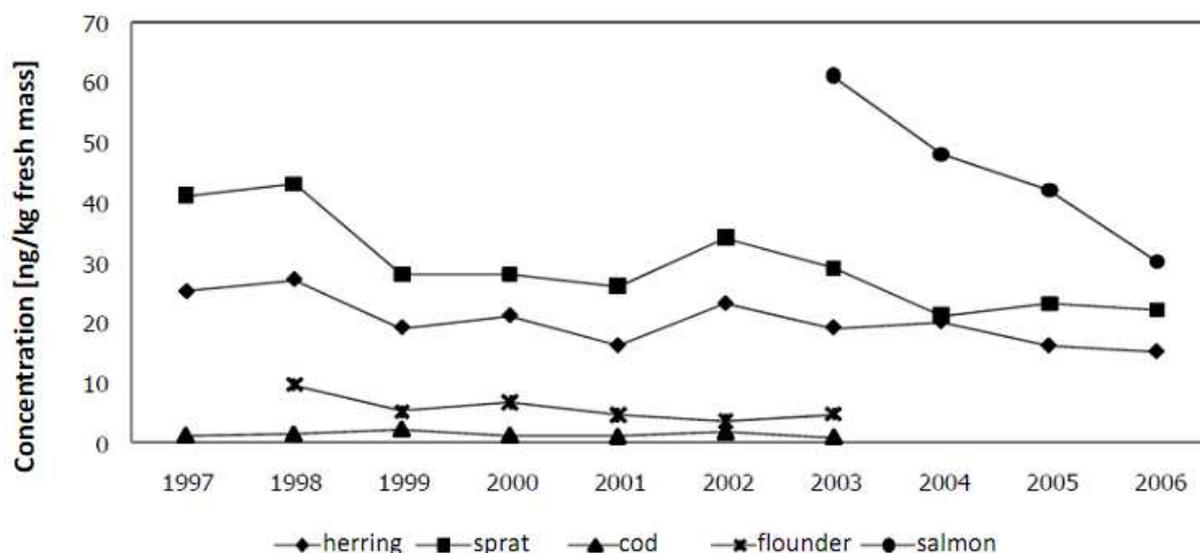


Fig. XVI. Changes in total content of PCB in Baltic fish muscle tissue in the period of 1997-2006 [26]

The analysis of test results reveals a decrease in total PCB content in the muscle tissue of all species of fish except cod in the period from 1997 to 2001, then in 2002 a slight increase is visible, and in subsequent year another decrease to the level of 2001. In subsequent years, such a clear reduction in PCB content in the tissue of herring and sprat is no longer observed. In the test period, a decline in the total content of PCBs is visible in case of salmon. Due to the low proportion of fat in the total weight of flounder and cod, the total PCB concentrations per fresh weight was very low for these species of fish in comparison with other species studied.

Table XVII presents the test results of organochlorine pesticide residues (DDT and its metabolites, α -HCH, β -HCH, γ -HCH, HCB, aldrin, dieldrin, chlordane, endrin, endosulfan, heptachlor, bromopropylate) in domestic and imported products of animal origin, carried out in the period of 2005-2009 under the *National Programme for screening for prohibited substances and residues of chemical, biological and medicinal products in animals and foods of animal origin*.

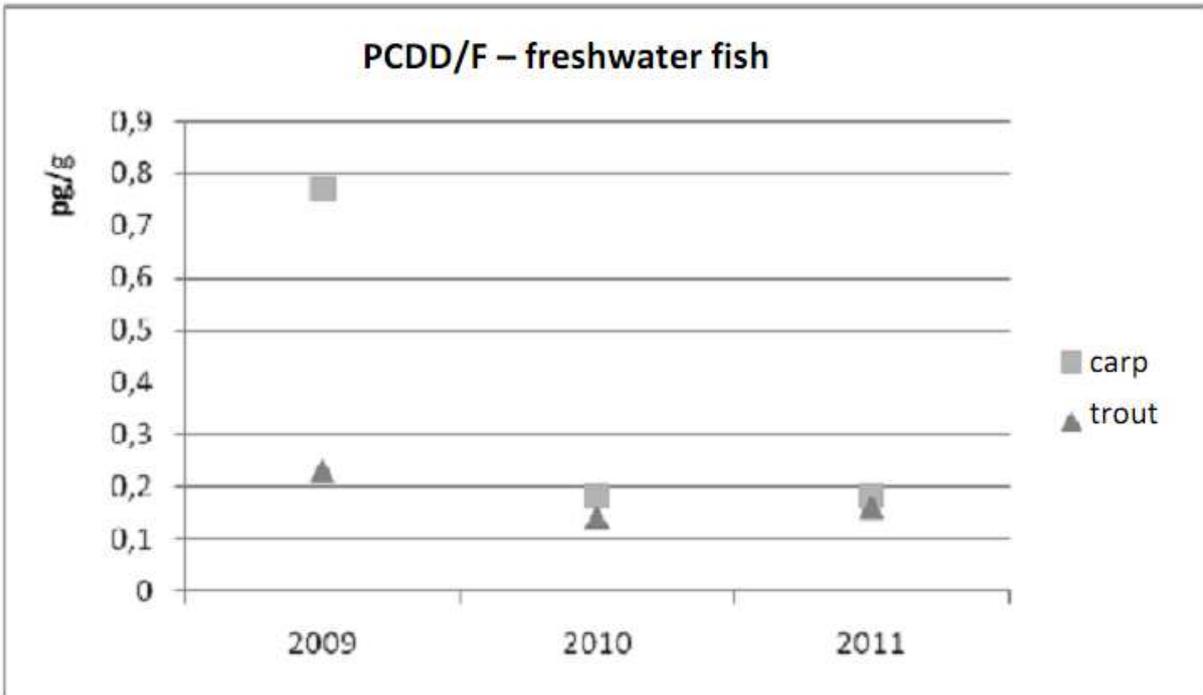
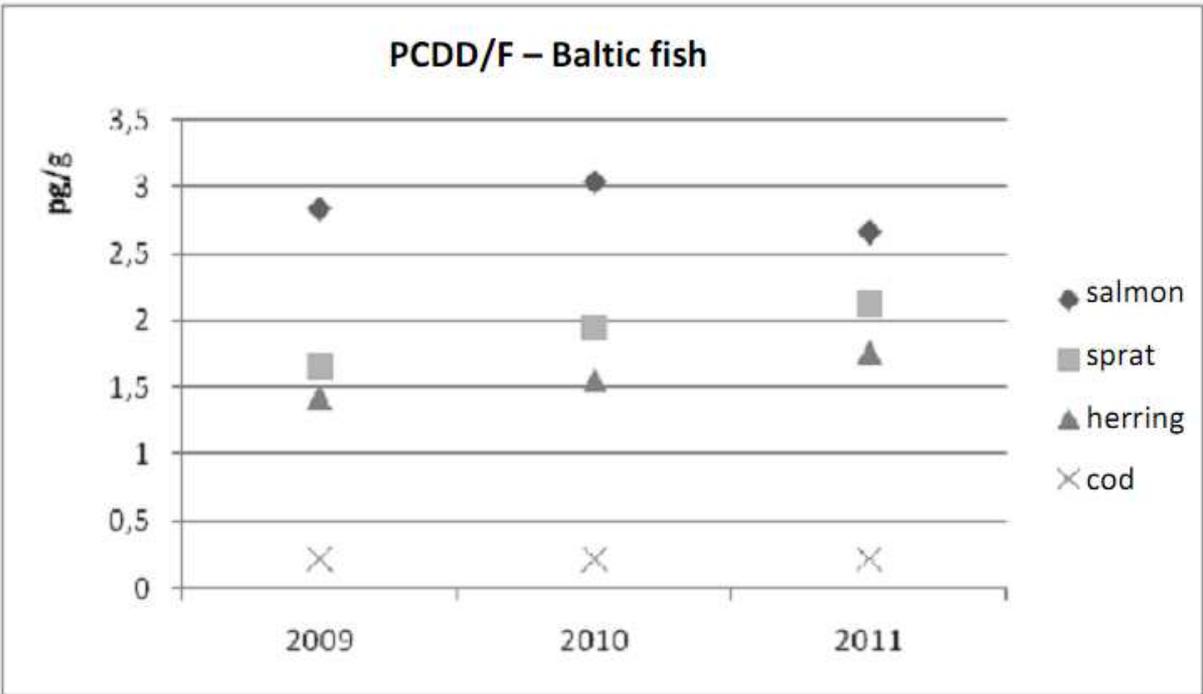
Table XVII. The test results of DDT and HCH residues in animal products surveyed in the period of 2005-2009 [23]

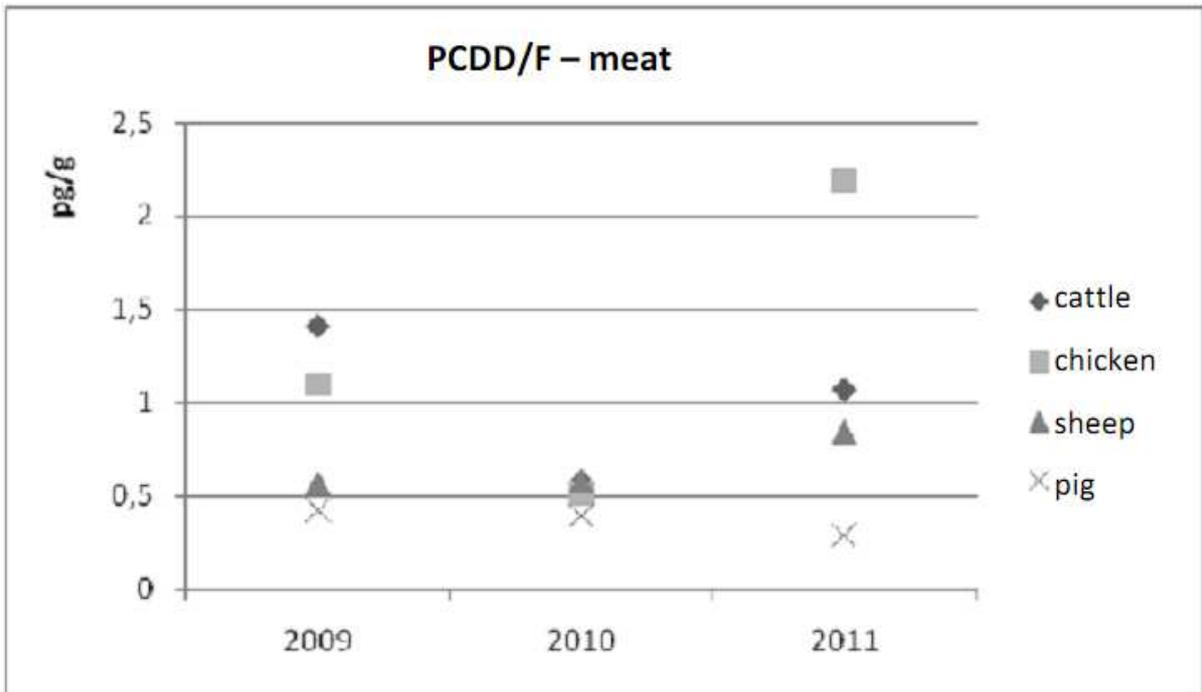
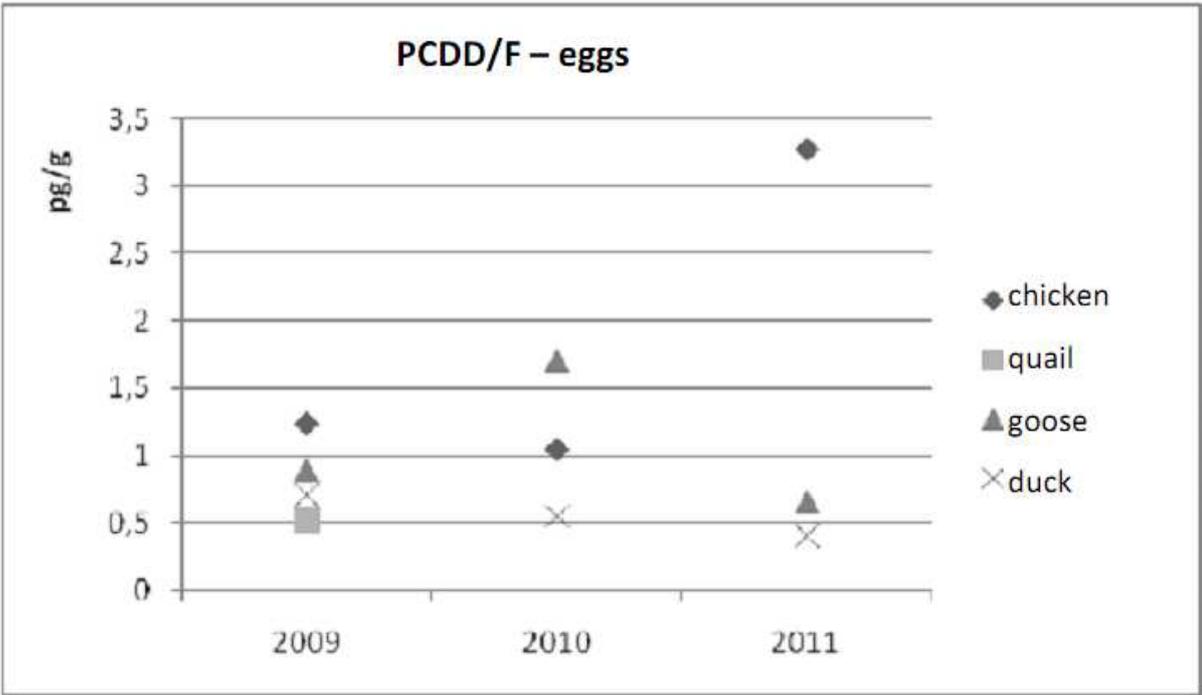
	Number of samples					Number of non-compliant results (NC)				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Test results of domestic products of animal origin										

Cattle	165	151	157	167	175	0	0	0	0	1
Pigs	265	261	271	289	272	0	0	0	0	2
Sheep/goats	20	20	20	21	20	0	0	0	0	0
Horses	30	30	37	34	32	0	0	0	0	0
Rabbits	20	19	20	21	20	0	0	0	0	0
Fish	71	66	61	59	71	0	0	1	0	1
Chickens	145	154	160	183	193	0	0	0	0	0
Turkeys	42	40	37	39	47	0	0	0	0	0
Geese	35	37	34	36	38	0	0	0	0	0
Ducks	29	24	28	27	29	0	0	0	0	0
Milk	135	120	123	131	114	0	0	0	0	0
Eggs	98	102	129	133	150	0	1	0	0	0
Honey	15	18	12	16	15	0	0	0	0	0
Farmed game animals	0	2	4	7	4	0	0	0	0	0
Wild game	82	83	80	89	104	0	0	2	1	0
Test results of imported products of animal origin										
Cattle	1	0	2	3	2	0	0	0	0	0
Pigs	20	15	6	2	1	0	0	0	0	0
Poultry	3	4	5	0	0	0	0	0	0	0
Fish	90	87	64	81	103	0	0	0	0	0
Honey	1	0	1	1	3	0	0	0	0	0
Sheep	0	0	1	0	0	0	0	0	0	0
	Number of samples					Number of non-compliant results (NC)				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Eggs	0	0	3	0	0	0	0	0	0	0

During the test period one case of non-compliance for game animals was detected in 2008: exceeding of DDT (the concentration of 1,487 mg/kg of fat). In 2009, exceeding of the limits was reported in 4 cases: DDT in pig fat (the concentration of 1,423 mg/kg of fat), DDT in muscle of farmed fish (the concentration of 666 mg/kg of fresh weight), γ -HCH in pig fat (the concentration of 44 mg/kg of fat) and γ -HCH in cattle fat (the concentration of 44 mg/kg of fat).

Figure XVII below shows the average levels of dioxins and furans (PCDD/F) in food samples tested in 2009-2011 under the *Control tests for dioxins, furans, dioxin-like polychlorinated biphenyls (dl-PCBs) in animals and animal products*. The sums of 7 PCDD congeners and 10 PCDF congeners (PCDD / F) were determined, the results are given in the WHO-TEQ.





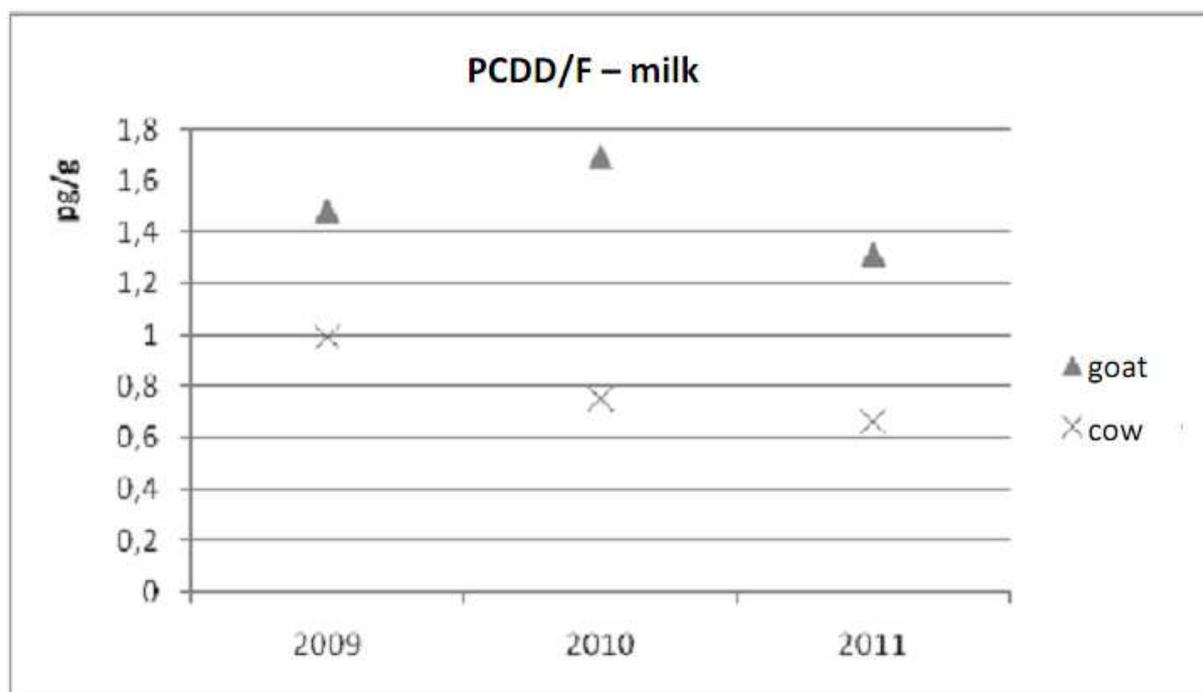


Fig. XVII. Changes in the average concentration of dioxins and furans (PCDD/F) in products of animal origin in the period of 2009-2011 (for fish, the contents are given in pg WHO-PCDD/F-TEQ/g of fresh weight, and for other products in pg WHO-PCDD / F-TEQ/g of fat)

In 2007, it was confirmed that in two samples of the Baltic salmon and in one sample of pig muscle the maximum levels were exceeded. In 2008, exceeding of the maximum levels was found in four samples of the Baltic salmon and two samples of milk. In 2009, exceeding of the permissible limits was detected in three samples of Baltic salmon and in one sample of chicken eggs.

Analysis of the data presented in graphs shows that the total PCDD/F in most animal products increased in 2006-2009 (except for fish, sheep meat and goat milk).

During the test period, in case of eggs, a doubling of the concentration of total PCDD/F for chicken eggs (from 0.59 to 1.23 pg WHO-PCDD/F-TEQ/g of fat) and goose eggs (from 0.35 to 0.89 pg WHO - PCDD/F-TEQ/g of fat) took place.

In case of pig meat, the concentration increased from 0.24 to 0.43 pg WHO-PCDD/F-TEQ/g of fat, in cattle meat – from 0.9 to 1.41 pg WHO-PCDD/F-TEQ/g of fat, and in chicken meat – from 0.56 to 1.1 pg WHO-PCDD/F-TEQ/g of fat.

In muscle tissue of fish, the total PCDD/F decreased in 2006-2008 to rise in 2009 for salmon and carp and continue to diminish for sprat and herring.

2.4.2.6.3 Feeds

Organochlorine compounds (aldrin, dieldrin, chlordane, DDT, endrin and heptachlor) are identified in the feed samples tested in the monitoring and official control of feeds in terms of pesticide residues, carried out by the Veterinary Service Establishments in Poland since 2004. Also since 2004, ongoing research is being conducted towards the determination of dioxins and non dioxin-like PCBs in feeds.

The principles of the programme are compiled annually by the Chief Veterinary Officer and determine the number of samples to be taken in each province to carry out the tests.

The materials to be sampled are the feeds of plant and animal origin as well as compound feeds for animals. Samples for dioxins and non dioxin-like PCBs are collected mainly from fish meal and feeds containing fats, from baking industry products intended for feeds, from food industry oil, as well as from feed materials of plant origin undergoing a drying process using heating oil.

In 2008, Veterinary Inspection collected a total of 381 samples of feed materials and 85 samples of compound feeds, including 316 samples of cereal products, for determination of pesticide residues in feeds. The study results revealed 8 cases of exceeding the pesticide levels permitted by legislation. Table XIX shows detailed information about the type of the substance the level of which was exceeded and the pesticide level identified in the course of the laboratory tests.

In 2009, research was conducted toward determination of dioxins and pesticides content in feed materials and compounds. Determination of dioxin level was conducted in 258 samples and of pesticide residues in 419 samples. As a result of the control, two cases of exceeding the dioxins level in cereal products were detected.

Table XVIII. Test results of organochlorine pesticides, dioxins and PCBs residues in feeds in the period of 2004-2009

Research Direction	Scheduled	Taken	not meeting the requirements
2004			
Chloroorganic pesticides		3	0
Dioxins (PCDD+PCDF, dioxin-like PCB)		268	8
PCB (congeners 28, 52, 101, 118, 138, 153, 180)		111	0
2005			
Chloroorganic pesticides		339	0
Dioxins (PCDD+PCDF, dioxin-like PCB)		405	3
PCB (congeners 28, 52, 101, 118, 138, 153, 180)		302	0
2006			
Chloroorganic pesticides	158	332	0
Dioxins (PCDD+PCDF, dioxin-like PCB)	144	339	3

PCB (congeners 28, 52, 101, 118, 138, 153, 180)	160	212	0
2007			
Chloroorganic pesticides	158	215	0
Dioxins and dioxin-like PCB(PCDD+PCDF)	80	134	3
PCB (congeners 28, 52, 101, 118, 138, 153, 180)	160	124	0
2008			
Chloroorganic pesticides	160	220	8
Dioxins (PCDD+PCDF, dioxin-like PCB)	80	131	1
PCB (congeners 28, 52, 101, 118, 138, 153, 180)	160	126	0
2009			
Chloroorganic pesticides	160	213	0
Dioxins (PCDD+PCDF, dioxin-like PCB)	160	181	2
PCB (congeners 28, 52, 101, 118)	80	77	0

Table XIX. Reported cases of exceeding the level of chloroorganic pesticide residues in feeds in 2008.

Research material	Substance found	Level detected, mg/kg
Middlings – oats, barley	β-HCH	0.070
	Aldrin	0.058
	Cis-chlordane	0.056
Oats	HCB	0.023
	Cis-chlordane	0.022
Middlings – oats, barley, wheat	β-HCH	0.020
	Cis-chlordane	0.034
Triticale	β-HCH	0.014
Oats, rye, triticale	HCB	0.014
Wheat bran	β-HCH	0.035
	Dieldrin	0.012
	Cis-chlordane	0.029
	α-endosulfan	0.024
Wheat bran	Aldrin	0.020
	Dieldrin	0.018
Barley middlings	Aldrin	0.020
	Dieldrin	0.018

2.5 Technical support

As of 30 June 2012, limited help was offered to Armenia (expert visit) and Nepal (consultation via electronic means) in the development of plans for implementation of the Convention by these countries. In addition to this, in the Bureau for Chemical Substances a project "The support in developing system of sound chemicals management in Armenia in order to facilitate economic integration with the European Union" was implemented in 2011. The programme of trainings covered, among others, the issues associated with the Stockholm Convention and persistent organic pollutants.

2.6 Financial resources and mechanisms

The tasks of public administration and public bodies are financed within the limit of expenditure provided in the budget act in the appropriate parts of the state budget. National Fund for Environmental Protection and Water Management (NFOŚiGW) provides investment loans for projects aiming to neutralize wastes containing PCB or PCT and decontaminate equipment or installations containing PCB or PCT under the programme *Management of Non- Municipal Waste*, from which the entrepreneurs may benefit. The programme's budget for the period of 2010 – 2012 amounts to PLN 10.5 million⁶.

After a particular entity files the grant application, NFOŚiGW analyses the document on the basis of the criteria of project selection set out in the programme. The grant award is determined by the order of application, its completeness and the detailed procedure laid down in the internal regulations of NFOŚiGW.

2.7 Synergy

The Basel, Rotterdam and Stockholm Convention, under the decision of the Conference of the Parties to the above mentioned three conventions, implement steps to enhance cooperation and coordination of the work undertaken by them. This process, known as the three conventions synergy, aims to increase the effectiveness of the Basel, Rotterdam and Stockholm Conventions to avoid taking separate actions in the same areas and to enhance savings of funds for the objectives of these conventions. The implementation of synergy process will take place at the global, regional and national levels.

The works related to synergy on the international forum enter the more advanced phase of operations following the decisions taken by the Extraordinary Conference of the Parties to the Basel, Rotterdam and Stockholm Conventions, which took place in Bali from 22 to 24 February 2010.

Accordingly, the operations of the three Conventions must be included in the National Plan of Implementation of the Stockholm Convention. The works related to synergy in Poland should be focused on implementation of projects related to chemical safety at national level, through the harmonisation of the activities of the Polish offices for the Basel, Rotterdam and Stockholm Conventions and the development of information necessary to establish a uniform policy regarding environmental protection and human health. In implementing the above mentioned tasks, it would

⁶ Information from www.nfosigw.gov.pl

be advisable to form an expert platform for Basel, Rotterdam and Stockholm Conventions supporting the activities of the Ministry of Environment in the Polish chemical policy. The aforementioned platform would effectively support the process of implementing the requirements of the above mentioned conventions in Poland at the organizational, factual and technical level and facilitate internal communication among the responsible individuals as well as promote the objectives of synergy. The operations of the expert platform would take place in collaboration with national secretariats for the Basel, Rotterdam and Stockholm Conventions, while maintaining the independence of the above mentioned secretariats.

3. PLANNED MEASURES

The implementation of Convention requirements should provide optimal effects from the point of view of human health and environmental protection.

Member States' duties as regards the execution of obligations resulting from the Convention have been specified in Regulation (EC) No 850/2004. Member States are obliged to prepare their own plans for the implementation of the Convention (Article 8 of the Regulation), to monitor the presence of dioxins, furans and PCBs in the environment (Article 9 of the Regulation), to participate in information exchange programmes (Article 11 of the Regulation), to exercise reporting (Article 12 of the Regulation) and to lay down penalties applicable to infringements of the provisions of the Regulation (Article 13 of the Regulation).

Monitoring data and results of scientific researches confirm the presence of POPs in the environment and their tendency to accumulate in live organisms' tissues. Results of researches concerning the content of POPs in human tissues carried out in recent years have not allowed to make clear-cut conclusions when it comes to the pace of POPs accumulation in organisms; however, the data from the monitoring of food products of animal origin indicate cases of overshooting the maximum admissible concentrations in these products. Adverse impact of dioxins and furans on the human organism ought not to be downplayed, thus all actions leading to the limitation of their emission to the environment are fully justified.

Since the entry of the Convention into force, Poland has fulfilled the obligations resulting thereof, particularly in the field of neutralising outdated plant protection products and PCB-contaminated oil, as well as limiting undesired emissions. It also results from conducted analyses that tasks that are pending execution mainly constitute a continuation of actions taken in previous years.

Due to low level of awareness in the Polish society of the harmfulness of persistent organic pollutants, there is a need to raise it among various social groups, among others through providing broad access to reliable and comprehensive information, including the issue of POPs into education programmes and strengthening the role of non-governmental organisations in the field of raising social awareness.

As regards various aspects of the issue of POPs, Polish legal and institutional system is sufficiently developed. Poland has an appropriate research potential that allows to conduct research in the field of monitoring, controlling and neutralising POPs, as well as assessing risks to health and agricultural production resulting from the presence of POPs in the environment.

Further implementation of tasks adopted by the Convention in Poland will require a continuation of work planned in regulations, environmental protection programmes, policies and other planning documents mentioned above, in the following areas:

- extending the scope of and providing decision-makers with reliable information that enables making economic and social decisions,
- efficient operation of the system of monitoring substances covered by the Convention,
- assessing the impact of POPs on human health and the environment,

- safeguarding funds for investments required by the provisions of the Convention.

The analysis of the possibilities to implement the Convention in Poland, as of 30 July 2012, indicated the following favourable conditions:

- no imports and production of POPs,
- not using POPs in economy,
- satisfactory legislative status,
- qualified research personnel,
- governmental administration and local governments executing tasks resulting from the Convention,
- market transformations that favour modernisation of industry,
- considerable potential of technical infrastructure in the field of eliminating releases and neutralising waste POPs,
- significant degree of execution of tasks regarding the elimination of:
 - waste plant protection products removed from use and stored in waste repositories,
 - waste polychlorinated biphenyls (PCBs).

On the other hand, the following unfavourable conditions have been identified:

- shortages of information on releases of POPs covered by the Convention to soil, waste and products, as well as on the levels of POP substances in the air, soil and waste,
- high costs of activating new procedures in laboratories in relation to the number of determinations made,
- limited number of data on the number of people exposed to dioxins and PCBs,
- insufficient funds for research, monitoring, inventories and POPs elimination,
- low social awareness as regards risks posed by POPs,
- incinerating waste in home furnaces, craft firms etc.

3.1 Tasks to be executed

Implementation of the provisions of the Convention does not require the establishment of new institutions. All tasks aimed at implementing the Convention can be executed by already functioning bodies, institutions and companies, extending their interests by issues related to persistent organic pollutants, according to their competences and scope of actions.

In order to eliminate emissions of PCDD/F from individual households, actions in the field of reducing low emissions, aimed at limiting POPs emissions from incinerating household waste at individual households not included in the central heating network will be continued.

In relation to accidental emission of PCDD/F, HCB and PCB to the air from metallurgical processes, there is a need to streamline technological processes, particularly the process of preparing iron ore sinters. Although emissions of PCDD/F to the air related to these processes that are noted in Poland are lower than in Western Europe, there is a need to continue actions aimed at their gradual limitation. The scope of these measures depends on the actual level of emissions taken into account the current status of environmental protection tools. As regards industrial processes in the iron and steel industry and secondary aluminium and copper metallurgy, actions aimed at the following will be taken:

- determination of the actual emission of PCDD/F, PCB and HCB by way of chemical analyses;
- comparison of obtained results with indices, measurement data from other countries and indications of BAT techniques with regard to entire processes;
- development and implementation of the programme for limited emissions of PCDD/F, PCB and HCB in particular enterprises.

The precondition for the abovementioned actions will be the introduction of appropriate emission standards for these processes, the excess of which will require the development and implementation of the programme aimed at bringing the emission levels down to the one determined by emission standards.

Moreover, there are tasks related to the implementation of EU Directives, specified in strategic documents in force in Poland, that are being and will be executed with a view to:

- energy saving and reduction of pollutant emissions by replacing old-type and low performance heat generating installations with high energetic performance equipment with relevant certificates of compliance and compatible with properly selected exhaust abstraction systems; by replacing a "traditional" furnace or boiler with a retort boiler we can reduce PCDD/F emissions by over 80%, at the same time limiting the emissions of other pollutants,
- saving generated energy and fossil raw materials by introducing "clean" biomass or other renewable energy sources and best available energy production technologies,
- energy saving by using thermal insulation of buildings and by automatisisation of local heat distribution,
- use of local excess of heat by connecting to heat networks,
- introduction of properly prepared and standardised assortments of carbons, pelletised, briquetted low-emission carbon and biomass fuels by involving small and medium-sized enterprises in their production.

Task 1. Conducting an inventory of emissions of POPs into the environment

Task 1.1. Conducting an inventory of emissions of POPs into the air, water and soil

This task includes works related to the implementation and extension of the scope of an inventory of emissions of persistent organic pollutants covered by the Convention.

Time frame: continuing task

Coordination: KASHUE-KOBIZE (Institute of Environmental Protection – National Research Institute) – inventory of air emissions of POPs and Chief Inspectorate of Environmental Protection – extension of the scope of an inventory of POPs emissions and inventory of soil and water emissions of POPs.

Task 1.2. Verification of indicators of PCDD/F emissions to air

This task includes verification of indicators of PCDD/F emissions to air from the secondary production of non-ferrous metals, the sintering processes in metallurgy and the combustion of industrial and hazardous waste. The values of emission indicators are significantly affected by changes in technology and modernization of plants, among other things. Therefore, these indicators should be periodically reviewed. This applies particularly to the major sources of emissions.

Estimated emissions from some processes are subject to considerable uncertainty, at least due to the fact that they were determined on the basis of indicators of PCDD/F air emissions calculated on the basis of measurements taken in other countries and thus failing to take account of Polish conditions. In the years 2008 - 2009, works aimed at improving the quality of data on PCDD/F emissions were carried out by supplementing and updating the many indicators of PCDD/F emissions to air.

It is expedient to carry out measurements of dioxin emissions from metals production processes and the burning of industrial and hazardous waste. Revision of indicators will enable the fulfilment of the provisions of Articles 5 and 11 of the Convention, and the results will be used in official statistics on air pollution emission inventory and reporting for the Economic Commission for Europe United Nations, monitoring and evaluation of long-range transmission of air pollutants program as well as the European Environment Agency (the UNECE / EMEP and EEA).

Time frame: continuing task

Coordination: Ministry of Environment in cooperation with the Bureau for Chemical Substances

Task 1.3. Verification of indicators of HCB and PCB emissions to air

The values of emission indicators are significantly affected by changes in technology and modernization of plants, hence it is important to regularly update the indicators, particularly for major sources of emissions. In 2001, the levels of HCB emissions were measured at sinter plants and cement plants, among other places. On the basis of the findings, the applied indicators were verified and the amount of HCB emissions were estimated. It is necessary to develop national emission indicators of the production of secondary metals.

Some indicators of PCB emissions were supplemented and corrected in the last two years, based on measurement data. It is very important to update the data from the inventory of PCB-containing electrical equipment, and in the case of HCB – review of indicators of secondary production of non-ferrous metals (especially copper). The revised indicators will be applied to the program of official

statistics in the inventory of air pollutant emissions and for reporting to the needs of the UNECE / EMEP and EEA. The indicators will enable the fulfilment of provisions of Articles 5 and 11 of the Convention.

Time frame: continuing task

Coordination: Ministry of Environment in cooperation with the Bureau for Chemical Substances

Task 1.4. Development and validation of indicators of HCB and PCBs emissions to the other elements of the environment (excluding air)

In the case of HCB and PCB emissions to surface water, soil, products and waste / residues, there is little data on relevant indicators, so it is important to expand this information.

The indicators will be used to develop an inventory of releases of pollutants into the environment, among other things, under the program of official statistics and reporting for the UNECE / EMEP and EEA.

Time frame: continuing task

Coordination: Ministry of Environment in cooperation with the Bureau for Chemical Substances

Task 2. Environmental education – development and implementation of information and education activities on the risks posed by POPs

A plan of information and education activities will be developed and implemented about the risks associated with the impact of persistent organic pollutants on human health and the environment.

This will be accompanied by the development of specialist websites aimed at informing employees of local and government administration on the current legislation and practice in assessing the hazard of the release of POPs into the environment.

Moreover, the issue of POPs will be more widely incorporated into school curricula at various levels.

Time frame: continuing task

Coordination: Ministry of Environment in cooperation with the Bureau for Chemical Substances

Task 3. Expert opinions, reports, opinions, research and development activities on emissions and releases of POPs

Task 3.1. Conducting scientific research and R&D activities

Scientific research and R&D activities will be intensified on the basis of the existing system of research funding by the Ministry of Science and Higher Education, co-financed also by the European Union.

The conclusion of the task covers the conduct of research on emissions and releases of POPs, by universities, institutes and research centres. In the first instance, they will deal with new substances covered by the regulations of the Convention.

Time frame: continuing task

Coordination: Ministry of Environment in cooperation with the Bureau for Chemical Substances

Task 3.2. Performance of analysis of the used technologies for determining the respective emission levels

The task will include preparation of a list of technologies used for each activity with the largest share of national emissions and analysis of emission levels for different technologies and the possible prospects for reducing emissions. The obtained results will serve to identify possible ways of reducing releases of POPs, whereby as regards installations covered by an obligation to obtain an integrated permit, provisions of Directive of the European Parliament and of the Council 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Official Journal L 334, 17.12.2010, p. 17) shall apply.

Time frame: 2013 - 2016

Coordination: Ministry of Environment in cooperation with the Bureau for Chemical Substances

Task 3.3. Analysis of the potential to use alternative methods of reduction of PCDD / F emissions in municipal services management

The assessment will require to collect a wide resource of information on alternative processes for municipal and individual heating and the expert assessment of opportunities for their use in Poland. The task is to fulfil the provisions of the EU strategy on dioxins, furans and PCBs and the provisions of Article 6 of the Convention.

Time frame: 2013-2015

Coordination: Ministry of Environment in cooperation with the Bureau for Chemical Substances

Task 3.4. Analysis of the potential for reducing emissions of POPs in the metallurgy sector

Results of the objective analysis will contribute to identifying opportunities for reducing emissions of POPs from the processes of secondary production of aluminum and copper, the production of steel in oxygen converter furnaces and sinter iron ore production. The share of this group of processes represents 8,5% of the total emissions of POPs in the national economy, and metallurgical equipment emitting POPs are quite numerous, whereby as regards installations covered by an obligation to obtain an integrated permit, provisions of Directive of the European Parliament and of the Council 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Official Journal L 334, 17.12.2010, p. 17) shall apply.

Time frame: 2013-2015

Coordination: Ministry of Environment in cooperation with the Bureau for Chemical Substances

Task 3.5. Introduction of restrictions on the use of fuels for low-emission sources

Conducting studies on solid fuels used in the municipal services management, particularly coal, which is the principal fuel, aimed to limit the availability of cultivars with high content of carbon components which have a significant impact on the quantity of POPs produced during combustion.

Time frame: 2011 - 2014

Coordination: Ministry of Environment in cooperation with the Bureau for Chemical Substances

Task 4. Determining the effect of POPs on human health and the environment

The task will involve determining the current impact of POPs on human health, associated with the presence of POPs in different environmental components (air, water, sediment, soil) and products (including food).

Time frame: continuing task

Coordination: Ministry of Environment in cooperation with the Ministry of Health

Task 5. Monitoring the current status of national environmental pollution by POPs

Task 5.1. Extension of monitoring of selected components of the environment pollution by POPs

Implementation of the task will include extension of the National Environmental Monitoring of pollution by monitoring the pollution by persistent organic pollutants of selected components of the environment (air, soil, sewage sludge).

Time frame: 2013 - 2016

Coordination: Chief Inspectorate for Environmental Protection

Task 5.2. Updating the binding legal acts to adjust the scope of POPs monitoring to the requirements of the Stockholm Convention.

Time frame: 2013-2016

Coordination: Ministry of Environment

Task 5.3. Monitoring of POPs releases from wastes deposited in landfills of industrial waste

The aim is to monitor the releases of persistent organic pollutants found in waste and industrial waste landfills pursuant to Article 6 of the Convention.

Time frame: continuing task

Coordination: Chief Inspectorate for Environmental Protection in Poland

Task 6. Enabling the financing of the execution of tasks resulting from the Stockholm Convention from the National Fund for Environmental Protection and Water Management

The actions will aim at enabling the financing of tasks resulting from the ratification of the Stockholm Convention on Persistent Organic Pollutants (preparation of reports for the Convention, carrying out analyses, etc.) from the Programme No 8 of the National Fund for Environmental Protection and

Water Management *Support of Minister of Environment to the implementation of the National Ecological Policy, part 3. Tasks resulting from international obligations of the Republic of Poland*, the beneficiaries of which can be: Ministry of Environment, General Directorate for Environmental Protection and the Chief Inspectorate for Environmental Protection. This programme will be implemented in the years 2011-2015 and planned liabilities for non-returnable forms of programme co-financing amount to PLN 19,800 thousand. The amount of funds the Ministry of Environment plans to apply for is PLN 201,095.

Time frame: 2013-2014

Coordination: Ministry of Environment

3.2 Task execution costs

Based on the analysis of the degree of implementation of the Convention, and the current needs in the follow-up necessary for its implementation, the costs of the tasks execution resulting directly and solely from compliance with the provisions of the Convention were calculated.

Among the costs of implementing the Convention in Poland, it is possible to isolate one-time, initial costs related to:

- membership fee,
- activities related to adapting the national legislation to the provisions of the Convention,

The implementation of Convention provisions requires considering the fixed annual costs, including:

- execution of tasks resulting from the Stockholm Convention,
- conducting emission inventories,
- environmental education – development and implementation of information and education activities on the risks posed by POPs,
- expert opinions, reports, opinions, research and development activities on emissions and releases of POPs,
- monitoring the impact of POPs on human health and the environment,
- membership fee.

Fixed annual costs related to implementation of the Convention tasks are presented in Table XX.

Table XX. Fixed annual costs of Convention implementation

No	Name of task	Task execution cost (in PLN million)
1	Execution of tasks resulting from the Stockholm Convention	0.07
2	Conducting an inventory of emissions of POPs into the environment	0.11
3	Environmental education – development and	0.27

	implementation of information and education activities on the risks posed by POPs	
4	Expert opinions, reports, opinions, research and development activities on emissions and releases of POPs	0.22
5	Monitoring the impact of POPs on human health and the environment	0.33
6	Monitoring of environment pollution by POPs	0.54
7	Membership fee	0.14
Total		1.67

The abovementioned annual costs of execution of tasks related to the implementation of the provisions of the Convention will be financed in the next years as part of expenditure planned in budget acts, in relevant parts of the state budget, without the need to allocate additional funds for this purpose.

Financial support for the implementation of the tasks is provided by the National Fund for Environmental Protection and Water Management and voivodship funds for environmental protection and water management, which provide funding for the research and development activities, expert opinions and investment projects related to the reduction of POPs into the environment and disposal of POPs.

ANNEX 1. LIST OF SOURCE DOCUMENTS

1. <http://chm.pops.int>
2. National Plan for Implementation of the Stockholm Convention, project GF/POL/01/004 – Enabling activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants, IOS, Warsaw 2004.
3. UNEP, World Bank, Guidance for Developing a National Implementation Plan for the Stockholm Convention (draft from December), 2003.
4. <http://prtr.ec.europa.eu/>
5. http://www.mos.gov.pl/g2/big/2009_04/851a133fff86d961c7220d235af1a584.pdf
6. Integrated Permissions Register, Ministry of Environment.
7. Report “National balance of emissions of SO₂, NO_x, CO, NH₃, dust, heavy metals, NMVOC and POPs in Poland in the years 2009-2010 according to SNAP and NFR classification system”. Polish version;
http://www.kobize.pl/materialy/Inwentaryzacje_krajowe/2012/Raport_LRTAP_2010.pdf.
8. Information provided by Organika-Azot Chemical Plant.
9. Siłowiecki A., Czarnomski K., Studium możliwości uwolnień TZO ze składowiska odpadów przemysłowych Organika-Azot w Jaworznie, materiały robocze do sporządzenia programu wdrażania Konwencji Sztokholmskiej w Polsce, Projekt GF/POL/NIP/R.9, Instytut Ochrony Środowiska, uzupełniono 2002 oraz 2010. [Study of the possibility of releases of POPs from industrial waste landfills Organika-Azot in Jaworzno, working material to prepare the implementation of the Stockholm Convention in Poland, Project GF/POL/NIP/R.9, Environmental Protection Institute, supplemented in 2002 and 2010.]
10. Annual Polish air quality assessment reports submitted to the European Commission, <http://cdr.eionet.europa.eu/pl/eu/annualair>.
11. <http://www.gios.gov.pl/artykuly/podkategoria/109/Monitoring-jakosci-wod-powierzchniowych>
12. Research report of the Vistula Lagoon waters conducted by the Regional Inspectorate for Environmental Protection in Olsztyn in the years 2007-2008, WIOŚ Olsztyn, Branch in Elbląg.
13. Landsberg-Ucziwek M. et al., Stan środowiska w województwie zachodniopomorskim w roku 2008, WIOŚ w Szczecinie, Szczecin 2009. [Condition of the environment in Zachodniopomorskie voivodship in 2008, WIOŚ in Szczecin, Szczecin, 2009]
14. National Environmental Monitoring Programme for the years 2010-2012, GIOŚ, Warsaw 2009.
15. Bojakowska I., Gliwicz T., Małecka K., Wyniki geochemicznych badań osadów wodnych Polski w latach 2003-2005, Biblioteka Monitoringu Środowiska, Warszawa 2006. [Results of geochemical studies of sediments in 2003-2005 in Poland, Environmental Monitoring Library, Warsaw 2006]

16. Environmental Protection Inspection data obtained under the State Environmental Monitoring Programme, Warsaw, 2010.
17. Bojakowska I., Gliwicz T., Wyniki geochemicznych badań osadów wodnych Polski w latach 2000-2002, Biblioteka Monitoringu Środowiska, Warszawa 2003. [Results of geochemical studies of sediments in 2000-2002 in Poland, Environmental Monitoring Library, Warsaw 2003]
18. Assessment of sediment contamination of rivers in 2009, electronic document, <http://ekoinfonet.gios.gov.pl/osady/mapa/Programy/2009.pdf>, state as per 17 May 2010.
19. Wyrzykowska B. et al., Polychlorinated biphenyls and -naphthalenes in pine needles and soil from Poland – Concentrations and patterns in view of long-term environmental monitoring, *Chemosphere* 67 (2007), p. 1877-1886.
20. Bernacka J., Pawłowska L., Substancje potencjalnie toksyczne w osadach z komunalnych oczyszczalni ścieków. [Potentially toxic substances in sludge from municipal sewage treatment plants] Monograph, Institute of Environmental Protection, Warsaw 2000].
21. Bernacka J. et al., Zmiany zawartości substancji potencjalnie toksycznych w komunalnych osadach ściekowych w latach 1998-2007, IOŚ, Warszawa 2008. [Changes in the content of potentially toxic substances in municipal sewage sludge in the years 1998-2007, Institute of Environmental Protection, Warsaw 2008]
22. Unpublished information from the National Institute of Hygiene, Warsaw, 2009.
23. Unpublished information from the State Sanitary Inspection, Warsaw, 2010.
24. Results of residue tests carried out in Poland in 2005-2009 under the National Programme for screening the presence of prohibited substances and residues of chemical, biological and medicinal products in animals and foods of animal origin produced in PIWet-PIB, General Veterinary Inspectorate, Ministry of Agriculture and Rural Development.
25. Discussion of the results of residue trials carried out in Poland in 2008 under the National Programme for screening the presence of prohibited substances and residues of chemical, biological and medicinal products in animals and foods of animal origin, PIWet-PIB, Department of Pharmacology and Toxicology, Puławy, March 2009.
26. Reports from the screening of dioxins, furans, dioxin-like polychlorinated biphenyls (dl-PCBs) in animals and animal products during the years 2006-2009, PIWet-PIB, Department of Radiobiology.
27. Szlinder-Richert J. et al., PCBs in fish from the southern Baltic Sea: Levels, bioaccumulation features, and temporal trends during the period from 1997 to 2006, *Marine Pollution Bulletin* 58 (2009) 85-92.
28. Szyrwińska K., Lulek J., Exposure to specific polychlorinated biphenyls and some chlorinated pesticides via breast milk in Poland, *Chemosphere* 66 (2007) 1895-1903.
29. Galassi S. et al., pp'DDE contamination of the blood and diet in central European populations, *Science of the Total Environment* 390 (2008) 45-52.

ANNEX 2. LIST OF LEGISLATION

International legislation:

1. Protocol to the MARPOL Convention (MARPOL 73/78) for the prevention of marine pollution by ships, made in London on 2 November 1973. (Journal of Laws, 1987 No. 17, item 101).
2. SOLAS Convention on Safety of Life at Sea, 1974, issued in London on 1 November 1974 (Journal of Laws of 1984, No. 61, item 318).
3. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, made in Basel on 22 March 1989 (Journal of Laws of 1995, No. 19, item 88).
4. IMDG Code – International Maritime Dangerous Goods Code of International Maritime Organization (IMO), annexed to the International Convention for the Safety of Life at Sea (SOLAS).
5. Protocol to the 1979 Convention on Long-range Transboundary Air Pollution on Persistent Organic Pollutants (Official Journal EU L 81, 19.3.2004 p. 37).
6. The Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, made in Rotterdam on 10 September 1998 (Journal of Laws of 2008, No. 158, item 990).
7. The Stockholm Convention on Persistent Organic Pollutants, made in Stockholm on 22 May 2001 (Journal of Laws of 2009, No. 14, item 76)⁷.

EU legislation:

8. Council Directive 79/117/EEC of 21 December 1978 prohibiting the placing on the market and use of plant protection products containing certain active substances (EU Official Journal L 33, 8.2.1979, p. 36, as amended; EU Official Journal, Special edition in Polish Chapter. 3, t. 4, p. 33).
9. Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) (EU Official Journal L 243, 24.9.1996, p. 1931-1935, as amended).
10. Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market (EU Official Journal L 123 of 24.04.1998, p. 1; EU Official Journal, Special edition in Polish, chapter. 3, vol. 23, p. 3).
11. Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (EU Official Journal L 182 of 16.07.1999, p. 1, as amended; EU Official Journal, Special edition in Polish, chapter 15, vol. 4, p. 228).
12. Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC (EU Official Journal L 158,

⁷ Updated English version of the Convention is available at:

<http://chm.pops.int/Convention/tabid/54/Default.aspx>.

30.04.2004, p. 7, as amended; EU Official Journal, Special edition in Polish, chapter 15, vol. 8, p. 465).

13. 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 (EU Official Journal L 33, 4.2.2006, p. 1).
14. Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (EU Official Journal L 190, 12.7.2006, p. 1, as amended).
15. Commission Regulation (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs (EU Official Journal L 364, 20.12.2006, p. 5, as amended).
16. 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, 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 (EU Official Journal L 396, 30.12.2006, p. 1, as amended).
17. 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 (EU Official Journal L 204, 31.7.2008, p. 1-35).
18. Directive of European Parliament and of the Council 2008/98/EC of 19 November 2008 on waste and repealing certain Directives (EU Official Journal L 312, 22.11.2008, p. 3).
19. 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, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (EU Official Journal L 353, 31.12.2008, p. 1).
20. Directive of the European Parliament and of the Council 2008/1/EC of 15 January 2008 concerning integrated pollution prevention and control (EU Official Journal L 24, 29.1.2009, p. 8), replaced by Directive 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Official Journal L 334, 17.12.2010, p. 17).
21. 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 (EU Official Journal L 309, 24.11.2009, p. 1).
22. Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on undesirable substances in animal feed (EU Official Journal L 140, 30.5.2002, p. 10, as amended; EU Official Journal, Special edition in Polish, Chapter 3, Volume 36, p. 3, as amended).
23. Regulation of the European Parliament and of the Council (EC) No 767/2009 of 13 July 2009 on the placing on the market and use of feed, amending European Parliament and Council Regulation (EC) No 1831/2003 and repealing Council Directive 79/373/EEC, Commission Directive

80/511/EEC, Council Directives 82/471/EEC, 83/228/EEC, 93/74/EEC, 93/113/EC and 96/25/EC and Commission Decision 2004/217/EC (EU Official Journal L 229, 1.9.2009, p. 1-28, as amended).

Polish legislation:

24. Act of 16 March 1995 on the prevention of marine pollution from ships (Journal of Laws of 2006, No. 99, item 692, as amended)
25. Act of 18 August 2011 on maritime safety (Journal of Laws No. 228, item 1368).
26. Act of 21 December 2000 on technical inspection (Journal of Laws No. 122, item 1321, as amended).
27. Act of 27 July 2001 on implementation of the Act – Environmental Protection Act, an act on waste and amending certain acts (Journal of Laws No. 100, item 1085, as amended).
28. Maritime Code of 18 September 2001 (Journal of Laws No 138, item 1545).
29. Act of 19 October 2011 on transport of dangerous goods (Journal of Laws No. 227, item 1367 and No. 244, item 1454).
30. Regulation of the Minister of Environment of 16 April 2002 on the types and concentrations of substances that cause the contamination of the output (Journal of Laws No. 55, item 498), hereinafter "Regulation on the types and concentrations of substances that cause the contamination of the output."
31. Regulation of the Minister of Economy of 24 June 2002 on the requirements for the use and handling of substances posing a particular threat to the environment and the use and cleaning of the plant or equipment, where substances posing a particular threat to the environment have been or are used (Journal of Laws No. 96, item 860).
32. Regulation of the Minister of Environment dated 9 September 2002 on standards for soil quality and ground quality (Journal of Laws No. 165, item 1359).
33. Act of 13 September 2002 on biocidal products (Journal of Laws of 2007, No. 39, item 252, as amended).
34. Regulation of the Minister of Economy of 26 September 2002 on the identification of equipment in which the substances posing a particular threat to the environment could be used (Journal of Laws No. 173, item 1416).
35. Regulation of the Minister of Infrastructure of 12 May 2003 on the transmission of information by the owner of a vessel carrying dangerous or polluting cargo (Journal of Laws No. 101, item 938, as amended).
36. Regulation of the Minister of Infrastructure of 3 April 2003 on the regulation of dangerous goods carried by vessels not subject to the SOLAS Convention (Journal of Laws No. 89, item 832).
37. Regulation of the Minister of Environment of 9 December 2003 on substances posing a particular threat to the environment (Journal of Laws No. 217, item 2141).

38. Ordinance of the Minister of Transport, Construction and Maritime Economy of 8 March 2012 on declarations on hazardous or polluting goods (Journal of Laws, item 303).
39. Regulation of the Minister for Economy and Labour of 4 August 2004 on the detailed method of dealing with waste oils (Journal of Laws No. 192, item 1968).
40. Act of 18 July 2001 – Water Law (Journal of Laws of 2012, item 145).
41. Act of 16 December 2005 on products of animal origin (Journal of Laws of 2006, No. 17, item 127, as amended).
42. Regulation of the Minister of Environment of 22 April 2011 on emission standards of installations (Journal of Laws No. 95, item 558).
43. Regulation of the Minister of Agriculture and Rural Development of 28 July 2006 on the way to deal with illicit substances, residues of chemical, biological, medicinal products and radioactive contamination of animals and animal products (Journal of Laws of 2006, No. 147, item 1067, as amended).
44. Regulation of the Minister of Environment of 24 July 2006 on conditions to be met for the introduction of sewage into the water or soil, and on substances particularly harmful to the aquatic environment (Journal of Laws No. 137, item 984, as amended).
45. Resolution of the Council of Ministers No. 217 dated 24 December 2010 on the "National Waste Management Plan 2014" (Official Gazette No. 101, item 1183).
46. Act of 10 April 1997 – Energy Law (Journal of Laws of 2006, No. 89, item 625 as amended).
47. Regulation of the Minister of Agriculture and Rural Development of 6 December 2012 on the content of undesired substances in feed (Journal of Laws of 2012, item 230).
48. Regulation of the Minister of Health of 29 March 2007 on the quality of water intended for human consumption (Journal of Laws No. 61, item 417, as amended).
49. Act of 27 April 2001 on waste (Journal of Laws of 2010, No. 185, item 1243, as amended).
50. Act of 29 June 2007 on the international shipment of waste (Journal of Laws No. 124, item 859, as amended).
51. Act of 18 December 2003 on Plant Protection (Journal of Laws of 2008, No. 133, item 849, as amended).
52. Regulation of the Minister of Environment of 3 March 2008 on the levels of certain substances in the air (Journal of Laws No. 47, item 281).
53. Act of 13 June 2008 on the ratification of the Stockholm Convention on Persistent Organic Pollutants, made in Stockholm on 22 May 2001 (Journal of Laws of No. 138, item 864).
54. Act of 27 April 2001 – Environmental Protection Law (Journal of Laws of 2008, No. 25, item 150, as amended).

55. Government Statement of 3 March 2006 on the binding force of the Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides, made in Rotterdam on 10 September 1998 (Journal of Laws of 2008, No. 158, item 991).
56. The Act of 17 July 2009 on the management system for emissions of greenhouse gases and other substances (Journal of Laws No. 130, item 1070, as amended).
57. Notification of the Minister of Economy of 21 December 2009 on the state energy policy until 2030 (Official Gazette of 2010, No. 2, item 11).
58. Act of 25 February 2011 on chemical substances and preparations (Journal of Laws No. 63, item 322).
59. Government Statement of 2 December 2008 on the binding force of the Stockholm Convention on Persistent Organic Pollutants, made in Stockholm on 22 May 2001 (Journal of Laws of 2009, No. 14, item 77).
60. Regulation of the Council of Ministers of 9 November 2010 on projects that may significantly affect the environment (Journal of Laws No. 213, item 1397).
61. Act of 22 July 2006 on feed (Journal of Laws of 2006, No. 144, item 1045, as amended).
62. Act of 19 August 2011 on transport of dangerous goods (Journal of Laws No. 227, item 1367, as amended).

ANNEX 3. GLOSSARY OF ABBREVIATIONS

α -HCH	α - hexachlorocyclohexane
β -HCH	β - hexachlorocyclohexane
γ -HCH	γ - hexachlorocyclohexane
B(a)P	benzo[a]pyrene
BAT	Best Available Techniques
BEP	Best Environmental Practices
CAS	substance identification number assigned by Chemical Abstracts Service
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CSO	Central Waste Landfill "Rudna Góra"
DDD	1,1-dichloro-2,2-di(4-chlorophenyl)ethane – a metabolite of DDT
DDE	1,1-dichloro-2,2-di(4-chlorophenyl)ethylene – a metabolite of DDT
DDT	1,1,1-trichloro-2,2-di(4-chlorophenyl)ethane
dl-PCB	dioxin-like PCBs
Journal of Laws	Journal of Laws of the Polish Republic
Official Journal	Official Journal of the European Union
ECHA	European Chemicals Agency
EEA	European Environment Agency
UNECE	United Nations Economic Commission for Europe
EMEP	European Monitoring Environmental Program
EPER	European Pollutant Emission Register
EEC	European Economic Community
GEF	Global Environmental Facility
GIOS	Chief Inspectorate for Environmental Protection in Poland
HCB	hexachlorobenzene
HCH	hexachlorocyclohexane
IJHARS	Quality Inspection of Agricultural and Food Products in Poland
IMGW	Institute of Meteorology and Water Management in Poland
IOŚ	Institute of Environmental Protection – National Research Institute in Poland
IW	Veterinary Inspection
KASHUE-KOBIZE	National Administrator of Emissions Trading System – National Center for Balance and Emissions Management in Poland
NIPSC	National Plan for Implementation of the Stockholm Convention
VOC	volatile organic compounds
MRL	maximum residue level

NMVOC	non-methane volatile organic compounds
PCDD	polychlorinated dibenzodioxins
PCDF	polychlorinated dibenzofurans
PCDD/F	polychlorinated dibenzodioxins and dibenzofurans
TEQ	toxic equivalent corresponding to 2,3,7,8-TCDD
PCB	polychlorinated biphenyls
PCT	polychlorinated terphenyls
PIS	State Sanitary Inspection in Poland
PIORiN	Main Inspectorate of Plant Health and Seed Inspection in Poland
PIWet-PIB	National Veterinary Institute – National Research Institute in Poland
SEM	State Environmental Monitoring in Poland
POPs	persistent organic pollutants
REACH	Regulation (EC) No 1907/2006 of the European Parliament and the Council of 18 December 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
RZGW	Regional Water Management Board in Poland
EU	European Union
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
US EPA	United States Environmental Protection Agency
EC	European Community
WHO	World Health Organization
WIOŚ	The Voivodship Inspectorate for Environmental Protection
PAH	polycyclic aromatic hydrocarbons
ZHW	Department of Veterinary Hygiene in Poland
ZWAR	High Voltage Equipment Plant