

REPUBLIC  OF CYPRUS



**STOCKHOLM CONVENTION  
ON PERSISTENT ORGANIC POLLUTANTS  
NATIONAL IMPLEMENTATION PLAN**

**MINISTRY OF LABOUR AND SOCIAL INSURANCE  
DEPARTMENT OF LABOUR INSPECTION**

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# SUMMARY

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The Stockholm Convention is an international treaty that was adopted in 2001 with an aim to protect human health and the environment from Persistent Organic Pollutants (POPs), i.e. from substances that have toxic properties, persist in the environment, bio-accumulate in humans and animals, are transported through air, water and migrating species and are deposited away from their emission sources.

According to the Convention, the parties must take measures for the prohibition, or the elimination of certain chemical substances (nine chemical substances or groups of chemical substances are included in the Convention), or the restriction of the production or use for the time being of one chemical substance (1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane), known as DDT. The Convention also lists the necessary measures to be taken for the reduction or elimination of those POPs which are produced unintentionally from human sources.

Cyprus ratified the Stockholm Convention through Law 42(III)/2004. A basic obligation of each party to the Convention is the preparation of a National Implementation Plan to implement the provisions of the Convention.

The first group of nine chemical substances which are listed in Annex A of the Stockholm Convention refers mainly to pesticides which have never been produced in Cyprus. Their import and use in Cyprus has been prohibited and there are no stockpiles of these substances. The same applies to DDT, which is listed in Annex B of the Stockholm Convention.

A group of chemicals listed in Annex A of the Stockholm Convention are the Polychlorinated Biphenyls (PCBs) which have been used as fluids in electrical equipment. In Cyprus, in 1986, there was one incident of uncontrolled disposal to soil of transformer fluids that contained PCBs (Askarel). The Geological Survey Department of the Ministry of Agriculture, Natural Resources and Environment had undertaken at that time the management of the contaminated soil.

The POPs that are listed in Annex C of the Stockholm Convention which are unintentionally produced from human sources are dioxins and furans, Hexachlorobenzene (HCB) and PCBs.

The preparation of emission inventories of Dioxins and Furans in Cyprus on a systematic basis started in 2002 by a study which was carried out on behalf of the European Commission by a consortium lead by TNO Environment and Geosciences from The Netherlands. Other partners in the consortium were IUTA from Germany, IOW from France and SHMU from Slovakia. The title of this study which lasted for 2 years was "Dioxin Emissions in Candidate Countries" and its aims were:

- (a) the preparation of emission inventories for the Countries acceding (at the time) the European Union
- (b) the training of personnel of these countries who participated in the study on the preparation of dioxin inventories using activity data and emission factors

- (c) to carry out dioxin emission measurements at various industrial installations in these countries

The Department of Labour Inspection of the Ministry of Labour and Social Insurance (DLI) participated in this study and prepared the first dioxin emission inventory for Cyprus for the year 2002. Two emission measurements were also carried out in Cyprus by the Inspectors of the DLI under the supervision of an Expert from the European Union.

The above emission measurements together with calculations using emission factors included in the Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases prepared by the United Nations Environment Programme were used to complete the inventory of dioxin emissions in Cyprus. From the inventory it was found that the highest percentage of dioxin emissions is due to the open burning of waste (agricultural and municipal). Through the enforcement of the relevant laws (i.e. the Law on prohibition of burning of agricultural waste) and through the construction of sanitary landfills, the open burning of waste in the existing open landfills is expected to be eliminated and therefore a significant reduction in the emissions of POPs will be achieved.

During the preparation of this Implementation Plan it was found out that the burning in the open of household (garden) waste and waste from various construction sites in inhabited areas is not regulated by any law. After this finding, the Union of Municipalities plans to amend the "Municipalities Law" so as to regulate the burning of waste within the boundaries of municipal areas. With this action, further reduction of POPs emissions is expected.

There are few industrial sources in Cyprus that may emit POPs. The emissions from these sources are very low. In addition, by the application of Best Available Techniques (BAT) at these sources through the enforcement of the Control of Atmospheric Pollution Law of 2002 and the Integrated Pollution and Prevention and Control Laws of 2003 and 2006, the emissions from these sources are expected to remain at very low levels.

The emission inventories for HCB and PCBs were prepared by using emission factors which were found in the literature. At the moment there is no toolkit available with emission factors for these pollutants similar to the Dioxins Toolkit. It should be mentioned that there are very few emission factors for HCB and PCBs available. As a result, the emission inventories of these pollutants have a higher uncertainty compared to the dioxins inventory. However, the measures that are taken in Cyprus to reduce the emissions of dioxins are expected to have a similar effect on the emissions of these pollutants.

From the data acquired about Cyprus during the study on Dioxin emissions it was found that the basic means for the reduction of the emissions of POPs in Cyprus is by the elimination of open burning as well as the use of alternative materials, products and processes for the prevention of the formation and emission of POPs into the environment.

There are several laws already in effect which regulate open burning, such as the law on the prevention of fires in rural areas and that on the prohibition of burning of

agricultural waste. The burning of municipal waste in open landfills is expected to be eliminated by 2010 when the new sanitary landfills which are now under design and /or construction are due to operate. These sanitary landfills will be constructed according to the provisions of the respective EU Directive and when they operate the existing open landfills will be closed and their sites will be reclaimed. The burning of waste in municipal areas is expected to be eliminated after the amendment of a relevant law by the Union of Municipalities.

Significant effort is required by the competent authorities to implement these laws and also to raise public awareness about the effects on the environment and human health from the emissions of POPs from various sources.

The DLI organised a seminar on 30.11.2006 to raise awareness among all the governmental and non-governmental organisations about the emissions of POPs from burning and incineration. Similar seminars will be organised in the future.

# 1. INTRODUCTION

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Persistent Organic Pollutants (POPs) are called those chemical substances that have toxic properties, persist in the environment for long periods of time, bioaccumulate, are transported and deposited in locations distant from their sources of release and can have adverse effects on human health and the environment.

## 1.1. The Stockholm Convention

In order to protect human health and the environment and aiming at the reduction and elimination of the risks from POPs, the Stockholm Convention was adopted in 2001.

Until now, 152 countries have signed the Convention whereas 147 countries are parties. Cyprus ratified the Convention on 7.3.2003.

According to Article 3 of the Convention, each Party shall prohibit or take measures to eliminate the nine chemicals listed in Annex A of the Convention and which are listed below:

- **Aldrin** – pesticide
- **Chlordane** – pesticide
- **Dieldrin** – pesticide
- **Endrin** – pesticide
- **Heptachlor** – pesticide
- **Hexachlorobenzene** – biocide
  - by-product during production of other chemicals
  - impurity in other chemicals
  - product of combustion
- **Mirex** – pesticide
  - additive in plastics and rubber as flame retardant
- **Toxaphene** – pesticide
- **Polychlorinated Biphenyls (PCBs)** – These chemicals are commonly known for their use in transformers and capacitors. They have also been used as heat exchanger fluids, as additives in paints and plastics and in carbonless copy paper. These substances are also produced and emitted unintentionally during combustion.

Another provision of Article 3 of the Stockholm Convention refers to the obligation of its Parties to restrict the production or use of 1,1,1-trichloro-2,2-bis (4-chlorophenyl) ethane known as **DDT** (Annex B of the Convention).

The Parties are also obliged according to Article 5 of the Convention to take measures to reduce or eliminate releases from unintentional production of the chemicals listed in Annex C of the Convention. These chemicals are:

- **Dioxins and Furans** – Dioxins is the name of a group of very toxic, polychlorinated chemical compounds, which are mainly produced unintentionally during combustion. The group of Dioxins consists of 75 congeners of polychlorinated dibenzo – p – dioxins (PCDD) and 135 congeners of polychlorinated dibenzofurans (PCDF). These chemicals have never been produced on industrial scale but only in laboratories for research purposes. They are formed and released during combustion (of various fuels and wastes) and as by-products from some industrial processes. Dioxins have the tendency to accumulate in human and animal fat.
- **Hexachlorobenzene and Polychlorinated Biphenyls** – These chemicals are listed also in Annex A of the Convention and have been mentioned above. Like Dioxins, they are also formed and released during combustion.

The basic measures that must be taken by the Parties to the Convention for the reduction of emissions of the above chemicals, according to the provisions of the Directive, are listed below:

- (a) The promotion of the use of Best Available Techniques, (BAT) within source categories.
- (b) The promotion of the development, and where it deems appropriate, the use of substitute or modified materials, products and processes to prevent the formation and release of the chemicals listed in Annex C of the Convention.
- (c) The reduction or elimination of the releases of POPs from stockpiles and wastes (Article 6).
- (d) The preparation of a National Implementation Plan by each Party for the implementation of its obligations under the Convention (Article 7).
- (e) The raising of awareness among the public with regard to POPs (Article 10).
- (f) The encouragement by each Party of appropriate research regarding the sources and releases of POPs into the environment as well as their presence and levels in humans and the environment (Article 11).
- (g) The submission of reports to the Conference of Parties through the Secretariat, regarding the implementation of the Convention (Article 15).
- (h) The evaluation of the effectiveness of the Convention (Article 16).

There is also a provision in the Convention for the procedure to be followed for future listing of other chemicals in Annexes A, B and C.

## **1.2. National Implementation Plan**

According to Article 7, each party to the Convention must prepare and submit within two years from accession to it, a National Implementation Plan to implement the provisions of the Convention.

The Department of Labour Inspection of the Ministry of Labour and Social Insurance which is responsible for the implementation of the Stockholm Convention has prepared the National Implementation Plan.

The steps that were taken for the preparation of the National Implementation Plan are the following:

- (a) An inventory of releases of POPs in Cyprus was first made and from this inventory the major emission sources were identified.
- (b) Letters were sent to all Governmental departments related to this subject, as well as to the Union of Municipalities informing them about the preparation of the National Implementation Plan and requesting them to give any relevant data they had, that should be included in the Plan.
- (c) A one-day seminar was organized with an aim to inform all Governmental departments, non-governmental organizations, representatives of various organizations (industrial, trading, agricultural), the trade unions and organizations dealing or having an interest to the environment, about the POPs issue and the National Implementation Plan.
- (d) The public was also informed about this seminar through the web page of the DLI:  
[www.mlsi.gov.cy/dli](http://www.mlsi.gov.cy/dli)
- (e) A draft National Implementation Plan (NIP) was prepared and sent to all parties involved for comments. At the same time the NIP was available on the web page of the DLI for a period of four weeks for comments.
- (f) The final NIP was prepared and submitted to the Council of Ministers.

## **2. COUNTRY BASELINE**

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### **2.1. Country Profile**

#### **2.1.1. Geography and Population**

##### **Geographical Location**

Cyprus is located in the eastern Mediterranean Sea, 97 km west of Syria and 64 km south of Turkey (33° East, 35° North). Cyprus is the third largest Mediterranean island, after Sicily and Sardinia, with a total area of 9.251 square kilometers. It extends 240 km from east to west and 100 km from north to south. Comparatively to its small size, Cyprus has long coastlines that stretch to 778 kilometers. Like all Mediterranean countries, Cyprus shows very noticeable geographical and climatic features.

##### **Topography**

There are two mountain ranges running from east to west: the Troodos range, in the southwest, dominated by the island's highest peak, Mount Olympos at 1.953 meters and the Pentadaktylos range in the northeast with its highest peak Kyparissouvounos at 1.024 meters. The central Messaoria plain has a low relief. There are no perennial rivers, only a few springs and streams.

##### **Climate and Weather Conditions**

Cyprus has an intense Mediterranean climate with a typical seasonal rhythm strongly marked in respect of temperature, rainfall and weather in general. Hot dry summers from June to September and rainy, rather changeable winters from November to March are separated by short autumn and spring seasons of rapid change in October, April and May.

Rainfall is geographically unevenly distributed, with maximum precipitation falling on the two mountain ranges and minimum precipitation observed in the eastern plain and the coastal areas. The average annual total precipitation ranges from less than 450 millimeters in the south western windward slopes to nearly 1.100 millimeters at the top of the central Troodos massif.

Rainfall in the warmer months contributes little or nothing to water resources and agriculture. The small amounts that fall are rapidly absorbed by the very dry soil and soon evaporated in high temperatures and low humidity. Agriculture and water supply generally depend on autumn and winter rainfall.

##### **Population**

850.300 (Dec. 2005)\*  
76,8 % (652.200), Greek Cypriots \*\*  
10,3% (87.900), Turkish Cypriots  
12,9% (110.200), foreign residents and workers

Population density: 88,4 persons / sq. km.

\* The population does not include the 162.000 illegal settlers residing in the Turkish-occupied part of Cyprus.

\*\* This figure includes the 8.000 (1%) Maronites, Armenians and Latins who opted to join the Greek Cypriot community in 1960 according to the provisions of the Constitution.

### **Official Languages**

The official languages are Greek and Turkish.

## **2.1.2. Political and Economic Profile**

### **Executive Power**

The governmental system is Presidential. The President is elected by universal suffrage for a five-year term. Executive power is exercised through an 11-member Council of Ministers appointed by the President. The Turkish Cypriots refuse to participate in the government since 1963.

### **Legislative Power**

Multi-party unicameral House of Representatives. The voting system is simple proportional representation. House members are elected by universal suffrage for a five-year term. The seats of the Turkish Cypriots are vacant since 1963.

### **Judicial Power**

Justice is administered by the Supreme Court and by the Assize and District Courts.

### **Independent Officers and Bodies**

A number of officers and bodies are independent and do not come under the jurisdiction of any Ministry. The independent Officers of the Republic under the Constitution are the Attorney-General and the Auditor-General, who head the Law Office and the Audit Office respectively, and the Governor of the Central Bank of Cyprus. The Ombudsman is also an independent Officer of the Republic whose position, however, was created much later, in 1991. The bodies with independent functions include the Public Service Commission, the Educational Service Commission, the Planning Bureau, the Treasury, the Commission for the Protection of Competition, the Office of the Commissioner of Electronic Communications and Postal Regulation, the Cyprus Energy Regulatory Authority, the Cyprus Agricultural Payments Organization, the Office of the Commissioner for Personal Data Protection, the Cooperative Societies' Supervision and Development Authority, the Internal Audit Office, the Office of the Commissioner for State Aid Control, the Tenders Review Authority, the Law Commissioner and the Tax Tribunal.

## **Local Authorities**

Local government is the responsibility of the Municipal and Community Councils. The former are concerned with the provision of local government services and administration of the towns and large rural areas, while the latter with the management of village affairs. These councils are independent bodies whose members are elected by universal suffrage.

## **International Relations**

The objective of the foreign policy of Cyprus is the active involvement in processes that aim to promote international co-operation, peace, stability, and sustainable development.

Cyprus has always been a dedicated supporter of human rights, the sovereignty and territorial integrity of States, and a strong advocate of international peace and security. Its geographical position enables it to play a role both in the Eastern Mediterranean region and within the European Union. Its accession to the European Union initiated new era in its relations with third countries, thus becoming a bridge of communication between the European Union and these countries.

Cyprus is a member of many international organizations including:

- The United Nations (UN) (1960) and its specialized agencies
- The Council of Europe (CoE) (1961)
- The Commonwealth (1961)
- The Organization for Security and Co-operation in Europe (OSCE) (1975)
- The International Maritime Organization (IMO) (1978)

## **Economy**

During the last couple of decades the economy has been transformed from an agricultural economy to an economy based on light industry and services. Today, Cyprus is an important tourist destination and a modern, service based economy with modern infrastructures and high quality social infrastructure.

The per capita gross domestic product in 2004 was 81,6% of the EU -25 average. The United Nations Human Development report 2003, ranks Cyprus as the 25<sup>th</sup> most developed country.

On 29<sup>th</sup> April 2005 the Cyprus pound became party to the Exchange Rate Mechanism (ERM II), which is a prerequisite for entering the Eurozone. Cyprus shall adopt the Euro on the 1<sup>st</sup> January 2008 and the exchange rate is fixed at €1=CY£0,585274.

The average rate of economic growth during the last five years was 3,6%. The rate of inflation was 3,1% and the rate of unemployment during the same period was 3,3%. Other relevant data is shown in **Tables I and II**.

**Table I**

<b>Sector</b>	<b>% Contribution to GDP (2004)</b>
Primary sector (mainly agriculture)	4,2%
Secondary (Mainly industry and construction)	19,6%
Tertiary (mainly services)	76,3%

**Table II**

<b>Other macro economic figures</b>	<b>2004</b>
Per capita GDP	C£ 9.979*
Inflation	2,3%
Rate of economic growth	3,6%
Unemployment	3,6%
Economically active population	346.900
Gainfully employed population	331.400

\* C£1= € 1.71, US\$ 2.35 (July 2007)

### **2.1.3. Profiles of Economic Sectors**

#### **Services**

The tertiary or services sector is the fastest growing area and today it accounts for about 76,3% of GDP and 72,3% of the gainfully employed population. The sector includes tourism, transport and communications, trade, banking, insurance, accounting, real estate, catering, public administration and business and legal services.

Tourism (hotels and restaurants) in particular plays an important role in the economy. In 2004 it contributed about 7,7% to GDP and 9,7% of the workforce is engaged in the industry. In 2004 over 2,35 million tourists visited Cyprus, mainly from the UK (56,7%), Germany (6,9%), Scandinavian countries (6,2%), Greece (5,7%), Russia (3,6%), and France (2,0%).

#### **Manufacturing**

Manufacturing accounts for 9,4% of GDP and provides employment to 10,2% of the workforce. The main industries are food processing, beverages, tobacco, textiles, clothing, furniture, leather goods, paints, metal products, pharmaceuticals and plastics.

## **Imports**

Chief imports include raw materials, consumer and capital goods, transport equipment and fuels. In 2003, 54% of total imports came from the EU, mainly Greece (12,2%), Italy (9,9%), Germany (8,0%), the UK (7,6%) and France (3,9%). Imports from the USA were 4,5% and from Japan 4,6%.

## **Exports**

Major exports are pharmaceutical products, cement, furniture, paper goods, wines, potatoes and citrus fruit. In 2003 54,7% of domestic exports went to EU countries, mainly to the UK (15,8%), Greece (10,7%) and Germany (7,8%). Also 16,9 % of exports went to Arab countries and 12,2% to Eastern European countries.

## **Transshipment**

On account of its geographical location Cyprus has developed into an important transshipment centre with a large volume of re-exports going to the emerging markets of the Middle East and Central Europe.

## **Agriculture – Animal Farming – Fishing**

Agriculture contributed about 3,6% to GDP in 2004 and gave employment to 6,3% of the working population. Principal crops are potatoes, other vegetables, cereals, citrus, grapes and olives. Livestock farming is mainly in cattle, sheep, goats, pigs and poultry. Fish production is derived from open sea fishing and marine aquaculture.

## **Natural Resources**

The island's natural resources are copper, gypsum, marble, bentonite and earth pigment, but none exist in significant quantities.

Water is a scarce resource in Cyprus. The problem of shortage of water has been met by the construction of dams and desalination plants.

### **2.1.4. Environmental Overview**

The protection of the environment became a very important issue after Cyprus' accession to the European Union (EU), since together with economy and social coherence they form the three basic pillars of European policy, as expressed by the Sustainable Development and Lisbon Strategies. As a result, while before joining the EU there were only a few specialized or relevant provisions for the environment in general legislation, after accession there are about 200 laws in Cyprus for the protection of the Environment.

The rapid economic development of the last four decades, the high standard of living and the changes in the way of living, have resulted in a number of pressures on the natural resources and the environment in Cyprus. It must be pointed out, however, that for the time being, and in comparison with the industrialized countries, the effects on the environment are limited.

In order to maintain and improve the situation, where necessary, measures and policies have already been decided for all sectors.

## **2.2. Institutional, Policy and Regulatory Framework**

### **2.2.1. Environmental Policy – Strategic Targets**

The basic aim of the Government policy regarding the environment is the protection of the environmental wealth of the country and the implementation of the principle of sustainable development. For this reason the development of the country is promoted with respect to the natural environment so as to preserve it for future generations.

In order to include the environmental dimension in all sectors of economic development, the implementation of environmental legislation based on the European environmental acquis is promoted.

The policy for solid and hazardous wastes aims at the implementation of a programme of energy and raw materials recovery through recycling part of the waste produced and the reduction of the volume deposited in landfills.

The basic aim regarding liquid effluents is the gradual but steady implementation of EU Directive 91/271/EEC on urban waste-water treatment, which refers to the building by 2012 of central sewage systems for the collection and treatment of liquid effluents in all settlements with equivalent population more than 2000 persons.

The policy of Cyprus in the Sector of Industrial Pollution Control has as main objective, the prevention, the reduction and the control of pollution which arises from industrial installations, so that the best possible protection of the health and welfare of the citizens and the protection of the environment of the Republic is safeguarded. The achievement of this objective is materialised through the effective implementation of the specific legislation for the control of industrial pollution, on the basis of which an integrated system of prevention and control has been established. This system includes the licensing of industrial installations, the systematic monitoring of their operation with on site inspections and emission measurements of pollutants, as well as the continuous monitoring and assessment of the atmospheric air quality.

Finally, the target of the energy policy is the creation of the necessary infrastructure which will fulfil the additional needs for energy and the use of alternative sources of energy in order to protect the environment.

### **2.2.2. Roles and Responsibilities of Ministries, Agencies and Other Governmental Institutions**

The Council of Ministers has the general responsibility for the preparation of the environmental policy of Cyprus. The co-ordination for the implementation of this policy is mainly performed by the Minister of Agriculture, Natural Resources and Environment.

For certain special topics, co-ordination is also made by the Minister of Labour and Social Insurance and the Minister of the Interior.

For the various issues related to the environment, especially the control of POPs, the following governmental services are involved:

- **The Planning Bureau**, whose role is:
  - to formulate the long term policy through the preparation of the five year Strategic Development Plans.
  - to contribute to the formulation of the short term (annual) policy.
  - to prepare, control and implement the development policy through the preparation of the state development budget.
  - to formulate the policy for the development and improvement of research activities in Cyprus.
- The **Department of Labour Inspection** of the Ministry of Labour and Social Insurance is responsible for the implementation of the legislation on atmospheric pollution control, air quality and the management and control of chemicals. The DLI is also responsible for the implementation of the European Regulation (EC) 850/2004 for Persistent Organic Pollutants, the Regulation (EC) 1907/2006 (REACH), the Regulation (EC) 304/2003 for the import and export of dangerous chemical substances, the ratifying Laws for the Rotterdam Convention (PIC) concerning dangerous wastes, for the Stockholm Convention and for the Protocol of the Geneva Convention of 1979 for the Long Range, Transboundary Air Pollution due to Persistent Organic Pollutants.
- The **Environment Service** of the Ministry of Agriculture, Natural Resources and Environment coordinates the programmes for the environment. It has the responsibility for environmental impact studies, the laws on the control of water and soil pollution, the waste management and the protection of nature. It is also the focal point for the Basel Convention on the Transboundary Transfer of Dangerous Waste, for the Vienna Convention and for the Montreal Protocol for the substances that deplete the Ozone Layer, the Aarhus Convention for the access of the General Public to Environmental Information, etc.
- The **Department of Agriculture** of the Ministry of Agriculture, Natural Resources and Environment has as its main responsibility the development of the agricultural and animal breeding sectors through the development of training programmes for farmers. The use of pesticides and fertilizers is within the Departments' responsibilities.
- The **Geological Survey Department** of the Ministry of Agriculture, Natural Resources and Environment has as mandate the mapping of the underground water resources, the mineral exploration and the geological research.
- The **Department of Fisheries and Marine Research** of the Ministry of Agriculture, Natural Resources and Environment is responsible for the sustainable management of marine resources, the development and sound management of aquaculture, the prevention and combating of marine pollution and the improvement of the fisheries infrastructure.

- The **Department of Forests** of the Ministry of Agriculture, Natural Resources and Environment is responsible for the management and protection of state forests and for the implementation of the forests policy and legislation. The Department of Forests has, among other duties, the responsibility for the implementation of the Forests Law, N.14/1967 and of the Forests (amendment) Laws 49/1987 to 78A(I) of 2003.

Some provisions of the Forests legislation prohibit the lighting of fires or the abandoning of a fire burning or the throwing of a match or a cigarette in the forest or within one kilometre from the boundaries of a forest.

- The **Water Development Department** of the Ministry of Agriculture, Natural Resources and Environment is responsible for the management and control of water resources.
- The **State General Laboratory** of the Ministry of Health is responsible for the chemical analyses of food and water, including liquid wastes. The main responsibilities of the specialised food laboratories cover the control and applied research in various fields among them the control of POPs. The activities of the State General Laboratory in the area of water and liquid effluent include the monitoring and analysis for the presence and concentration of various pollutants.
- The **Public Health Services** of the Ministry of Health is the Competent Authority for the implementation of the relevant food legislation which includes drinking water. As part of these responsibilities and in cooperation with other services involved, an integrated policy has been developed to safeguard the safety of foods.
- The **Ministry of Commerce, Industry and Tourism** is responsible for the effective use of energy, the promotion of the use of renewable energy sources and the management of subsidies for the reduction of industrial pollution and the protection of the environment in general.

### **2.2.3. Relevant International Commitments and Obligations**

#### **Protocol on Persistent Organic Pollutants**

Following a decision of the Council of Ministers of 11.7.1991, the Republic of Cyprus acceded to the Geneva Convention of 1979 on Long Range Transboundary Air Pollution. Within the framework of this Convention eight Protocols have been issued. One of them, the Protocol to the 1979 Geneva Convention on Long Range Transboundary Air Pollution on Persistent Organic Pollutants was signed in Aarhus, Denmark on the 24th of June 1998, during the 4<sup>th</sup> Pan European Forum of Environment Ministers.

The abovementioned Protocol sets the obligation of its Parties to take all appropriate and necessary measures to control the use and reduce the annual emissions of POPs.

## **European Union Regulation 850/2004**

The European Community issued on 30.4.2004, Regulation 850/2004 on Persistent Organic Pollutants. The objective of this Regulation is the fulfilment of the obligations of the Member States arising from the Stockholm Convention and the Protocol on POPs for the protection of the environment and human health.

The main obligations of the EU Member States as far as Regulation 850/2004 is concerned are the following:

- (a) Total ban of the production and use of a list of substances (Annex I of the Regulation 850/2004) which include plant protection products and other chemical substances which have already been banned in Cyprus.
- (b) To prepare an inventory of POPs emissions and to prepare a National Plan for their reduction.
- (c) Submit the National Plan to the European Commission.
- (d) Notify the Commission about the rules that apply in each Member State in case of violations of this Regulation.
- (e) Designate the National Competent Authority for Regulation 850/2004 and notify it to the Commission.

The Competent Authorities for the implementation of the provisions of Regulation 850/2004 in Cyprus are the Minister of Labour and Social Insurance and the Minister of Agriculture, Natural Resources and Environment. Focal point and coordinator is the Minister of Labour and Social Insurance.

## **PIC Convention**

Cyprus signed the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Plant Protection Products in International Trade on 11.9.1998 and acceded to it on 17.12.2004. The European Union has issued the European Regulation 304/2003 which includes all the provisions of the Convention and is binding for all Member States. This Regulation includes a list of dangerous substances and preparations for which, in case of export, the Member State should receive the explicit consent of the importing country. Member States should designate their competent authority for exchange of information with other competent authorities on import/export issues.

The PIC Convention introduces restrictions to the import and export of certain dangerous chemicals and plant protection products (a total of 39 chemicals and plant protection products) creating a mechanism of information exchange between the countries that import or export any of these products.

Specifically, the PIC Convention prescribes:

- A list of 27 very dangerous chemicals or groups of chemicals for the environment and human health. For these chemicals a prior informed consent procedure applies.

- The prior informed consent procedure, which refers to the mechanism for information exchange in the case of import or export of one of the chemicals covered by the Convention.
- The procedure for including additional chemicals in the list.
- The procedure for the notification for export of a chemical which has been banned or for which restrictions apply in a country Party to the Convention.
- The information accompanying the chemicals exported and the procedure for information exchange between the countries involved.
- The requirements for applying the provisions of the Convention and the procedures followed in case of non-compliance.
- The rules of procedure for the Conference of the Parties, the Secretariat, the procedure for settling disputes among parties and the procedure for amending the Convention.

The Competent Authority for the implementation of the provisions of the PIC Convention is the Minister of Labour and Social Insurance through the Department of Labour Inspection. In case issues related to plant protection products arise, the Competent Authority forwards them to the Department of Agriculture of the Ministry of Agriculture, Natural Resources and Environment.

### **Basel Convention**

The Basel Convention covers issues related to the control of transboundary transport of dangerous wastes. Cyprus signed the Basel Convention on 22.3.1989 and acceded to it on 17.9.1992. The Competent Authority for the implementation of the provisions of the Convention is the Minister of Agriculture, Natural Resources and Environment.

### **Other Activities**

Cyprus participates in the following European and International Conventions, Committees, Programmes and Networks:

- (a) Clean Air for Europe (CAFÉ) Programme
- (b) European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL Network)
- (c) Committee for the implementation of Regulation 166/2006 for the preparation of a European Pollutant Release and Transfer Register (PRTR) - Integrated Pollution Prevention and Control Directive (IPPC)
- (d) European Information and Observation Network (EIONET) of the European Environment Agency

- (e) Executive Body of the 1979 Geneva Convention on Long-range Transboundary Air Pollution (CLRTAP)
- (f) Steering Body of the European Monitoring and Evaluation Programme (EMEP) (Protocol to the 1979 LRTAP Convention)
- (g) Intergovernmental Forum of Chemical Substances (IFCS)
- (h) Strategic Approach to International Chemicals Management (SAICM)
- (i) European Chemicals Agency

#### **2.2.4. Existing Legislation and Regulations Addressing POPs**

In Cyprus, the control of Persistent Organic Pollutants is regulated by the following legislative instruments:

##### **International Instruments**

- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal Ratifying Law of 1992 (Law 29 (III)/1992)
- The Protocol to the 1979 Convention on Long-range Transboundary Air Pollution on Persistent Organic Pollutants (Ratifying) Law of 2004 (Law 39 (III)/2004)
- The Stockholm Convention on Persistent Organic Pollutants Ratifying Law of 2004 (Law 42(III)/2004)
- The Rotterdam Convention on the Prior Informed Consent for Certain Hazardous Chemicals and Pesticides in International Trade Ratifying Law of 2004 (Law 20(III)/2004)

##### **European Instruments**

- 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.
- Regulation (EC) No 304/2003 of the European Parliament and of the Council of 28 January 2003 concerning the export and import of dangerous chemicals.
- 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).

##### **National Legislation**

###### **Solid Wastes**

- The Management of Solid and Hazardous Wastes Law of 2002 (Law 215(I)/2002)

- The Management of Solid and Hazardous Wastes (List of Wastes) Order of 2003 (P.I. 157/2003)
- The Management of Solid and Hazardous Wastes (Registry of Wastes) Order of 2003 (P.I. 157/2003)
- The Management of Solid and Hazardous Wastes (Landfills) Regulations of 2003 (P.I. 562/2003)

#### Dangerous Chemical Substances - Pesticides

- The Dangerous Substances Laws of 1991 to 2004 (Law 199/1991, Law 27(I)/1997, Law 81(I)/2002 and Law 194(I)/2004)
- The Dangerous Substances (Classification, Packaging and Labelling of Dangerous Substances and Preparations) Regulations of 2002 to 2005 (P.I. 292/2002, P.I. 536/2004 and P.I. 301/2005)
- The Agricultural Pesticides Law of 2003 (Law 1(I)/1993)
- The Agricultural Pesticides Regulations of 1993 (P.I. 7/93)
- The Agricultural Pesticides (Amendment) Regulations of 2000 (P.I. 204/2000),
- The Agricultural Pesticides (Amendment) Law of 2004 (Law 117(I)/2004)
- The Agricultural Pesticides (Amendment) Regulations of 2004 (P.I. 521/2004)
- The Agricultural Pesticides (Sale, production and storage) Regulations of 2003 (P.I. 615/2003)
- The Biocides Law of 2004 (Law 72(I)2004)

#### PCBs

- The Solid and Hazardous Wastes (Poly-chloro-biphenyls and Poly-chloro-triphenyls) (PCB/PCT) Regulations of 2002 (P.I. 636/2002)

#### Atmospheric Emissions

- The Control of Atmospheric Pollution Law of 2002 (Law 187(I)/2002)
- The Integrated Pollution Prevention and Control Law of 2003 (Law 56(I)/2003)
- The Integrated Pollution Prevention and Control (Amendment) Law of 2006 (Law 15(I)/2006)
- The Control of Atmospheric Pollution (Incineration of Waste Oils) Regulations of 2002 (P.I. 529/2002)
- The Control of Atmospheric Pollution (Prevention of Air Pollution from Existing Municipal Incineration Plants) Regulations of 2003 (P.I. 75/2003)
- The Control of Atmospheric Pollution (Incineration of Waste) Regulations of 2003 (P.I. 284/2003)
- The Control of Atmospheric Pollution (Limitation of Emissions of Certain Pollutants into Air from Large Combustion Plants) Regulations of 2004 (P.I. 195/2004)

#### Water – Land

- The Water and Land Pollution Control Law of 2002 (Law 106(I)/2002)
- The Water and Land Pollution Control (Disposal of dangerous Substances) Regulations of 2002 (P.I. 504/2002)

- The Water and Land Pollution Control (Disposal of dangerous Substances in underground waters) Regulations of 2002 (P.I. 508/2002)
- The Water and Land Pollution Control (Pollution from dangerous Substances) Regulations of 2002 (P.I. 513/2002)
- The Water and Land Pollution Control (Disposal of Incineration Residues) Regulations of 2004 (P.I. 535/2004)
- The Protection and Management of Waters Law of 2004 (N. 13(I)/2004)

## **2.3 Assessment of the POPs Issue in Cyprus**

### **2.3.1. Assessment with Respect to Pesticides (including DDT)**

The Department of Agriculture of the Ministry of Agriculture, Natural Resources and Environment enforces legislation that concerns the registration, import, production, quality, use and generally the marketing of plant protection products and biocides. This legislation is harmonized with the relative EU legislation.

As a result of the application of the above legislation in Cyprus, the placing on the market and the use of plant protection products that contain substances, some of which are listed in Annexes A and B of the Stockholm Convention have been prohibited. Even before the adoption of the European Acquis, from the decade of the 1980s, specific plant protection products that were available on the market in Cyprus were withdrawn after a decision of the Pesticides Authorization Board while certain others, that are also listed in Annex A of the Stockholm Convention, have never been introduced into the market.

The substances listed in Annexes A and B of the Convention whose use has been prohibited in Cyprus, are presented in **Table III**. It is important to mention that none of these chemical substances was ever produced in Cyprus.

**TABLE III**

<b>Name of Substance</b>	<b>CAS No</b>	<b>Date of Prohibition</b>
Aldrin	309-00-2	8.12.1980
Chlordane	57-74-9	8.2.1988
Dieldrin	60-57-1	8.12.1980
Endrin	72-20-8	It was never approved for use as pesticide
Heptachlor	76-44-8	It was never approved for use as pesticide
Hexachlorobenzene	118-74-1	It was never approved for use use as pesticide
Mirex	2385-85-5	It was never approved for use as pesticide

<b>Name of Substance</b>	<b>CAS No</b>	<b>Date of Prohibition</b>
Toxaphene	8001-35-2	It was never approved for use as pesticide
Polychlorinated biphenyls (PCBs)	1336-36-3 And other	21.6.2002
DDT	50-29-3	1.12.1976

The above list has been given to the Customs and Excise Department for the control of chemical substances that are imported in Cyprus.

### **2.3.2. Assessment with Respect to PCBs**

The PCBs threaten the environment because of their toxicity, their non-biodegradability and their bioaccumulation in animal tissue. In Cyprus, PCBs were never produced and their use has been progressively eliminated since the beginning of the decade of the 1970s.

It is generally been recognized that PCBs which remain in existing equipment continue to be a threat for the environment. For this reason, EU Directive 96/59/EC on the disposal of PCBs places several conditions for the preparation of lists of PCB containing equipment, for the labelling and for the treatment of PCBs. Cyprus's legislation is fully harmonized with the above Directive with corresponding Regulations entitled "The Solid and Dangerous Wastes (Polychlorobiphenyls and Polychlorotriphenyls) (PCB/PCT) Regulations of 2002 (P.I. 636/2002)". The main obligations resulting from the above mentioned Directive and Regulations are the following:

- (a) By 2010, all of the equipment containing PCBs with capacity more than 5 dm<sup>3</sup> must be disposed of properly. (Article 3 of the Directive)
- (b) Equipment in which the fluids contain between 0,05% (500 ppm) and 0,005% (50 ppm) by weight PCBs may continue to be used and be disposed of at the end of their useful life. Equipment that contains more than 50 ppm PCBs must be included in an inventory and labeled (Article 4(2) and 9(2) of the Directive)
- (c) The replacement of the fluid is allowed if it contains less than 0,05% and preferably less than 0,005% of PCBs. In addition, the topping up of such fluid is prohibited.

Recognizing the environmental problems caused by PCBs, the Government of Cyprus imposed a ban in 1987 on the import of PCB-containing equipment. In Cyprus, PCB-containing equipment has never been manufactured. For the import of transformers, a chemical analysis certificate is required by an approved laboratory, ensuring that the oil of the transformers is free from PCBs.

### 2.3.3 Assessment of Releases from Unintentional Production

#### Dioxins/Furans

Dioxins is the name of a group of very toxic, polychlorinated chemical compounds, which are mainly produced unintentionally during combustion. The group of Dioxins consists of 75 congeners of polychlorinated dibenzo – p – dioxins (PCDD) and 135 congeners of polychlorinated dibenzofurans (PCDF).

The toxicity of these chemical compounds differs between each congener and depends on the number and location of Chlorine atoms they contain. The most toxic congener is 2,3,7,8, tetrachlorodibenzo-p-dioxin (2,3,7,8-Cl<sub>4</sub>DD) which has a toxicity factor of 1. This congener as well as the other most toxic congeners and their toxicity factors are shown in **Table IV**. In this table the initial International Toxicity Factors (1990) are listed together with the more recent factors prepared by the World Health Organisation (WHO) in 1998.

**Table IV: Toxic Equivalent Factors**

Congener	International Toxicity Equivalency Factors (I – TEF)	WHO Toxicity Factors (WHO – TEFs)
2,3,7,8-Cl <sub>4</sub> DD	1	1
1,2,3,7,8-Cl <sub>5</sub> DD	0,5	1
1,2,3,4,7,8-Cl <sub>6</sub> DD	0,1	0,1
1,2,3,7,8,9-Cl <sub>6</sub> DD	0,1	0,1
1,2,3,6,7,8-Cl <sub>6</sub> DD	0,1	0,1
1,2,3,4,6,7,8-Cl <sub>7</sub> DD	0,01	0,01
Cl <sub>8</sub> DD	0,001	0,0001
2,3,7,8-Cl <sub>4</sub> DF	0,1	0,1
1,2,3,7,8-Cl <sub>5</sub> DF	0,05	0,05
2,3,4,7,8-Cl <sub>5</sub> DF	0,5	0,5
1,2,3,4,7,8-Cl <sub>6</sub> DF	0,1	0,1
1,2,3,7,8,9-Cl <sub>6</sub> DF	0,1	0,1
1,2,3,6,7,8-Cl <sub>6</sub> DF	0,1	0,1
2,3,4,6,7,8-Cl <sub>6</sub> DF	0,1	0,1
1,2,3,4,6,7,8-Cl <sub>7</sub> DF	0,01	0,01
1,2,3,4,7,8,9-Cl <sub>7</sub> DF	0,01	0,01
Cl <sub>8</sub> DF	0,001	0,0001

Since the various congeners of dioxins and furans have different toxicity, the emissions which consist of a mixture of congeners are expressed in TEQ (Toxic Equivalents). The Toxic Equivalents relate the toxicity of all congeners to the toxicity of 2,3,7,8 – Cl<sub>4</sub>DD.

Although dioxins are also formed from natural sources (such as forest fires) the main interest is focused on the emission of dioxins from human sources especially during combustion of various fuels and the incineration of waste.

In 2002, the Directorate General of Environment, of the European Commission, commissioned a study aiming at the preparation of dioxin emission inventories for the

Candidate (at the time) Countries to compare with the inventories of the 15 “old” Member States. The study lasted for two years, and within this period, two workshops and several emission measurements in various installations were carried out. The DLI participated in both workshops and carried out dioxin emission measurements at two industrial installations in Cyprus. It was the first time that a detailed inventory of dioxins emissions in Cyprus was prepared using emission factors from the UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases.

During the period of the above study the DLI acquired the necessary equipment for the sampling of dioxins from emission sources.

The Inspectors of the DLI were initially trained for the use of this equipment according to standard EN 1948 – 1 by the supplier of the equipment. The consortium that carried out the above study (TNO from the Netherlands, IUTA from Germany, IOW from France and SHMU from Slovakia) arranged for the visit to Cyprus of an Austrian expert from the Federal Environmental Protection Agency of Austria (Umweltbundesamt GmbH) who provided further training to the Inspectors during the first sampling for dioxins at a cement factory. A second sampling was carried out at a power station. All the samples that were taken were sent to the laboratories of Umweltbundesamt GmbH in Vienna for analysis. The reports with the results of these emission measurements were included by TNO and IUTA in their final report which was submitted to the European Commission and is available on the web page:

[http://ec.europa.eu/environment/dioxin/pdf/rapport\\_2005.pdf](http://ec.europa.eu/environment/dioxin/pdf/rapport_2005.pdf)

As a result of this study the first dioxin inventory for emissions to the atmosphere was prepared for the year 2002, which was subsequently extended for all years since 1990. For the calculation of the emissions the activity data for industrial sources (production and fuels) were used. An estimation of the quantities of materials (wastes, agricultural residues, forests etc) that are burned in an uncontrolled way was also made.

The inventory of dioxin emissions as well as the projections for the period 1990 – 2010 are shown in Figures I – III. The total dioxin emissions are presented in **Figure I**, from which it can be seen that most of the releases are emissions to the atmosphere. In **Figure II** the emissions to atmosphere from four major sources are presented. These sources are the burning of fuels (for energy production and by cars), the industrial sources, the open burning and the incineration.

As it can be seen in **Figure II**, the highest percentage of dioxins is emitted to the atmosphere from open burning which includes:

- (a) burning of municipal waste in open landfills
- (b) burning of garden waste and wastes from construction sites in inhabited areas
- (c) burning of agricultural waste (wheat stalk residues, trimming of trees, plastic film used in greenhouses and animal carcasses)
- (d) bonfires
- (e) accidental fires of buildings, cars, etc.

The percentage of dioxins emitted to the atmosphere due to the open burning is about 85% of the total emissions for the years 1990 to 2005. Following the

implementation of several measures (which are outlined in section 3.3.3), this percentage is expected to be reduced significantly.

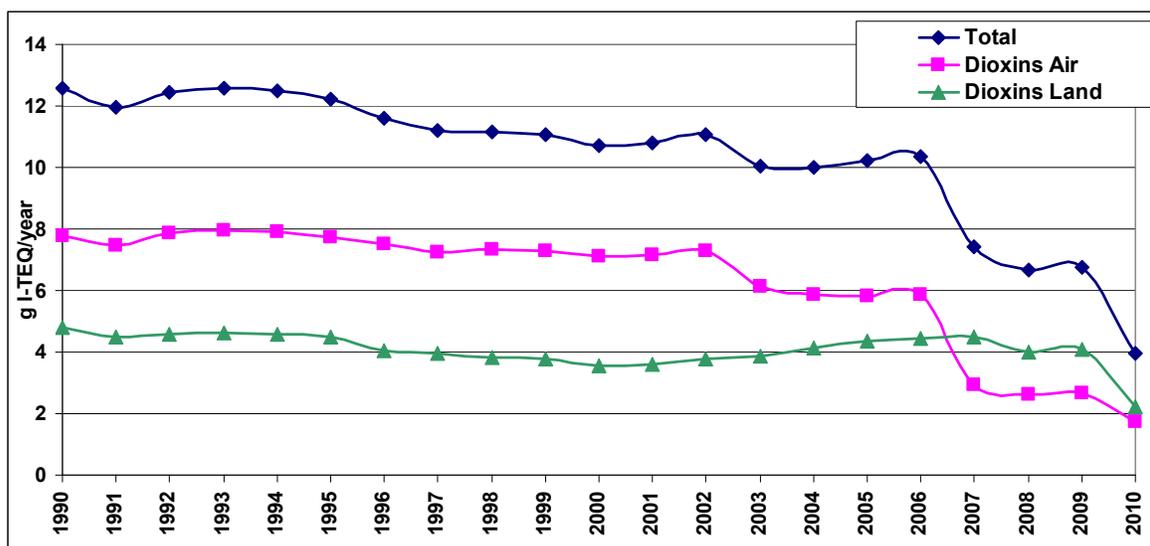


Figure I: Dioxins Emissions in Cyprus

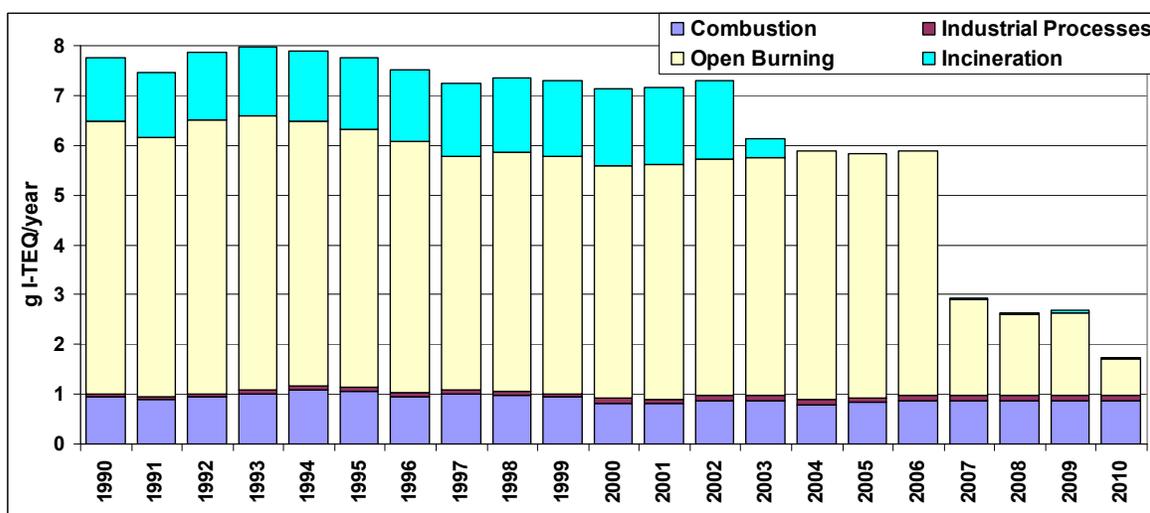


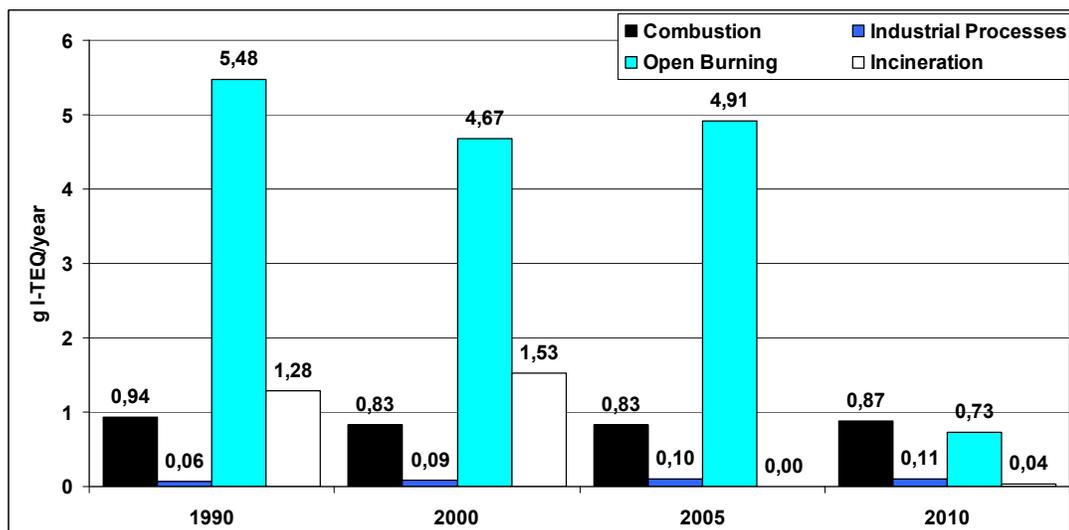
Figure II: Dioxins Emissions to the Atmosphere

The emissions from industrial sources and from the burning of various fuels are steady and they are very low. The emissions from incineration dropped to zero after 31.3.2003 when the operation of the incinerators of clinical waste of five hospitals was terminated. The clinical waste in Cyprus now are shredded and sterilized, and they are either disposed of at sanitary landfills or co-incinerated at cement factories where emissions of dioxins are very low due to the high temperatures used, the continuous operation, high residence time, sudden and efficient cooling of combustion gases and efficient filtration. Dioxin emission measurements carried out at a cement factory showed that the emissions are about 10 times lower than the limit used for incineration and co-incineration.

A significant reduction of dioxin emissions is expected as from 2007, due to the beginning of operation of an animal carcass incinerator. In the past, animal carcasses

were either buried or burned in the open. The emissions of dioxins from modern incinerators operating on a continuous basis are very low compared to the corresponding emissions from the open burning of the animal carcasses.

**Figure III** presents the fluctuation of the emissions of dioxins to the atmosphere for the above four general categories for the years 1990, 2000, 2005 and 2010. From this figure it can be seen that the highest reduction of emissions is achieved by the elimination of open burning of waste.



**Figure III: Dioxins Emissions to the Atmosphere**

### HCB and PCBs

HCB and PCBs are emitted from combustion processes in which chlorinated fuels/materials are used and especially when combustion is incomplete.

The main emission sources of HCB and PCBs are:

- (a) the waste incinerators (clinical, municipal, hazardous)
- (b) the cement production kilns (clinker)

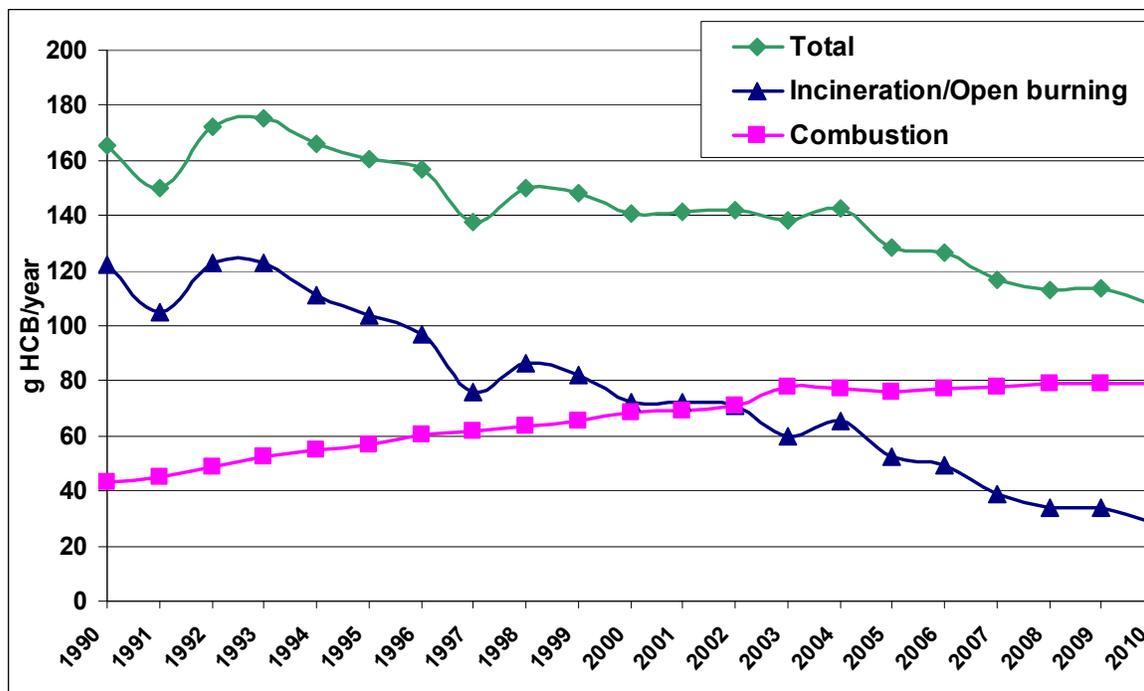
Other emission sources mentioned in the Stockholm Convention are:

- (a) the open burning of wastes
- (b) the combustion of fossil fuels
- (c) the combustion of wood and other biomass
- (d) the combustion of animal carcasses

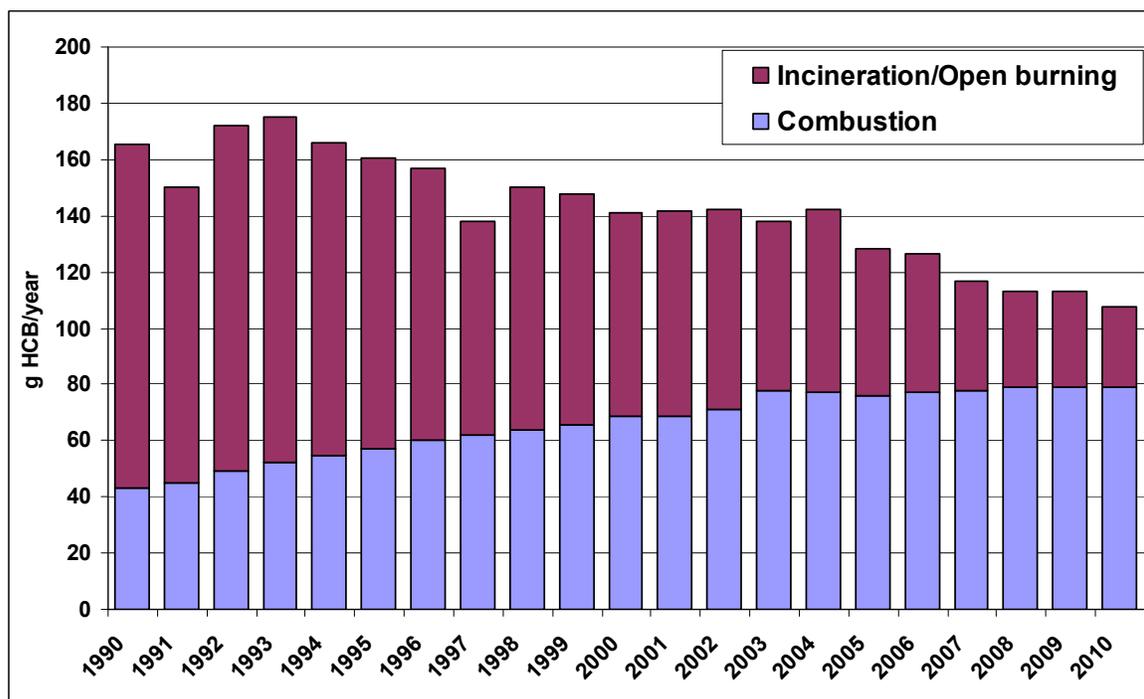
Based on the activity data used for the emission inventory of dioxins and with the use of emission factors derived from the EMEP/CORINAIR Emission Inventory Guidebook, the emissions and the projections of emissions for HCB and PCBs for the year 1990 until 2010 were estimated.

It should be mentioned that there are very few emission factors for HCB and PCBs available. As a result, the emissions of HCB and PCBs have high uncertainty compared with the dioxins emission inventory inventories.

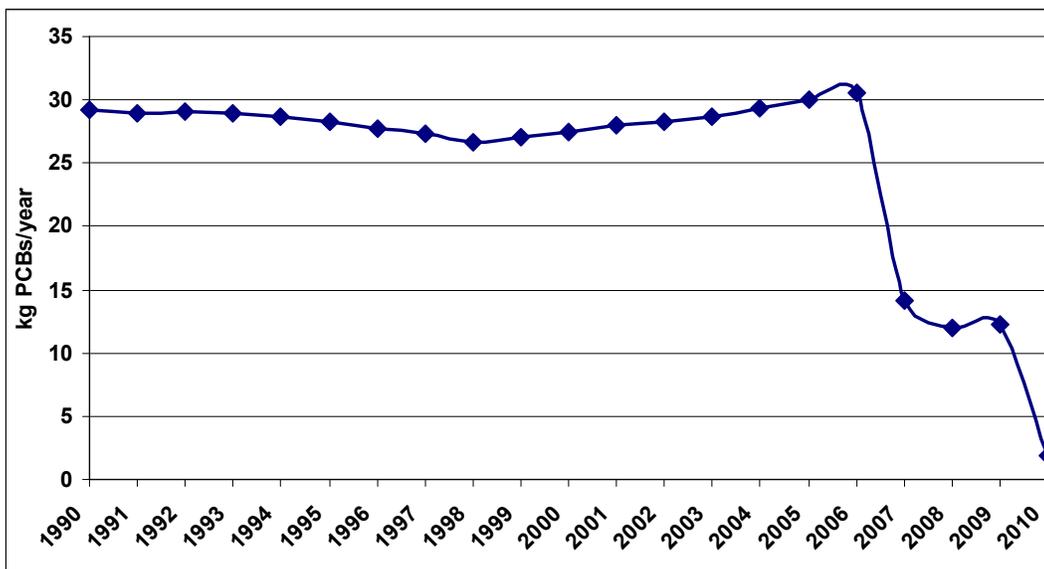
The emissions of HCB are presented in **Figures IV and V**. The emissions of PCBs are presented in **Figure VI**. As shown in these Figures the emissions as from 2007 are reduced and the main reason is due to the elimination of open burning of animal carcasses.



**Figure IV: Hexachlorobenzene Emissions**



**Figure V: Hexachlorobenzene Emissions**



**Figure VI: Emissions of PCBs**

#### **2.3.4. Stockpiles**

##### Chemicals of Annexes A and B of the Convention except PCBs

According to the records and inspections carried out by the Department of Agriculture in factories and stores of agricultural products, there are no stockpiles of the chemicals listed in Annexes A and B of the Convention. This situation is the result of the policy of the Pesticides Authorization Board which aimed at the use or disposal of the stockpiles of those chemicals using all legal options, during the period that they had to be phased out.

In Cyprus there was no need to carry out any studies for the disposal or destruction of POPs listed in Annexes A and B of the Convention since those substances had either not been registered in Cyprus (and therefore were not available on the market) or they were withdrawn following a decision of the Pesticides Authorization Board during the 1980's (Table III, in section 2.3.1).

In addition, the above Board, after investigating the stockpiles of all importers, decided to prohibit imports, allowing enough time to consume all stockpiles for special applications. For example, in 1974 when DDT was prohibited for agricultural use, it was allowed to be used as mouse exterminant until all stockpiles were exhausted.

##### PCBs

The Ministry of Agriculture, Natural Resources and Environment through the Geological Survey Department carried out a study to identify any equipment containing PCBs, both in governmental and private organizations. A summary of the results of this investigation was submitted to the European Commission.

The above study focused on the possible holders of equipment that may contain PCBs. For this reason, a questionnaire was developed and sent to 660 facilities and enterprises. Follow-up visits with sampling were made at about 60 facilities. All the information collected was filed in an electronic data base.

Quantitative analyses were carried out on 149 samples from transformers out of which only for one there was indication that its PCB content was above 5 dm<sup>3</sup>. It was also found out that forty transformers contained between 50 and 500 mg/kg PCBs.

The concentration of PCBs in condensers is not possible to detect without destroying them. As a result, a list of the condensers that may contain PCBs has been prepared, based on an internationally recognized list of manufacturers.

Within the framework of its environmental policy, the Electricity Authority of Cyprus carried out an investigation between 1989 and 1995 regarding the content of PCBs in all electrical equipment under its possession. As a result of this investigation 565 transformers were located and decontaminated (a total of 107 tonnes of fluid).

### Dioxins

There are no recorded stockpiles of wastes in Cyprus that contain dioxins.

### **2.3.5. Wastes**

The Environment Service of the Ministry of Agriculture, Natural Resources and Environment which has the responsibility for the implementation of the Management of Solid and Hazardous Wastes Law of 2002, is carrying out a study for the design of a central facility for the management of hazardous wastes in Cyprus. This facility will consist of

- (a) a unit for the collection, separation and temporary storage of waste
- (b) a unit for physicochemical treatment
- (c) an incinerator
- (d) an area for the sanitary landfill of hazardous wastes.

After the completion of the study, a proposal will be made to the Council of Ministers for approval of this project. When the above facility is constructed, all hazardous wastes will be transported there for treatment or landfilling.

At present, the hazardous wastes are either securely stored at various locations or exported from Cyprus for treatment abroad, according to international Conventions, rules and standards.

### **2.3.6. Contaminated Sites**

In 1986, a quantity of transformer fluids (Askarel) was disposed of in an uncontrolled manner in the area of Kato Polemidia in Limassol. The Geological Survey Department arranged for the burial of the contaminated soil in specially constructed leak – proof cells which were also fenced.

The quantities of contaminated soil in the two cells are estimated at 30000 cubic meters and the contamination from PCBs varies from several mg/kg to a few hundreds of mg/kg. The total quantity of PCBs in the soil is estimated between 50 and 100 tonnes.

Between 2000 and 2003 the Geological Survey Department re-evaluated the area of the burial of the contaminated soil in co-operation with a Swedish Organisation, investigating whether there is any leak of PCBs from the cells. For this reason more than thirty boreholes were drilled both within and outside the fenced area. From the investigation no leaks were found.

Within the framework of this investigation a system for the monitoring of the area was installed. Five of the boreholes are used for observation purposes. From these boreholes, water and soil samples are taken two times per year for monitoring of PCBs. From this investigation no leak to the surrounding environment was detected.

### **2.3.7. Identification and Assessment of Chemicals with POP Characteristics**

According to Article 8 of the Stockholm Convention, a Party may submit a proposal to the Secretariat for listing a chemical in Annexes A, B and/or C. The proposal is submitted according to the screening criteria given in Annex D of the Convention.

In case any chemical is approved for listing in the future in any of the Annexes of the Convention the relevant national legislation will be amended accordingly to include that chemical.

### **2.3.8. Monitoring of POPs**

The monitoring of emissions of POPs from industrial sources and especially of dioxins is carried out through the implementation of the Control of Atmospheric Pollution Law of 2002 and the Integrated Pollution Prevention and Control Laws of 2003 to 2006. According to these Laws industrial installations are granted an emission permit and where applicable, the emission limit for dioxins is prescribed at 0,1 ng I – TEQ / Nm<sup>3</sup>.

From the emission measurements carried out until now by the DLI it was found that the emissions from cement factories and power plants are well below the above limit.

Regarding the impact of the above POPs on human health, the Ministry of Health has carried out medical research which has shown that the levels of PCBs, dioxins and furans in the human milk of breast-feeding mothers were very low.

In addition, the Public Health Services of the Ministry of Health implement periodically various programmes for the monitoring of PCBs, dioxins and furans in foods and drinking water.

The legislation regarding the monitoring of animal food provides that these should be free of POPs such as dioxins, PCBs and organochlorinated pesticides. For

this reason animal food is monitored according to national legislation. During 2005, analyses of 15 samples were carried out in an accredited laboratory in Germany.

Since 1988, PCBs are continuously monitored in the major dams of Cyprus, following the episode of illegal disposal of PCBs in the soil in the Kato Polemidia area. It was found that from 1989 until now there is a steady downward trend of PCB concentration. The maximum concentration found in dams in 1989 was 600 ng/L and in 2005 it was reduced to 25 ng/L with the exception of the dam near Kato Polemidia where the maximum concentration was 254 ng/L. The maximum concentration detected in rivers was 19 ng/L.

This investigation was carried out by the State General Laboratory of the Ministry of Health. Further details about this investigation can be found in the UNEP Chemicals report of 2002 with title "Regionally Based Assessment of Persistent Toxic Substances: Mediterranean Regional Report" which is available at:

<http://www.chem.unep.ch/>

Details about more recent results of the monitoring carried out by the State General Laboratory are shown in Annex I.

### **2.3.9. Information and Awareness Raising**

During the last five years and especially after the accession of Cyprus to the European Union on 1.5.2004 the public has become more sensitive on environmental issues.

Regarding POPs, the pollutants that are better known to the public are PCBs and dioxins.

However, in general the public seem to ignore the risks from the emissions of POPs from open burning of waste (mainly agricultural and domestic) which takes place both in inhabited areas and also in open landfills. As an initial effort to raise public awareness the DLI organized on 30.11.2006 a seminar titled "Releases of Persistent Organic Pollutants during burning and incineration". All governmental and non-governmental organizations involved, agricultural organizations, Municipalities, trade unions and others were invited.

During this seminar general information about the Stockholm Convention and the obligations of the Parties was given and the preparation of the National Implementation Plan was also highlighted. Reference was also made to the sources of release of POPs, the effects on the environment and human health and finally the inventories of POPs were presented.

All the presentations are available on the web page of the DLI at:

<http://www.mlsi.gov.cy/dli>

### **3. STRATEGY AND ACTION PLAN**

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#### **3.1. Policy Statement**

The Government, recognising the adverse effects of POPs on human health and the environment in general, is determined to take all necessary measures included in the National Implementation Plan to eliminate releases of POPs as anticipated in the Stockholm Convention.

Given that the import and use in Cyprus of the substances listed in Annexes A and B of the Convention is prohibited, special attention will be paid on the control of emissions of the chemical substances listed in Annex C of the Convention and on the safe disposal of the stockpiles of PCBs.

According to article 5(c) of the Stockholm Convention every possible effort will be made to promote the development and, where it deems appropriate, the use of substitute or modified materials, products and processes to prevent the formation and release of the chemicals listed in Annex C of the Convention will be promoted.

Furthermore, according to the provisions of article 5(d) of the Convention, as well as of the provisions of the Control of Atmospheric Pollution Law of 2002 and of the Integrated Prevention and Pollution Control Laws of 2003 and 2006, new processes (especially for the incineration of waste) have to apply the Best Available Techniques (BAT) for the limitation of the emissions of Persistent Organic Pollutants.

The application of BAT and / or best environmental practices is also required for all processes from which POPs may be emitted.

#### **3.2. Implementation Strategy**

The strategy which will be followed to implement the provisions of the Stockholm Convention mainly aims at the implementation of the Action Plans for the management and destruction of PCBs and the elimination of open burning of waste to reduce POPs releases since it was found out from the emission inventories that this is the main source of emissions of the pollutants listed in Annex C of the Convention.

A number of authorities are involved in this subject but the DLI which is responsible for the implementation of the Convention will coordinate all activities carried out for this purpose. The DLI will also continue the campaign to raise public awareness about the effects on the environment and human health from the emission of POPs particularly from open burning.

##### **3.2.1. Emissions from Industrial Sources**

The emissions from industrial sources are expected to remain at very low levels by the application of BAT through the permitting procedure according to the provisions of the Atmospheric Pollution Control Law of 2002 and the Water and Land Pollution

Control Law of 2002 as well as the Integrated Prevention and Pollution Control Laws of 2003 and 2006.

In addition, industrial processes that produce less or no pollutants from those listed in Annex C of the Convention will be promoted. Within this framework the operation of small incinerators that cannot operate continuously will be limited since their emissions of POPs are high due to the frequent start-up and shut-down procedures. As an alternative the installation of a central incinerator for various types of waste operating on a continuous basis will be promoted. As far as the disposal of clinical waste is concerned the sterilization method currently used will continue since it is satisfactory.

### **3.2.2. Evaluation of the Effectiveness of the Convention**

Cyprus will contribute towards the effectiveness of the Convention by providing data to the Secretariat based on experiences and knowledge that will be acquired during the implementation stage. In addition, Cyprus will organize special workshops every 5 years for the evaluation of the implementation and the effectiveness of the Stockholm Convention. Adjustments to the Action Plan will be made according to the conclusions of these workshops.

### **3.2.3. Reports**

Cyprus through the DLI has already promptly responded and will continue to respond positively to the submission of reports when required by the provisions of the Convention.

### **3.2.4. Evaluation/Revision of National Implementation Plan**

The effectiveness of the National Implementation Plan will be monitored systematically and will be amended according to new information (new sources of emissions, new emission limit values, new emission factors etc.). The revision of the Plan is due to be carried out in five years, after the expected reductions of emissions of Persistent Organic Pollutants to be achieved by 2010.

## **3.3. Activities and Action Plans**

### **3.3.1. Elimination of Production, Use, Import and Export of POPs (Articles 3(1) and 3(2) of the Convention)**

The POPs listed in Annexes A and B of the Stockholm Convention have never been produced in Cyprus and their import and use is prohibited. The Customs and Excise Department which controls the import of chemical substances in Cyprus is informed about all prohibitions. As a result these substances are not imported or used in Cyprus.

### **3.3.2. Action Plan for the equipment /Phase-out and disposal of PCB-containing equipment**

The **Action Plan** for the equipment, which as mentioned in section 2.3.4 may contain PCBs, has been prepared by the Environment Service of the Ministry of Agriculture, Natural Resources and Environment and includes the following:

#### **Decontamination of Transformers detected to contain PCBs with volume more than 5 dm<sup>3</sup>**

The holder of any transformer detected to contain more than 5 dm<sup>3</sup> of PCBs is obliged to take the following measures:

- a) In case of relocation of the transformer, to notify the authorities,
- b) to decontaminate the transformer before 31.12.2010
- c) before the decontamination the holder of the transformer should:
  - Take a sample of the fluid contained in the transformer, perform an analysis in an accredited laboratory in order to detect the PCB content of the transformer and submit the results to the Environment Service.
  - Notify the Environment Service, at least two working weeks prior to the removal of the fluid, so that an Inspector can be present during this process.
  - Obtain the services of a person to whom the fluid will be shipped for decontamination/destruction.
  - Submit to the Environment Service evidence regarding the commitment of the aforementioned person to decontaminate the fluid, and also about the relevant permit that this person has, which must be issued by the country in which he operates.
  - Obtain all necessary permits required by the relevant legislation for the shipment of the fluid for decontamination and ensure that shipment will be done within 3 weeks from the day the fluid is removed.
  - Ensure that the person who will decontaminate the fluid will issue a valid Certificate confirming that this was done. The Certificate must be submitted to the Environment Service.
  - Label the transformer according to the requirements of the Annex of P.I. 636/2002.

In case of a definite withdrawal of the transformer, in addition to the procedure described in (c) above, the holder is obliged to inform the Environment Service, prior to the withdrawal, the procedure that will be followed for this purpose which must comply with the requirements of the Solid and Hazardous Waste Laws of 2002 and 2006.

#### **Decontamination of the transformers the fluids of which may contain between 0.05% and 0.005% by weight of PCBs**

According to Article 9.2 of the Directive 96/59/EC, the holders of transformers which may contain between 0.05% and 0.005% by weight of PCBs are required either to decontaminate them or to dispose them at the end of their useful lives. In **Table A**

**(Annex II)** a list with all transformers the fluids in which may contain between 0.05% and 0.005% by weight of PCBs is presented.

#### Transformer Withdrawal

- a) Three months prior to the withdrawal, the holder of a transformer that is included in **Table A (Annex II)**, is obliged to inform the Environment Service about his intention to do so
- b) In case a transformer will be shipped for decontamination, the holder is obliged, two working weeks prior to disassembly to:
  - Take a sample of the fluid contained in the transformer, perform an analysis in an accredited laboratory in order to detect the PCB content of the transformer and submit the results to the Environment Service.
  - Notify the Environment Service in order to make arrangements for an Inspector to be present during disassembly.
  - Obtain all necessary permits required by the relevant legislation for the shipment and export of the transformer and take all necessary measures to ensure that this will be done within 3 weeks from the day of the disassembly.
  - Obtain the services of a person to whom the transformer will be shipped for decontamination/destruction.
  - Submit to the Environment Service evidence regarding the commitment of the aforementioned person to decontaminate the fluid, and also about the relevant permit that this person has, which must be issued by the country in which he operates.
  - Ensure that the person that will decontaminate the fluid will issue a valid Certificate confirming that this was done. The Certificate must be submitted to the Environment Service.

#### Decontamination of Transformers

The holder of a transformer that will be decontaminated in Cyprus by the removal of the fluid is obliged to:

- Notify the Environment Service, at least two working weeks prior to the removal of the fluid, so that an Inspector can be present during this process.
- Take a sample of the fluid contained in the transformer, perform an analysis in an accredited laboratory in order to detect the PCB content of the transformer and submit the results to the Environment Service.
- Obtain the services of a person to whom the fluid will be shipped for decontamination/destruction.
- Submit to the Environment Service evidence regarding the commitment of the aforementioned person to decontaminate the fluid, and also about the relevant permit that this person has, which must be issued by the country in which he operates.
- Obtain all necessary permits required by the relevant legislation for the shipment of the fluid for decontamination and make sure that this will be done within 3 weeks from the day the fluid is removed.
- Ensure that the person that will decontaminate the fluid will issue a valid Certificate confirming that this was done. The Certificate must be submitted to the Environment Service.

- Label the transformer according to the requirements of the Annex of P.I. 636/2002 in case that the transformer will continue to operate. In case that the transformer will be disposed of, this must take place according to the requirements of the Solid and Hazardous Waste Laws of 2002 and 2006.

### **Decontamination / destruction of capacitors which may contain between 0.05% and 0.005% by weight of PCBs**

Taking into account that it is not practicable to examine whether the capacitors contain PCBs without destroying them, **Table B (Annex II)** lists the capacitors suspected that may contain PCBs. The holders of those capacitors can keep them until the end of their useful lives. By the end of the useful life of any capacitor and three months before its withdrawal, the holder is obliged to inform the Environment Service about his intention to do so. Subsequently he is obliged to:

- Notify the Environment Service in order to make arrangements for an Inspector to be present during the disassembly process.
- Take a sample of the fluid contained in the capacitor, perform an analysis in an accredited laboratory in order to detect the PCB content of the capacitor and submit the results to the Environment Service.
- Obtain all necessary permits required by the relevant legislation for the shipment of the capacitor and make sure that this will be done within 3 weeks from the day is disassembled.
- Obtain the services of a person to whom the capacitor will be shipped for decontamination/destruction.
- Submit to the Environment Service evidence regarding the commitment of the aforementioned person to decontaminate the capacitor, and also about the relevant permit that this person has, which must be issued by the country in which he operates.
- Ensure that the person that will decontaminate the fluid will issue a valid Certificate confirming that this was done. The Certificate must be submitted to the Environment Service.

### **Destruction of PCBs**

The destruction of PCBs should take place in a licensed facility in a European Union Member State. The process of the shipment of PCBs to the facilities for destruction falls under the scope of the Management of Solid and Hazardous Waste Laws of 2002 and 2006.

The facilities that have the capacity to destroy either PCBs or equipment containing PCBs are included in a list prepared by the United Nations (Inventory of world-wide PCB Destruction Capacity) and can be found at the website of the Environment Service:

[www.chem.unep.ch/pops/](http://www.chem.unep.ch/pops/)

### **3.3.3. Action Plan for the Reduction of Emissions of Persistent Organic Pollutants from unintentional production**

The POPs which are listed in Appendix C of the Stockholm Convention are released to the environment from various industrial installations, from non-industrial sources and also from open burning of waste. The Action Plan includes the necessary actions as well as the time schedule for its implementation in order to eliminate the releases of POPs to the environment.

The Action Plan for the reduction of emissions of Persistent Organic Pollutants listed in Annex C of the Convention (i.e. the pollutants emitted from unintentional production), was prepared by the DLI after taking into consideration relevant information from all governmental departments involved and includes the following:

#### **Releases of Persistent Organic Pollutants from Industrial Installations**

##### Atmospheric Emissions

Emissions to the atmosphere from industrial installations are regulated by the Control of Atmospheric Pollution Law of 2002, (Law 187(I)/2002) and the Integrated Pollution Prevention and Control Laws of 2003 and 2006, (Law 56(I)/2003 and Law 15(I)/2006) and the Regulations that were issued according to the provisions of Law 187(I)/2002.

A basic requirement of these Laws is the obligation of the operator of an installation to apply for an Emission Permit. The operating conditions and emission limits prescribed in the permits are based on BAT. Although similar laws were enforced since 1991, an essential requirement for issuing the Permit since 2002 is the application of the Best Available Techniques. In case the installation cannot apply the Best Available Techniques the application for a Permit is rejected and the installation is required to suspend its operations.

Such examples were the incinerators of clinical waste of the General Hospitals in Nicosia, Limassol, Larnaca, Pafos and Kyperounta that terminated their operation on 31.03.2003 since they could not comply with the new operating conditions. Since this date the clinical wastes are sterilized and then disposed of either in sanitary landfills or co-incinerated in a cement factory. As a result of the conditions under which the kilns of the cement factory operate, the emissions of dioxins/furans are very low.

All major industrial sources that emit POPs have been granted permits. The operating conditions that were prescribed in the permits are those that are included in the relevant EU Directives. Compliance with the operating conditions and the emission limits which are included in the relevant permits is ensured through inspections and measurements of the concentration of emissions and also through the obligation of the plant operator for self monitoring.

##### Liquid/Solid Wastes

The disposal of wastes is regulated by the Water and Land Pollution Control Law of 2002, (Law 106(I)/2002) and the Management of Solid and Hazardous Wastes Law of 2002 (Law 215(I)/2002).

As mentioned in section 2.3.4. the only stockpiles of POPs in Cyprus are the traces of PCBs in the recorded transformers and condensers. Any wastes identified in the future that contain POPs will be either stored in appropriate sites for transportation and treatment in the facility for the management of hazardous waste that is currently under study and is expected to start operation in 2010 or will be exported from Cyprus for treatment abroad taking into account international Conventions, rules, standards and guidance documents.

## **Emissions of Persistent Organic Pollutants from Non-Industrial Sources – Open burning of Waste**

### Burning of Domestic Waste in Landfills

In Cyprus domestic waste is disposed of in open landfills, where very often it is ignited and as result POPs are released to the environment. The aim of the Government is to create sites for the collection and separation of domestic waste for recycling purposes. Wastes that cannot be recycled (mainly organic waste) will be disposed of in sanitary landfills. In Cyprus the first Sanitary Landfill of Waste in Pafos operates since 2005. The competent authority for this issue is the Ministry of the Interior.

By 2010 all the sanitary landfills that are currently under design or construction are expected to operate. The existing open landfills will be closed and the sites will be reclaimed. As a result it is expected that from 2010 onwards there will be no or very limited releases of POPs due to open burning of wastes in landfills.

### Burning of Agricultural Waste

Until 2002 the practice in Cyprus for the disposal of various types of agricultural wastes was the open burning and as a result various pollutants including POPs were released to the environment. The situation has changed since 2002 as a result of the amendment of the Prevention of Fires in the Countryside Laws 1988 until 2001. According to the Prevention of Fires in the Countryside (Amendment) Law of 2002 (Law 109(I)/2002) lighting a fire in any place in the countryside is prohibited. Lighting of fires is permitted only during the months of December and January for the burning of waste branches of vine trees and other fruit producing trees after obtaining a relevant permit from the local authority. Permits are also issued for the burning of trees or plants that have been infected by a disease. The burning of wheat stalk residues in the fields after harvesting is not permitted any more and there are continuous efforts to raise awareness among the farmers about this prohibition.

### Burning of Animal Carcasses

Until recently the practice for disposing of dead animals from various animal farms was the burial, uncontrolled disposal in remote locations and even the burning on site using waste car tires as fuel. The practice of burning dead animals resulted in the release of POPs.

Since the beginning of 2007 dead animals are disposed of by the method of incineration at a central incinerator which incorporates the BAT and therefore it is

expected that the emissions of Persistent Organic Pollutants from the incineration of animal carcasses will be significantly reduced.

#### Burning of Waste in Inhabited Areas

The burning of waste (branches of trees after pruning, weeds etc) in inhabited areas as well as the burning of waste in construction sites (paper and plastic bags, wood etc) is common practice.

However, research carried out in other countries showed that the burning of such wastes causes significant emissions of POPs.

After a relevant search in Cyprus it has been found that the Municipalities do not have appropriate legislation to regulate the above processes. The Union of Municipalities, intends to modify the "Municipalities Law" in order to regulate the open burning of waste in inhabited areas.

It is estimated that up to two years are needed for the preparation, approval and implementation of the new Law. As a result it is expected that the emissions of persistent organic pollutants from the burning of domestic waste will be reduced after 2010.

#### Burning of Biomass in Domestic Boilers

Domestic heating in Cyprus was initially achieved by burning wood in fireplaces (mainly in mountainous regions) and by the burning of liquefied natural gas and kerosene in small heaters. Subsequently, central heating systems that operate on diesel began to be used on a large scale.

Recently, it was observed that there is a tendency to burn biomass and especially olive seeds as well as wood in domestic boilers for heating purposes. The use of these fuels results in the emission of persistent organic pollutants as well as particulates, especially when combustion is incomplete, as is usually the case with small capacity boilers.

In order to prevent the increase of consumption of wood and other biomass that is used for the purpose of domestic heating through small and inefficient boilers which will result in the increase of the emissions of the pollutants listed in Appendix C of the Convention, the DLI recently started a campaign which aims at informing the various Governmental and non-governmental organisations involved about this subject. A series of events is scheduled which aim at raising public awareness about this issue.

The aim is not to prohibit the use of biomass but to promote its use in suitable boilers of high efficiency and low emissions.

#### **3.3.4. Prevention of the production and use of new chemicals exhibiting characteristics of POPs**

New industrial installations before their initial start up operation have to obtain all relevant permits from various Governmental Departments. Existing installations are

also controlled and permitted. In case it is found out that any product currently produced or intended to be produced exhibits characteristics of Persistent Organic Pollutants, measures can be taken according to Law N. 42(III)/2004 by which the Stockholm Convention was ratified.

### **3.3.5. Assessing and controlling chemicals in use**

Chemical substances in use are controlled through the implementation of the Dangerous Substances Regulations of 2002.

### **3.3.6. Country specific exemptions**

Cyprus has not applied for or secured any exemptions according to article 3(6) of the Stockholm Convention.

### **3.3.7. Identification and environmentally sound management of stockpiles, articles in use and wastes**

As mentioned in section 2.3.4 in Cyprus there are no stockpiles of chemical substances listed in Annexes A and B of the Convention. There are only certain condensers and transformers that may contain PCBs. These have been recorded and are listed in Tables A and B of Annex II. The issue of waste is discussed in section 2.3.5.

## **3.4. Institutional and Regulatory Strengthening Measures**

During the period of the preparation of the National Plan it was evident that the main areas that need strengthening for its effective implementation are:

### **Research**

In Cyprus there are no research centers conducting research on the emission mechanism of various pollutants and their emission rates so as to have immediate access to information needed to estimate emissions. For this reason Cyprus, for the time being, obtains the relevant information from the results of research carried out in other countries. However, the aim is to carry out research on the identification of all POPs emission sources and levels. It is also intended to carry out research about the levels of POPs in the various environmental receptors in Cyprus.

### **Human resources**

Although Governmental Departments employ highly competent personnel, they require further strengthening due to the recently increased international obligations of the Republic. The Government, acknowledging this problem, has recently decided to strengthen the various Departments by creating new posts.

## **Legislation**

During the preparation of the National Implementation Plan it was found that there is no relevant legislation for regulating the open burning of waste in residential areas. The existing legislation will be amended by the Union of Municipalities.

### **3.5. Priorities**

The priorities to meet Convention obligations are:

#### **Emission Factors**

The use of suitable emission factors, particularly for HCB, is a necessary condition for the preparation of the inventories so as to verify and confirm the measures that have to be taken in order to eliminate the emissions of pollutants listed in Annex C of the Convention.

#### **Elimination of open burning of waste**

Open burning of waste especially in open landfills will be eliminated after the construction and operation of suitable sanitary landfills according to the provisions of the relevant EU Directive. The construction of these new landfills is a priority for the country.

As far as the issue of burning of waste in inhabited areas is concerned, every possible effort will be made to accelerate the procedures mentioned above to amend the relevant legislation so as to regulate this matter.

Until the completion of the above work for the construction of sanitary landfills, the effort to raise public awareness about the impact on the environment and human health from the emissions of POPs will continue in various ways. The aim is to make the public aware and sensitive about these issues so as to gradually eliminate the practice of open burning.

#### **Central Waste Management Facility**

This is considered to be a high priority issue. Every effort is being made in order to accelerate procedures to create a central facility for the collection, treatment and disposal of dangerous waste.

### **3.6. Timetable for Plan Implementation and Measures of Success**

#### **Permitting of industrial installations**

The permitting of industrial installations and in particular the big installations started and is expected to be completed by October 2007. These installations are permitted provided they apply the Best Available Techniques.

### **Construction of Sanitary Landfills**

One sanitary landfill that meets the provisions of the relevant EU Directive has been constructed and it is now in operation. According to the plans of the Ministry of the Interior three other new sanitary landfills are expected to be constructed by 2010. When these operate, the existing landfills will stop operating and their sites will be reclaimed. Therefore it is expected that the open burning of waste in open landfills will be terminated. For the control of the effectiveness of this measure inspections are carried out in order to verify that open burning of waste is eliminated.

### **Implementation of the legislation concerning agricultural waste**

The open burning of agricultural waste has been prohibited as explained in section 3.3.3.

### **Construction of a Central Waste Management Facility**

The construction of this facility is the subject of a detailed study which is being carried out and the aim is to construct it by the end of 2010. It is estimated that this cost will reach 30 million Euro.

## **3.7. Resource Requirements**

The cost for the implementation of the measures taken or needed to eliminate emissions of Persistent Organic Pollutants is difficult to be estimated since the measures are not taken exclusively for the implementation of the Stockholm Convention but also to comply with other international and local obligations.

However, the cost for the construction of the four sanitary landfills referred to above is estimated at about 200 million Euro and the cost for reclaiming the existing landfills is about 50 million Euro.

The cost for implementing measures to reduce industrial emissions is not expected to be high because all affected industrial installations have already taken the necessary measures.

The cost for the installation of the animal carcass incinerator is about 3,5 million Euro and the cost for the construction of the Central Waste Management Facility is estimated at about 30 million Euro.

Other regulatory measures have relatively low cost.

## ANNEX I

### MONITORING OF WATER AND FOOD CARRIED OUT BY THE STATE GENERAL LABORATORY

#### A. Monitoring of Surface Waters for POPs

Within the framework of the monitoring of the surface waters in Cyprus according to Law 113(I)/2004 (which harmonizes the Cyprus Legislation with European Union Directive 2000/60/EE), samples of water are analysed for the presence of various organic pollutants including POPs.

These samples are monitored for the 32 parameters shown in **Table 1** which include 8 of the 12 POPs (Aldrin, Chlordane, Heptachlor, DDT, Hexachlorobenzene, Dieldrin, Endrin, PCBs).

**Table 1:** Organochlorinated pesticides and (PCBs) that are monitored in water

Organochlorinated pesticides		PCB	
1	Hexachlorobenzene	1	PCB 1
2	$\alpha$ -BHC	2	PCB 11
3	Lindane	3	PCB 28
4	b-BHC	4	PCB 29
5	Heptachlor	5	PCB 52
6	Aldrin	6	PCB 47
7	Hept-epox	7	PCB 121
8	$\alpha$ - Endosulfan	8	PCB 101
9	pp DDE	9	PCB 136
10	Dieldrin	10	PCB 118
11	op DDD	11	PCB 153
12	Endrin	12	PCB 138
13	op DDT	13	PCB 185
14	pp DDD	14	PCB 180
15	b- Endosulfan	15	PCB 194
16	pp DDT	16	PCB 206

From the 124 samples of surface waters that were analysed during the period 2003 until 2005, the persistent organic pollutants which were detected in dams and

rivers and their concentrations are shown in **Tables 2 and 3** respectively. The maximum concentrations were detected in the Polemidia dam and the river Garillis which flows into this dam.

**Table 2. Concentration of POPs in µg/L in the dams**

PCB 28	0,019
PCB 47	0,013
PCB 54	0,025
PCB 52	0,01
Heptachlor	0,021
Hexachlorobenzene	0,001
ppDDT	0,002
<b>Polemidia Dam</b>	
PCB1	0,249
PCB52	0,006
PCB11	0,084

**Table 3. Concentration of POPs in µg/L in rivers**

PCB 52	0,019
PCB 28	0,008
PCB 29	0,014
Heptachlor	0,021
Hexachlorobenzene	0,007
Aldrin	0,002
<b>River Garillis</b>	
PCB1	0,038
PCB52	0,004

## **B. Monitoring of food for organochlorinated pesticides and PCBs**

The food from vegetable sources, among other pesticides is systematically monitored for ppDDE and Lindane. For the year 2005, 171 samples have been analysed for ppDDE and Lindane and 215 samples were analysed in 2006. Lindane was not detected in any sample and the percentage of samples annually in which

ppDDE was detected does not exceed 2,5%. The concentrations detected were within the acceptable limits.

The food of animal origin is mainly monitored for the fifteen organic pollutants: a- HCH, b- HCH, Lindane, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, Aldrin, Dieldrin, Endrin, opDDE, ppDDE, opDDD, ppDDD, opDDT, ppDDT and for PCBs 28, 52, 101, 118, 153, 138, 180, 29, 47, 121, 136, 185, 194, 206, 209.

The laboratory for the monitoring of pesticides and PCBs participated in the following programmes for monitoring samples of animal origin:

- Programme for monitoring samples of animal origin, mainly fresh milk, as specified by the Veterinary Services. The milk is analysed for the above pollutants and PCBs as well as for other pesticides. During the years 2005 - 2006 20 samples of milk were analysed out of which only 2 were positive as for ppDDE in concentrations less than 0,002 mg/kg which is the limit of quantification.
- Medpol Programme for the investigation of the pollution of the Mediterranean in connection with the Department of Fisheries and Marine Research. For the purposes of this programme, samples of the fish *Mullus Barbatulus* are analysed. The samples of fish are analysed for the above pollutants and PCBs and also for Arochlors 1254 and 1260. The samples are usually positive for ppDDE in concentrations less than 100 ng/g. Traces of PCBs were found and these vary between the detection limit and the limit of quantification.

The results of the analyses for the years 2005-2006 are shown below in **Table 4**.

**Table 4: Monitoring programme for Organochlorines and PCBs in fish samples 2005-2006**

No.	Description of sample	Location	Results of analysis (ng/g) on dry basis	LOQ for detected compounds (ng/g)
9691/05	Mullus Barbatus	Larnaca/Kavo Kiti	ppDDE=13	5
9692/05	Mullus Barbatus	Larnaca/Kavo Kiti	ppDDE=10	5
9693/05	Mullus Barbatus	Larnaca/Kavo Kiti	ppDDE=17	5
9694/05	Mullus Barbatus	Larnaca/Kavo Kiti	ppDDE=14	5
9695/05	Mullus Barbatus	Larnaca/Kavo Kiti	ppDDE=13	5
9696/05	Mullus Barbatus	Limassol / Moni	ppDDE=34	5
9697/05	Mullus Barbatus	Limassol / Moni	ppDDE=49	5
9698/05	Mullus Barbatus	Limassol / Moni	ppDDE=8,2	5
9699/05	Mullus Barbatus	Limassol / Moni	ppDDE=13	5
9700/05	Mullus Barbatus	Limassol / Moni	ppDDE=22	5
9701/05	Mullus Barbatus	Paphos / Moulia	ppDDE=17	5
9702/05	Mullus Barbatus	Paphos / Moulia	ppDDE=18	5
3975/06	Mullus Barbatus	Larnaca / Phanari	ppDDE=14,3	10
3976/06	Mullus Barbatus	Larnaca / Phanari	ppDDE=28,7	10
3977/06	Mullus Barbatus	Larnaca / Phanari	ppDDE=62,4	10
3978/06	Mullus Barbatus	Larnaca / Phanari	ppDDE=67,0	10
			PCB 101=27,9	20
			10 < PCB 138 < 20	20
3979/06	Mullus Barbatus	Larnaca / Phanari	ppDDE=36,7	10
3980/06	Mullus Barbatus	Larnaca / Phanari	5 < ppDDE < 10	10
3981/06	Mullus Barbatus	Limassol/ Sheraton	5 < ppDDE < 10	10
3982/06	Mullus Barbatus	Limassol / Sheraton	5 < ppDDE < 10	10
3983/06	Mullus Barbatus	Limassol / Sheraton	ppDDE=19,7	10
			10 < PCB 101 < 20	20
3984/06	Mullus Barbatus	Limassol / Sheraton	5 < ppDDE < 10	10
			10 < PCB 180 < 20	20
3985/06	Mullus Barbatus	Limassol/ Sheraton	5 < ppDDE < 10	10
3986/06	Mullus Barbatus	Limassol/ Sheraton	5 < ppDDE < 10	10
3987/06	Mullus Barbatus	Paphos / Airport	ppDDE=32,8	10
			10 < PCB 101 < 20	20
3988/06	Mullus Barbatus	Paphos / Airport	ppDDE=39,9	10
			10 < PCB 101 < 20	20
3989/06	Mullus Barbatus	Paphos / Airport	ppDDE=35,5	10
3990/06	Mullus Barbatus	Paphos / Airport	ppDDE=25,7	10
3991/06	Mullus Barbatus	Paphos / Airport	ppDDE=31,7	10
3992/06	Mullus Barbatus	Paphos / Airport	ppDDE=52,0	10
			10 < PCB 101 < 20	20

\* The samples have been analysed for  $\alpha$ -HCH,  $\beta$ -HCH, Lindane, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, Aldrin, Dieldrin, Endrin, opDDE, ppDDE, opDDD, ppDDD, opDDT, ppDDT, PCBs 28, 52, 101, 118, 153, 138, 180 and Arochlor 1254 & 1260.

## ANNEX II

**TABLE A: Transformers that may contain PCBs**

Holder	Producer	Number	Possible Concentration PCBs (ppm)
Cyprus Telecommunication Authority	OCREV	52310	605
Carlsberg Breweries	ELETRATOR		439
Cyprus Broadcasting Corporation	OCREV	60750	54
Cyprus Broadcasting Corporation	OCREV	60749	51
Cyprus Cement Co Ltd	TRAFO UNION	K219846	248
Cyprus Cement Co Ltd	TRAFO UNION	K219848	217
Cyprus Cement Co Ltd	CEM-CIE ELECTRO- MECANIQUE	FH25785	89
Cyprus Cement Co Ltd	CEM-CIE ELECTRO- MECHANIQUE	FH25786	81
Cyprus Petroleum Refinery Ltd	BRUSH	76660	58
Cyprus Port Authority (Limassol Port )	WODEN	107462/2	114
Cyprus State Fair Authority	BONAR&LONG CO. LTD.	02/74/3262	96
Cyprus Telecommunication Authority	OCREV	52308	378
Cyprus Telecommunication Authority	MACE	8112	74
Cyprus Telecommunication Authority	MACE	8109	70
Cyprus Telecommunication Authority	MACE	8106	61
Cyprus Telecommunication Authority	MACE	8104	57
Cyprus Telecommunication Authority	MACE	81108	52
Cyprus Telecommunication Authority	MACE	8102	50
Hellenic Chemical Industries	ELTA	173583	103
Hellenic Chemical Industries	(-----) U.S.S.R.	220052	80
Hellenic Copper Mines Ltd	G.E.C.	266206	129
Hellenic Copper Mines Ltd	G.E.C.*	266208	97
Hellenic Copper Mines Ltd	STATTER & CO.	53/2696/B	92
Hellenic Copper Mines Ltd	PARSONS	88549	62
Hellenic Mining Co Ltd	G.E.C.	266207	100
Larnaca Airport	BONAR LONG	02/74/3276	83
Larnaca Airport	WODEN BILSTON	H121269/1	58
Paralimni Hospital	MEDICOR	065-26	126
Vasiliko Cement Works Ltd	SIEMENS	T305266	285
Vasiliko Cement Works Ltd	SIEMENS	484352	120
Vasiliko Cement Works Ltd	HELMKE	772820	104
Vasiliko Cement Works Ltd	TRAFO UNION	403090	101
Vasiliko Cement Works Ltd	HELMKE	-----	73
Vasiliko Cement Works Ltd	GEC ENGLAND	999408	73
Vasiliko Cement Works Ltd	BRUSH	54213/2	64
Vasiliko Cement Works Ltd	SIEMENS	-----	58
Vasiliko Cement Works Ltd	SIEMENS	TM228509	58
Vasiliko Cement Works Ltd	SIEMENS	TM228511	51

**TABLE B: Condensers that may contain PCBs**

<b>Holder</b>	<b>Producer</b>	<b>Number</b>
British East Mediterranean Relay Station	BICC	X6731/54
British East Mediterranean Relay Station	BICC	X6731/56
British East Mediterranean Relay Station	BICC	CX8004 A/11
British East Mediterranean Relay Station	BICC	X6731/24
British East Mediterranean Relay Station	BICC	X6731/29
British East Mediterranean Relay Station	BICC	X6731/22
British East Mediterranean Relay Station	BICC	X6731/33
British East Mediterranean Relay Station	BICC	X6731/56
British East Mediterranean Relay Station	BICC	CX8004 A/1
CARLSBERG Breweries Cyprus	Johnson & Phillips Ltd	A5788/A3
CARLSBERG Breweries Cyprus	Johnson & Phillips Ltd	A5788/A4
CARLSBERG Breweries Cyprus	Johnson & Phillips Ltd	A5788/A1
CARLSBERG Breweries Cyprus	Johnson & Phillips Ltd	A12331/A1//01
CARLSBERG Breweries Cyprus	Johnson & Phillips Ltd	A5788/A2
Water Development Department	ELIN UNION	1640429
Vasiliko Cement Works	ASEA	236-46
Vasiliko Cement Works	HUNTS	Z2/6113/C4
Vasiliko Cement Works	HUNTS	Z2/6113/C5
Vasiliko Cement Works	HUNTS	Z2/6113A2
Vasiliko Cement Works	HUNTS	Z2/6113/A1
Vasiliko Cement Works	SIEMENS	D653614/24
Vasiliko Cement Works	SIEMENS	D653613/27
Vasiliko Cement Works	SIEMENS	70641461/1
Vasiliko Cement Works	SIEMENS	E193685
Vasiliko Cement Works	SIEMENS	E254567
Vasiliko Cement Works	SIEMENS	
Vasiliko Cement Works	SIEMENS	E254564
Vasiliko Cement Works	SIEMENS	544358

## ANNEX III

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### List of abbreviations used

BAT:	Best Available Techniques
BREF:	Best Available Technique Reference Documents
DDT:	1,1,1 trichloro-2,2 bi (4-chlorophenyl) ethane
DLI:	Department of Labour Inspection (Ministry of Labour and Social Insurance)
EU:	European Union
HCB:	Hexachlorobenzene
NIP:	National Implementation Plan
PCBs:	Polychlorinated Biphenyls
PCTs:	Polychlorinated Triphenyls
POPs:	Persistent Organic Pollutants
WHO:	World Health Organisation