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**MEDITERRANEAN ACTION PLAN**

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# STRATEGIC ACTION PROGRAMME

## REGIONAL INVENTORY

## QUANTITIES AND USES OF PESTICIDES AND PCBs FOR THE MEDITERRANEAN REGION

In cooperation with

GEF

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## Introduction

The Strategic Action Programme (SAP) was elaborated and adopted to facilitate the implementation by the Contracting Parties to the Barcelona Convention of the LBS Protocol. Therefore it is designed to assist Parties in taking actions individually or jointly within their respective policies, priorities and resources which will lead to the prevention, reduction, control and/or elimination of the degradation of the marine environment.

The issue of POPs, namely, nine chlorinated pesticides and PCBs and other POPs is addressed in the Strategic Action Programme under the substances that are toxic, persistent and liable to bioaccumulate. The SAP targets are:

- "By the year 2010 to phase out inputs of 9 pesticides and PCBs and reduce to the fullest possible extent inputs of unwanted contaminants;
- By the year 2005, to reduce 50 per cent of the inputs of the priority 12 POPs;
- By the year 2005, to collect and dispose of all PCB waste in a safe and environmentally-sound manner."

These targets would be reached through a set of regional and national activities on the basis of a regional strategy for the management of POPs and a national strategy and plan for the management of POPs, both elaborated on the basis of environmentally-sound management processes.

In this perspective,over a period of two years the Mediterranean countries will make an inventory of quantities and uses of the nine pesticides and PCBs, as well as of the industries that manufacture or condition them.

The present document outlines the major courses of accumulation of pesticides in the Mediterranean region and provides general comments regarding the uses of these chemical substances.

The document constitutes a milestone that would enable the Mediterranean countries to prepare their inventories. It includes an inventory of PCBs and nine pesticides based on the available information and international programmes such as UNEP, UNEP-chemicals, UNEP/MAP, FAO and others.

## Methodology for POPs inventory

POPs could be classified into 3 types:

- Chemicals used in pesticide formulation;
- Chemicals (PCB/PCT) used in closed systems as isolators (transformers, capacitators) and as hydraulic fluid;
- Chemicals produced unintentionnally (dioxins) during the thermal degradation of organic halogenated compounds (bromine and chlorine).

The methodology considers the life cycle of the chemicals during their uses in an industrial process or as obsolete chemicals.

Obsolete POPs exist frequently as stocks in customs, farms, pesticide dealers, old industrial sites.

POPs are also found mixed with different types of products such as:

- Luboil contaminated with PCB (>50 ppm);
- Luboil used in concrete modulation contaminated with PCBs (>50 ppm);
- Contaminated soils;
- Contaminated packaging materials.

The information used to compile inventories for POPs are from two sources:

- The inventories of national stocks. The FAO database is considered to be the most comprehensive source of information for stocks;
- The atmospheric emissions of POPs which are considered as a relevant geographical indicator of sources.

These two sources have been explored to set up the present POPs inventory in the Mediterranean countries. The information includes:

- List of consent of each country regarding the PIC Convention;
- List of obsolete chemicals;
- Status of ratification of relevant conventions and protocols;
- Indicators of atmospheric pollution for Polychlorinated biphenyls (PCB) Benzo[a]pyrene (BaP) Hexaclorobenzene (HCB) Polychlorinated dibenzo[p]dioxines and furans (PCDD/Fs) g-Hexachlorocyclohexane (g-HCH).

A number of statements could be drawn from these inventories :

- For many Mediterranean countries, no detailed information exists on the releases of PCBs and nine pesticides from point sources (industry and urban centres).This could be the result of the lack of monitoring programmes.

- Due to the fact that most of the compounds concerned have been banned in the majority of the countries of the region, the main sources will consist of stockpiles and inventories due to former production and/or import and, more importantly, the compounds present in the main environmental vectors and reservoirs due to previous chronicle usage and in accidental spills. The contribution by industrial production will only be important in those cases where some restricted usage of the PTS is allowed (i.e. DDT as precursor of Dicofol).

- The nine pesticides have been widely used in the region, but the production and usage of most of the compounds are banned in the majority of the countries of the region as a consequence of the application of the PIC protocols. The exceptions being DDT, which is consented as precursor in the production of Dicofol, and also for restricted pest control in some countries of the region.

- There is limited information about production and uses for most substances. Some exceptions are the Drin group of compounds (aldrin, dieldrin), where some restricted uses are allowed in the EU countries, and endrin, which is not subject to the PIC procedure. Endrin is allowed for very limited applications in the EU countries of the region and is banned in Algeria, Cyprus, Israel and Greece. Heptachlor, chlordane and toxaphene are also banned or severely restricted in the region and the same applies to HCB when used as a pesticide. Mirex is not affected by the PIC procedure, although many countries have banned its use.

- DDT is the only organochloride pesticide that is still currently in production and use in the region. In some Mediterranean countries, both in the north and south, some specific uses are still in practice.

- The valuable information drawn from the inventories that most of the nine pesticides remain in stockpiles of pesticides in some of the countries of the region .

- PCB containing equipment has been largely used in the region.

- The first regulation on PCBs applied by the EEC was in 1976, when their use was restricted to closed circuits; the second one, in 1985, when the use of PCB as a raw material or chemical intermediate was banned. Finally, in 1987, PCB was totally banned for use in new closed circuits.

- PCB is part of the PIC procedure followed by most countries in the region. Countries are therefore committed to monitoring and controlling trade in very dangerous substances and, according to the Convention, export of a chemical can only take place with the prior informed consent of the importing party. The Convention covers a list of five industrial chemicals and 22 pesticides, including aldrin, chlordane, DDT, dieldrin, heptachlor, HCB and PCBs and can, therefore, be seen as a very useful and complementary instrument to the Stockholm Convention.

- In spite of the legislation in force, there are still large amounts of PCB in use. This is because in many countries there are exemptions for restricted uses in devices in use for a long period. Moreover, there are stockpiled amounts waiting to be eliminated.

- There is general agreement that the disposal of equipment with PCB containing oils is the main source of PCBs in the region. PCB production and use has been linked to economic development before the use of the substance was banned. Hence, the main stockpiles of PCB equipment will reside in the northern parts of the region, where appropriate management of the PCB wastes has not been fully implemented.

- The non-European countries of the Mediterranean region have their share of PCB stocks due to the import of PCB containing equipment without the appropriate environmental infrastructure to manage its disposal.

- There is no uniform information regarding the statistics on actual uses and stocks of PCB’s for the countries of the region.

According to the FAO investigation, the causes of accumulation of unwanted stocks of chlorinated pesticides are the following:

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| • product bans; |
| • inadequate storage and poor stock management; |
| • unsuitable products or packaging; |
| • donation or purchase in excess of requirements; |
| • lack of coordination between donor agencies; |
| • commercial interests of private sector and hidden factors. |

**Banning of products**

In many countries, where a range of products has been banned or withdrawn for health or environmental reasons, the fate of existing stocks is given scant consideration. Stocks remain where they are stored and eventually deteriorate. This applies particularly to organochlorine compounds that are part of strategic stocks for locust control. A common example is the occurrence of dieldrin stocks in many African countries where migratory locusts cause problems. Dieldrin was banned from use in donor-supported locust control programmes in the late 1970s, but no provision was made for the depletion or removal of existing stocks. These have been stored since then, awaiting an appropriate solution. In some cases the pesticides have leaked from damaged containers and elsewhere they have been used illegally.

**Inadequate storage and poor stock management**

**Insufficient storage capacity for pesticides.** The authorities responsible for pesticide stocks often do not have sufficient storage capacity to store all their pesticides safely. Many stores are poorly constructed, have insufficient ventilation, are too hot and/or do not have concrete floors.

Because of space constraints, pesticides are often not properly stacked, thereby reducing access to products and making it difficult to monitor the condition of containers. In many places, pesticides are stored in the open for prolonged periods. Poor storage conditions accelerate the degradation of pesticides and their containers. New products are sometimes stored inappropriately because obsolete products are occupying the limited storage space.

**Inappropriate storage conditions.** Some pesticides require specific storage conditions because of their physical-chemical properties. For example, solid formulations should be separated from liquids; corrosive agents should be kept away from metal containers; and oxidizing agents should be stored separately from flammable and combustible products. Advice and information on these matters are available from product labels, material safety data sheets (MSDS) and published guidelines. However, rural storekeepers in developing countries rarely, if ever, have access to such material and are unlikely to be trained in its interpretation. It is unlikely that existing storage facilities will allow such requirements to be accommodated. It is therefore common to find products inappropriately stored. This adds to the risk of damage to products and containers and acceleration of product deterioration.

**Staff not trained in stock management.** Storekeepers of major stores and those responsible for national stocks are often unfamiliar with the rules of good stock management (proper stacking, product segregation, principle of "first in - first out", etc.). Leakage and spills may not be cleaned up immediately because staff have not been trained in how to handle them, or because the necessary materials and protective equipment are unavailable.

Contamination and improper stacking may affect the condition of other products and may impede the application of good stock management. Stock records may not be regularly updated and communicated to the central authority responsible for establishing the country's pesticide requirements, which in turn leads to over- or underordering of pesticides in subsequent seasons.

**Poor distribution systems.** Delays in processing imported pesticides and poor stock management at the first point of storage and distribution in a country can result in long delays before products reach their point of use. In many cases, products only reach their final destination shortly before or even after their date of expiry. Storekeepers and plant protection officers in remote areas may not be aware of this issue because of a lack of training or absence of information on product labels. Even where officials are aware of product expiry

they are reluctant to turn away scarce and expensive supplies since no alternatives are available.

**Inappropriate handling during transport**. Drums and other packaging materials are often damaged through rough handling or in transport. When drums are battered, their inner and outer coatings may be damaged, which will accelerate corrosion and shorten their life. Unnecessarily long periods of exposure to direct sun during transit are another important factor that affects both the container and its contents.

**Unavailability of analytical facilities.** Because laboratory facilities for pesticide quality control are not available in most developing countries, it may be difficult to determine whether a pesticide can still be used after its indicated shelf-life has expired. Inadequate labelling and the absence of a date of manufacture/release on labels or on the container may complicate the matter. For this reason, there is often an understandable tendency to deviate from the principle of "first in - first out" and to use a newer product to be certain of its effectiveness; however, this practice leads to prolonged storage of older products.

**Unsuitable products and packaging**

Products that have been donated or procured are sometimes unsuitable for their intended use and will therefore remain in store and deteriorate. It should be noted that all the causes of obsolescence covered under this heading are addressed in the International Code of Conduct on the Distribution and Use of Pesticides (amended version) of 1990. Governments, procuring agencies and industry should be following this Code of Conduct, yet the evidence indicates that this is not so in many countries.

**Inappropriate active ingredient or formulation**. Examples of cases where products have been considered unsuitable include the following:

- The active ingredient of a product was not evaluated in the recipient country and field trials were required before it could be approved for use. This took time and the product started to deteriorate;
- The product was not effective against the target pest or against the weed it was supposed to destroy, or it had unacceptable side-effects (e.g. it appeared to have phytotoxic effects on the crop itself);
- The formulation was not stable under tropical conditions and the product rapidly degraded;
- The formulation could not be used with locally available application equipment (e.g. ultra-low volume [ULV] formulation for use by small-scale farmers who only have knapsack-sprayers).

**Impractical package size or poor container quality**. Bulk quantities of pesticides are commonly supplied in 200-litre metal drums of liquid formulations or 25-kg, or larger, sacks of powder. For countries without good repackaging facilities this may create problems if the pesticides are intended for use by plant protection staff, extension staff or small-scale farmers. In order to transfer the contents of large drums into smaller packages, large quantities of small empty containers, a pump, labels, etc. are needed. These are often not available, or are insufficient, at the repackaging location. Consequently, pesticides may remain unused, or improvised measures may be taken that are dangerous to handlers or users.

Pesticides are sometimes delivered in containers of poor durability that soon start to leak. Once drums have corroded or leak, they can no longer be transported, which makes it considerably more difficult to use their contents. The same applies to torn bags and other damaged packaging.

If the container quality is not specified in tender documents, bidders may be tempted to reduce their price by compromising on the quality of containers.

**Missing or incomplete labels**. In some cases, pesticides are not used because the end user does not know the specifications of the product, or how to apply it, since labels are missing or incomplete, are illegible (as a result of rain, sunlight, leakage) or are in a language alien to the user.

**Insufficient communication between aid agency and recipient country**. In some cases, the quantity, active ingredient, formulation or packaging of donated pesticides is inappropriate for the intended use. Such mistakes generally occur because of a lack of detailed specifications in requests for pesticide donations and/or a lack of background information and justification. Developing countries are not the only ones responsible for this communication gap. Aid agencies can also be guilty of failing to obtain such information before processing requests for pesticide donations. This failure can be due to: insufficient communication with officials who are well informed about the country's pesticide needs, failure to request detailed information on the quantity of pesticides needed, or failure to evaluate pesticide orders placed by recipient countries.

The Japanese "KR2" agricultural aid programme, in particular, has been criticized for providing excessive quantities of pesticides and pesticides that the recipients already have in store. In this case, problems of communication are partly to blame.

**Lack of product stewardship by donors and suppliers**. Release of pesticides from customs and their transportation to point of use can be extremely slow in developing countries. Donors and suppliers of pesticides do not always take responsibility for ensuring that donated pesticides, or pesticides bought with agricultural development funds, are dealt with properly and efficiently in the recipient country. This continues to be a problem in Ethiopia, where pesticides provided by the Japanese KR2 programme sometimes arrive at stores in remote locations after or very close to their expiry date, and new supplies have been ordered while the current disposal operation is taking place. Similarly, European Community (EC)-donated pesticides delivered to Rwanda in 1995 were poorly stored (despite being held within the EC compound in Kigali), and have as a result been seriously damaged and are now contaminating the environment.

**Fraudulent practices of unreliable suppliers**. It has been recorded that pesticides banned in one country have been supplied to another without the recipient country understanding that the products were obsolete before receipt. Elsewhere, in order to keep costs as low as possible, suppliers of pesticides have purchased substandard products to meet contract specifications that did not adequately define product quality standards. There are examples of consignments being left unused because an unreliable supplier adulterated the product to increase profits and it was no longer suitable for the intended purpose.

This kind of practice is inevitable in a market where money can be made. Only strict tendering procedures, tight specifications and stringent quality monitoring can prevent such practices. Unfortunately, donors do not always employ these practices strictly enough and developing countries do not have the resources to do so.

**Donations or purchases in excess of requirements**

**Inaccurate assessment of requirements**. An assessment of pesticide needs is generally based on approximate estimates of the area to be treated. Insufficient consideration is often given to the actual agro-ecological conditions (e.g. variations in intensity of pest outbreaks, economic thresholds) and to factors that may limit the use of pesticides, such as the local

application capacity (availability of spraying equipment, protective clothing and trained staff), storage facilities and the effectiveness of distribution systems. The ability of the envisaged users to pay for the product is another factor that is sometimes overlooked. In addition, there is a tendency to overestimate requirements in order to avoid shortages.

Centralized and up-to-date information on existing in-country stocks is sometimes not readily available or is incomplete, which complicates the assessment of additional requirements. In this case, the national authority responsible for the assessment of the country's yearly requirement of pesticides may not rely on these stocks and will keep them out of the equation when drawing up a list of products to be procured or requested from donors.

**Lower than expected pest incidence**. The extent of an expected pest outbreak is sometimes difficult to forecast. A lower pest incidence than expected may result in unused pesticide stocks. In the past, this was particularly true for outbreaks or invasions of migratory pests such as locusts. Countries that established large strategic pesticide stocks in preparation for possible upsurges or invasions often ended up with large quantities of unused products. Decentralizing such stocks further increased the risk.

The maintenance of strategic pesticide stocks in readiness for possible locust outbreaks is a strategy that continues in most countries affected by locusts. This strategy is endorsed by FAO and continues to be supported by some donors such as the EC and Japan. There appears to be a general lack of confidence in strategies that do not rely on strategic pesticide stocks. As a result, proposals including rapid mobilization of pesticides to deal with pest outbreaks and rotation of strategic stocks, have not been tried.

FAO also coordinates activities to monitor and control migratory pests and, in particular, desert locusts. In this context, monitoring efforts help to focus control efforts geographically and in time and thereby reduce the volumes of pesticides applied. Nevertheless, the foundation of locust control programmes is still based on chemical pesticides and affected countries continue to hold strategic pesticide stocks that have been, and continue to be, a major contributor to obsolete stockpiles. For example, Morocco currently has the largest stockpile of obsolete pesticides in Africa, which is almost entirely the result of strategic stocks of locust control pesticides. The Moroccan authorities and FAO defend continuation of this strategy despite the accumulation of obsolete stocks.

Other strategies have been proposed, including rapid mobilization of pesticides from producers, rotation of stocks, biological control agents and zero control. There has been little progress with any of these options other than recent FAO approval of the biological control agent Green Muscle, based on the fungal pathogen Metarhiziium anisopliae.

Overstocking of products with a short shelf-life. Most currently used pesticides have a two-year shelf-life. Tropical conditions characterized by excessive heat, high humidity and/or strong fluctuations in temperature may reduce this already short life span. During medium- or longer-term storage periods, these products degrade and become unusable. Overstocking of such products is a common cause of pesticides becoming obsolete.

**Excessive donations**. Aid agencies have sometimes provided pesticide donations far in excess of requirements. In several cases this has involved products manufactured in the home country of the aid agency or funding government (see the section on The cost of obsolete pesticide stocks, on p.10).

Under some agricultural input supply programmes lasting a number of years, the provision of pesticides is automatic until notice is given to stop. This system, which depends on feedback, does not always work effectively. In some cases, it has led to an accumulation of pesticides when demand dropped and supply was not adjusted.

Examples are known of unsolicited pesticide donations, where pesticides were offered to a developing country by a donor country having excessive or unwanted pesticides. Since developing countries may be concerned that refusing a gift could be considered undiplomatic, or may believe the gift to be useful, these donations were accepted but in some cases were never used and were simply added to obsolete pesticide stockpiles.

**Removal of subsidies**. Many countries are reducing or removing subsidies from pesticides. The rationale behind the adjustment of pricing policies is both technical and economic. Direct and indirect subsidies on pesticides are not desirable because they stimulate overuse and over-reliance on pesticides and frustrate the introduction of integrated pest management (IPM) or other sustainable production systems.

Moreover, structural adjustment programmes require the removal of subsidies from agricultural inputs so that market forces will determine the extent of pesticide use. This often causes a sudden drop in demand for pesticides because farmers can no longer afford them. As a result, stocks may remain in store longer than planned and are at increased risk of becoming obsolete.

**Inadequate coordination among and within aid agencies**

Poor coordination among aid agencies. Insufficient coordination among aid agencies providing pesticides, especially for locust and other migratory pest control operations, has been a major factor in causing excess donations of pesticides. Recipient governments do not usually have any guarantee that the required pesticides will be provided by the donor agency first contacted. In emergency situations, this may lead to simultaneous requests for assistance being made to several agencies, with the hope that at least one will react in time. In the end, the requested amount may be received from more than one donor. Given this undesirable situation, FAO is actively seeking to enhance donor coordination in emergency situations, at both the international level and the national level in recipient countries.

**Administrative procedures within aid agencies**. Slow processing of requests for pesticides in some cases has meant that the pesticides have arrived too late. Project or programme funds are often allocated for spending within a certain period. Consequently, timing for the procurement of pesticides is sometimes determined by budgetary factors, rather than by actual requirements. This means that recipient countries may be pressed to accept pesticide supplies on a "now or never" basis, which in many cases conflicts with the principle of providing pesticides only when they are actually needed.

Several aid agencies have not yet assigned responsibility for the appraisal and processing of requests for pesticides to a specific technical office within the agency. Instead, the country desk concerned processes such requests. There may be little coordination among country desks, or between country desks, technical departments and procurement departments. Without a specifically designated technical office to appraise requests for pesticides, it may be difficult to build up an institutional memory to avoid repetition of mistakes.

**Commercial interests and hidden factors**

Pesticide manufacturers, distributors and traders commonly find themselves in situations of conflicting interest. On the one hand they seek to promote and sell their own pesticides, and on the other are asked for advice on pest control strategies. This frequently occurs where extension services are under-resourced and overstretched and farmers are desperate for advice. The information given by pesticide companies is free, while crop consultants and agronomists charge for their advice.

Agrochemical companies, or their local agents, often take the initiative in advising plant protection services and other large-scale users on their pesticide requirements. Sometimes such advice forms the basis for requests to donors. However, assessments may be in excess of actual requirements.

Large sums of money are involved in pesticide supplies. As a result, a variety of hidden interests may play a role in decisions concerning pesticide procurement or donations. Often these interests are not strictly related to the best technical solution to pest problems. Companies may use a range of aggressive marketing methods that result in procurement of quantities in excess of actual requirements, or of low-quality or otherwise inappropriate products. Some individuals involved in pesticide procurement may have personal financial interests.

Donor countries may place increased emphasis on the supply of pesticides because of the spin-off for the national pesticide industry, thereby increasing the risk of donations being supply- rather than demand-driven.

Supply-driven donations of pesticides are more likely to become obsolete because their nature and quantity are not necessarily linked to actual needs in the recipient country but may be based solely on what is available from the donor. Tied aid may restrict the range from which products can be selected because the producers in the donor country may not make the most appropriate products for conditions in the recipient country.

Such hidden factors often complicate a sound technical approach to pest and pesticide management and should be identified and addressed in policy decisions.

## PROBLEMS RESULTING FROM PESTICIDE STOCKS

Storage and handling of pesticides, even when products are in good condition, present significant hazards to those working with the pesticides, the public at large and the environment. Adherence to good practice guidelines such as those produced by FAO and GCPF can minimize risks by eliminating exposure, or reducing it to a minimum.

In the case of obsolete pesticide stocks, the hazards are greater, and the control of personal or environmental exposure can be much more difficult. As a result, the risks to health and the environment are greater and, unfortunately, in many cases are realized.

The poor condition and inappropriate location of many obsolete pesticide stockpiles are described in the section on p. 3. The problems arising from these conditions are summarized in the following sections.

### Persistent organic pollutants

The effects of POPs on health and the environment range from acute toxicity to intergenerational endocrine disrupting effects. POPs are bioaccumulative and once in the environment cannot be removed. POPs are also transported by climatic and environmental processes over long distances. They tend to move from warmer climate regions, where most obsolete pesticide stockpiles are held, to colder climates, even as far as the poles where they accumulate in the fatty tissues of humans and wildlife at the top of food chains.

Extensive monitoring of POPs' body burdens, effects on health and movement in the environment is being carried out in Canada, northern Europe and the United States. Little or no work has been carried out in the tropics where POP insecticides have been extensively used and now form a significant proportion of obsolete pesticide stockpiles. The POP

insecticide DDT also continues to be stored and used in several tropical countries for the control of malaria vectors.

**Product deterioration**

As pesticides decompose they form by-products, many of which have toxic properties. Some by-products of decomposition are more toxic than the original poison. While little information is available to storekeepers and users on the hazards of pesticides in developing countries, virtually none is available on the breakdown products of stored pesticides. Once this process of decomposition begins, the products are effectively unidentified and need to be handled as such. The assumption needs to be made that all unidentified products belong to the highest hazard category for the purposes of handling, transport and disposal.

In the process of decomposition, pesticides can change their physical state, liquids crystallize to solids or solids liquefy. Many pesticide decomposition processes form gases where the volume is greater than the original product. This can lead to high pressure being generated in the containers, which sometimes explode, or the contents shoot out when opened.

This can make handling more difficult and can significantly alter the behaviour of the chemicals in the environment.

**Open or damaged containers**

The most obvious consequence of open or damaged containers is spillage of the contents. The released pesticides find their way into surface waters as a result of runoff; into groundwater as a result of leaching through soil; and into soil on which they have been spilled. They can thus contaminate other materials.

Where pesticides are stored in the open, people who happen to be working, living, passing by or playing in the vicinity will be exposed to them and may suffer acute or chronic health effects. There are many examples of children playing, livestock grazing, people working, cooking, drawing water and growing food around dumped and leaking pesticides.

**Product identification**

Where there are obsolete pesticide stocks it is common to find containers from the original pesticide suppliers that were unlabelled when supplied; products that have been transferred from their original, leaking containers into new, unlabelled containers; illegible labels; labels in foreign languages; and labels lacking basic information. In all such cases the products must be assumed to belong to the most hazardous class of products and need to be managed as such.

**Movement of obsolete pesticides**

Obsolete pesticide stocks may be in poor condition and might be contaminating the environment and harming health. However, the movement of these products without appropriate safeguards can aggravate the situation.

# ANNEX I

# INVENTORIES

**ALBANIA**

## Overall situation

### Albania: Sidetracked Pesticides 1

In the Balkans, the project encountered some German-German peculiarities: During Albania's political transition period in 1991 and 1992, the Government received a "gift" of more than 460 tonnes of plant protection products from a German company. The pesticides stemmed from old GDR stocks. As an investigation by the Hanover public prosecutor's office later confirmed, this was all very legal.

In 1992, the new Government in Tirana requested the German Government to take the pesticides back because Albania did not need them.

So, in the summer of 1993, a mixed delegation of experts acting on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety travelled to Albania to investigate the situation and conduct an inventory. The team was also supposed to explore the options for disposing of the pesticides in Albania. The delegation inspected five sites and a "German State Railroad train", the latter containing 217 tonnes of pesticides. The inspection revealed no considerable differences between the officially-stated quantities and those actually found. Some 375 tonnes of pesticides were sampled, but another 85 tonnes in all were stored in lesser amounts at numerous small stores, only two of which could be visited because of the team's tight schedule.

The experts' attention soon centred on the "German State Railroad train" at the Baize border station. Seventeen goods wagons were found parked on a hill at the Montenegrin border station, a mere 3 km from Shkodra Lake, and there was no way to move them. Due to the embargo, the rail connection to Montenegro was closed, and violent storms had destroyed the upcountry tracks.

The cars were full of pesticides in total disorder - and in flagrant disregard of valid International regulations governing the rail transport of hazardous goods. Every sheet steel drum in the entire train was rusty, and large, black stains underneath the cars attested to leakage. Seven tonnes of delicia emulsion were found in simple 25-liter demi-johns with no more protection against breakage than ordinary wicker jackets like those used on most cider jugs. Delicia emulsion contains 50 per cent camphechlor (technically chlorinated camphene - toxaphene), dissolved in petroleum. Any breakage not only would probably have killed the fish in the nearby lake, but also caused a fire that soon would have spread to engulf the rest of the train, as well.

Chemicophysical analysis of the samples showed that there were 43 different products with 40 different active ingredients on the train. Eleven of those pesticides were either totally prohibited or strictly limited for use by European Union directives. Twelve of the products had been approved for use in the GDR, but not in the Federal Republic of Germany (FRG). Their application was only permissible during a transition period that would terminate at the end of I 994, as dictated by Germany's reunification agreement. For a few products, the experts recommended further use, but Albania refused: Following privatization of the country's state-owned farms, the average sIze of an Albanian farm had shrunk to 1.5 hectares. The rate of pesticide consumption declined drastically, due in part to the unreliable price structure for agricultural produce. Thus, the containers were too large for the potential new users, who

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were also unfamiliar with most of the pesticides. Consequently, the experts recommended that the train's entire inventory be safeguarded without delay and transferred to Germany for destruction because Albania had no suitable facilities.

The Albanian Government's insistence that the pesticides be returned to Germany, plus the symbolic redemption of 1 tonne by Greenpeace, turned the old waste into an expanding political affair. Finally in 1994, the pesticides were taken to Germany and disposed of at a cost of DM 7 million.

The delegation made revealing discoveries at other sites, too. In addition to leaky drums and burst bags, they found large quantities of new, perfectly well-packaged plant protection products that had been brought into the country after 1991 by the European Union (EU), the World Bank and various manufacturers. These agents, they found, had been put in store and never used. If this is allowed to run its course, the next candidates for disposal are already in the offing.

**Inventory of obsolete pesticides drawn up in 2000**

The pesticides were collected throughout the country and stored in temporary sites before being exported for destruction by high-temperature incineration.

| | | | |
|---|---|---|---|
| 63 | MIXTURE | | 53673 |
| 81 | SULFAZOL | Sulphur | 18693 |
| 73 | K. PERM-ANGAN | Pot. permang. | 8705 |
| 82 | SULPHUR | Sulphur | 6730 |
| 36 | EPTAN | EPTC | 5050 |
| 26 | DICURAN | Chlorotoluron | 5039 |
| 44 | FOGARD | Atrazine | 4459 |
| 91 | VAPAM | Metam sodium | 4070 |
| 31 | DIPTEREX | Tricchlorfon | 3722 |
| 60 | MELIPAKS | Camphechior | 3722 |
| 9 | BORDAUX MIX | Bordeaux-mix. | 3490 |
| 18 | 2.4-D | 2.4-D | 3028 |
| 64 | NA. ARSENATE | Na arsenate | 2950 |
| 53 | LASSO | Alachior | 1685 |
| 17 | COPPER OXICH. | Copper oxichlon'de | 1630 |
| 77 | SELINON | DNOC | 1352 |
| 13 | C. SULPHURE | Carbon. suiph. | 1230 |
| 90 | TRIBUNIL | Metabenzthiazuron | 1198 |
| 37 | ETAZINE | o Secbumeton | 1100 |
| 2 | ALAKLOR | Alachior | 764 |
| 89 | TREFLAN | Trifluraline | 734 |
| 15 | CIKOCEL | C.C.C | 717 |
| 88 | TIODAN | Endosulfane | 572 |
| 23 | DEVRINOL | Nepropamide | 551 |
| 3 | ANTMO | Fonnothion | 542 |
| 10 | BUMINAL | Proteine hidroliz. | 512 |
| 14 | CHLORTOLURO | Chlorotoluron | 480 |
| 87 | T.M.T.D. | TMTD | 470 |
| 19 | DACTAL | Chiorthal dimethyl | 460 |
| 68 | OLIOVOFATON | Parathion methyl | 408 |
| 16 | CONSTANDINEL | | 400 |
| 42 | FILITOX | Methanudophos | 400 |

| | | | |
|---|---|---|---|
| 58 | MALTAMON | Malathion | 366 |
| 66 | NOGOS | Dichiorvos | 364 |
| 45 | FRIJMIDOR | Thiofanate-Maneb | 349 |
| 30 | DINOSEB | Dinoseb | 330 |
| 49 | ILLOKSAN | Diclofop-methyl | 314 |
| 1 | AGROFOS | Parathion-ethyl | 306 |
| 59 | MELASE | | 286 |
| 24 | DIAZINON | Diazinon | 275 |
| 27 | DIFENAMID | Difenamide | 250 |
| 67 | NOVACRON | Monochrotofos | 227 |
| 5 | BACIL | Bac. turingensis | 210 |
| 28 | DIKOTEX | MCPA | 200 |
| 40 | FESULPHATE | Fe sulphide | 200 |
| 61 | METHYLBROMI | Methyl Bromide | 200 |
| 80 | SUFFIX | Flamprop isopropyl | 200 |
| 33 | DURIT | | 190 |
| 56 | LINDANE | Lindane | 160 |
| 43 | FLIBOL | Trichiorfon | 150 |
| 57 | MAIZINE | Atrazine | 150 |
| 8 | BORAX | Boro | 118 |
| 34 | DYREIT | | 110 |
| 20 | DALAPON | Dalapon | 100 |
| 71 | PIRECID | Piretrine natural | 98 |
| 41 | FEKAMA | Adjuvant | 80 |
| 29 | DIMEKRON | Fosfamidone | 78 |
| 12 | Ca ARSENAT | Ca arsenate | 77 |
| 4 | ANTRAZINE | Atrazine | 75 |
| 74 | PROMETRINE | Prometrine | 60 |
| 22 | DECIS | Decamethrine | 55 |
| 85 | SUMITHION | Fenithrotion | 54 |
| 25 | DIBLJTOX | Dinoseb | 50 |
| 62 | MITAK | Arnitraze | 50 |
| 65 | NEMASOL | Metam | 50 |
| 35 | ENOVIT | Thiophanate methyl | 45 |
| 78 | SENKOR | Metribuzine | 45 |
| 75 | RATITOX | Murfarine | 44 |
| 32 | DODENE | Dodine | 40 |
| 70 | PATORAN | Metobromuron | 40 |
| 72 | PIRIMOR | Pirimicarb | 29 |
| 48 | HOSTAQUICK | Heptenphos | 27 |
| 6 | BAYCOR | Bitertanol | 25 |
| 21 | DANITOL | Fenpropathrine | 25 |
| 83 | SUMI-ALPHA | Swnicidine | 25 |
| 51 | KELTON | Dicofoi | 24 |
| 69 | OXAMYL | Oxainyl | 20 |
| 84 | SUMICIDINE | Sumocidine | 20 |
| 76 | ROGOR | Dimethoate | 15 |
| 39 | FASTAK | Alvha ermethrin | 11 |
| 50 | KAPTROPRIT | | 10 |
| 52 | KERB Propysamide | | 10 |
| 54 | LEBAYCID | Fenthion | 6 |

| | | | |
|---|---|---|---|
| 46 | FIJNDAZOL | Benomyl | 5 |
| 86 | SUPRACID | Mthidathion | 5 |
| 7 | BENFORMALINE | Adleyde formic | 4 |
| 55 | LILSINE | | 4 |
| 11 | BUTOX | Deltamethrine | 3 |
| 79 | SEVRN5O | Carbaryl | 3 |
| 47 | GRANOZAN | N-ethylmercur. | 0 |

**Total 144 tonnes . The quantitative and qualitative inventory was drawn up by the Ministry of Agriculture.**

**PIC consent list**

**Import decisions**

**Crocidolite (CAS: 12001-28-4)**
Final Decision on Import : no consent
Published: 6/30/96

Remarks: This chemical is not used in the country or in the local economy. Law on Environmental Protection No. 7664 of 21.1.1993; Decision on Hazardous Wastes and Residues No. 26 of 31.1.94 of the Council of Ministers.

**Polybrominated Biphenyls (PCBs) (CAS: 13654-09-6)**
Final Decision on Import : no consent
Published: 6/30/96

Remarks: The chemicals are not used in the country or in the local economy. Law on Environmental Protection No. 7664 of 21.1.1993; Decision on Hazardous Wastes and Residues No. 26 of 31.1.94 of the Council of Ministers.

**Polychlorinated Biphenyls (PCBs) (CAS: 1336-36-3)**
Final Decision on Import : no consent
Published: 6/30/96

Remarks: This chemical is not used in the country or in the local economy. Law on Environmental protection No. 7664 of 21.1.1993; Decision on Hazardous Wastes and Residues No. 26 of 31.1.94 of the Council of Ministers.

**Polychlorinated Terphenyls (PCTs) (CAS: 61788-33-8)**
Final Decision on Import : no consent
Published: 6/30/96

Remarks: This chemical is not used in the country or in the local economy. Law on Environmental Protection No. 7664 of 21.1.1993; Decision on Hazardous Wastes and Residues No. 26 of 31.1.94 of the Council of Ministers.

**Tris(2,3 dibromopropyl)phosphate (CAS: 126-72-7)**
Final Decision on Import : no consent
Published: 6/30/96

Remarks: This chemical is not used in the country or in the local economy. Law on Environmental Protection No. 7664 of 21.1.1993; Decision on Hazardous Wastes and Residues No. 26 of 31.1.94 of the Council of Ministers.

**Designated national authorities**

| | |
|---|---|
| Industrial Chemicals Committee of Environment Protection<br>Ministry of Health and Environment Protection<br>Tirana,<br>Bulevardi "Bajram Curri"<br>Mr. Argon Jana<br>Fax +355 42 27924<br>Phone +355 42 42682 | Pesticides<br><br>Director Directorate of Plant Protection Service<br>Ministry of Agriculture and Food<br>Tirana,<br>Bulevardi "Deshmoret e Kombit"<br>Fax +355 42 23952<br>Phone +355 42 23952 |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 08/10/1999 (Ac) |
| CB | 29/06/1999 (a) |
| PIC | |
| Rat.PIC | |
| Sign POP | 05/12/2001 |
| Rat POP | |
| Sign Biodiv | |
| Rat Biodiv | 05/01/1994 †acs |

**Atmospheric pollution Iidicators**

**Persistent organic pollutants (POPs)**

Emissions in 1998

The calculations for 1970-1998 have been carried out on the basis of emission expert estimates adopted from the POPCYCLING-Baltic project [Pacyna et al., 1999]. The spatial distributions of emissions for 1998 are given in the table below:

| POPs | Total emission (t/y) |
|---|---|
| B[a]P | 0.221 |
| PCCD/Fs | 2.67* |
| HCB | 0.055 |
| PCBs | 0.146 |

*** for PCDD/Fs - g I-TEQ/y**

**Average levels of depositions and concentrations in various media for 1998**

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air, | Soil, | Vegetation, | Sea, | Emission flux | Deposition flux, | Total deposition, |
|---|---|---|---|---|---|---|---|
| | $pg/m^3$ | ng/g d.w. | ng/g d.w | pg/l | $g/km^2/y$ | $g/km^2/y$ | kg/y |
| PCDD/Fs* | $2.04\sum10^{-3}$ | $4.56\sum10^{-5}$ | $4.55\sum10^{-4}$ | $8.74\sum10^{-4}$ | $9.15\sum10^{-5}$ | $1.21\sum10^{-4}$ | $3.52\sum10^{-3}$ |
| HCB | 53.00 | 0.04 | 0.18 | 5.67 | 1.88 | 0.15 | 4.46 |
| PCBs | 106.00 | 0.60 | 9.50 | 16.20 | 5.74 | 2.21 | 56.18 |

*** - I-TEQ**

**Upper and lower estimations of PCB pollution levels for 2010**

Using the multicompartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, pg/$m^3$ | | Soil, ng/g d.w. | | Deposition flux, g/$km^2$/y | |
|---|---|---|---|---|---|
| Max | Min | max | min | max | min |
| 90 | 8.8 | 0.4 | 0.3 | 1.92 | 0.16 |

**Transboundary deposition fluxes and air concentrations of B[a]P in 1998**

Contributions of European countries to annual mean and maximum diurnal air concentrations, as well as for deposition fluxes of B[a]P averaged over the country, are summarized in the table below:

| POPs | Annual mean conc. | Maximum diurnal conc. | Deposition fluxes to | Deposition fluxes from |
|---|---|---|---|---|
| B[a]P | 2, ng/m3 | 2, ng/m3 | 2, g/km2/y | 2, g/km2/y |

**ALGERIA**

**Overall situation**

**Inventory of pesticides**

| Location | Common name | Commercial name | Qty. Kgs | Qty. Lts | Year | Origin | Comments |
|---|---|---|---|---|---|---|---|
| Tipaza | Aldrin | Aldrex | 25 | | | ? | |
| Algiers | Aldrin | Aldrex | 320 | | | ? | |
| Ain temouchent | DDT | DDT | 5000 | | | ? | |
| Algiers | DDT | DDT | 1000 | | | ? | |
| Mustaganem | DDT | DDT | 180000 | | | ? | |
| Sidi bel abbas | DDT | DDT | 2000 | | | ? | |
| Tizi ouzou | DDT | DDT | 800 | | | ? | |
| Mascara | DDT | Magirol | 1000 | | | ? | |
| Mascara | DDT | Magirol | 400 | | | ? | |
| Tipaza | DDT | S.clodet | 425 | | | ? | |
| Tizi ouzou | DDT | Sectum | 275 | | | ? | |
| Chlef | Endrune | Endrune 20 EC | | 6000 | | ? | |
| Ouregla | HCH | HCH +son | 600 | | | ? | |
| Saida | HCH | HCH +son | 3500 | | | ? | |
| Setif | HCH | HCH | 75 | | | ? | |
| Tizi ouzou | HCH | Hexafor | 25 | | | ? | |
| Bedjaia | HCH | Hexafor | 500 | | | ? | |
| Medea | HCH | Sectumol | 600 | | | ? | |
| Setif | HCH | Sectumol | 100 | | | ? | |
| Ouregla | HCH | HCH +son | 300 | | | ? | |
| Algiers | HCH | Digigain | | 150 | | ? | |
| Ouregla | HCH | HCH +son | 750 | | | ? | |
| Ouregla | HCH | HCH +son | 700 | | | ? | |
| El-bayadh | Isomer H.C.H | Lindanol | | 600 | | ? | |
| Boumerdes | Lindal | Lindal | 600 | | | ? | |
| Ain defla | Lindane | Lindane | 675 | | | ? | |
| Boumerdes | Lindane | Lindane | 75 | | | ? | |
| Boumerdes | Lindane | Lindane | 25 | | | ? | |
| Oum el bouaghi | Lindane | Lindane | 700 | | | ? | |
| Tipaza | Lindane | Lindane | 52 | | | ? | |
| Mustaganem | Lindane | Lindanole | 200 | | | ? | |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 20.10.1992(Ac) |
| CB | 15.09.98 (a) |
| PIC | |

| | |
|---|---|
| Rat.PIC | NON |
| Sign POP | 5 Sep 2001† |
| Rat POP | |
| Sign Biodiv | †13/06/1992† |
| Rat Biodiv | †14/08/1995†rtf |

**List of PIC products authorized**

**Crocidolite (CAS: 12001-28-4)**
Interim Decision on Import : consent
Published: 30/6/1996

Conditions: Crocidolite is banned for use in production of consumer goods.

Remarks: Decree 95-39 of 28.1.95 on prior authorizations for production of toxic products or products which present a particular risk.

**Polychlorinated Biphenyls (PCBs) (CAS: 1336-36-3)**
Final Decision on Import no consent
Published: 30/6/1996

Remarks: Decree 98-182 of 18.8.87 on PCB-based oils, electric equipment containing these oils and materials contaminated by this product.

**Algerian report on POPs**

## I. MEASURES TAKEN TO ADDRESS THE RISKS ASSOCIATED WITH ASKARELS

Algeria, in common with the rest of the international community, uses electrical equipment with askarels (5,000 transformers at the last count).

Because of this, numerous incidents associated with the use of this equipment have been reported.

These incidents, which have occurred in every part of the country, have happily not had serious consequences, neither on the environment nor on the health of the population.

In view of the dangers connected with askarels, our country has undertaken a series of actions to tackle this problem.

Given the intersectoral character of these actions, the responsibility for this issue has been entrusted to an inter ministerial group set up for that purpose in July 1986.

This interministerial group was composed of representatives of the sectors concerned (public health, light industry, heavy industry, energy and petrochemical industries, home affairs and the environment).

This interministerial group, led by the sector responsible for the environment, has undertaken a series of actions to tackle this problem in all its aspects, as follows:

| |
|---|
| • Preparation of an inventory of electrical equipment using askarels and materials contaminated by this product; |
| • An information and awareness-raising campaign for businessmen, local cooperatives and the public at large on the risks connected with askarels; |
| • Framing of regulations regarding the use of equipment with askarels and the management of materials contaminated by these products; |
| • Planning the organization required to be set up in the field to deal with accidental spills; |
| • Studies on the establishment of a national centre for disposing of askarel wastes. |
| • Inventory of electrical equipment using askarels |
| • Information and awareness-raising |

Every effort has been made, targeting business people, local cooperatives and the public at large, to inform and make them aware of the risks connected with electrical equipment using askarels, the dangers arising from accidental spills of oils based on PCBs and the way of dealing with accidental pollution by these products.

The main actions are as follows:

| |
|---|
| • Organization of workshops in all the provinces; the heads of local administrations took part in these workshops, as well as concerned business people. The workshops were conducted by members of the inter ministerial group. |
| • The local authorities are currently very well aware of the dangers connected with askarels. They are also well informed on safety measures and what they should do in the case of accidents that might happen. |
| • The publication of a technical brochure, distributed to local authorities and owners of electrical equipment using askarels. This brochure, a copy of which is attached herewith, contains all the information needed for the maintenance, storage and transport of electrical equipment using fluids based on PCBs. |

| |
|---|
| • It also explains how to handle oils based on PCBs and how to deal with spills of these products; |
| • The preparation and distribution of a leaflet explaining briefly what PCBs are and the measures to be taken in the case of accidents (sample attached herewith); |
| • The preparation and distribution of a briefing sheet listing the criteria for identifying electrical equipment using askarels; |
| • The distribution of press bulletins in the national daily newspapers inviting the owners of electrical equipment using askarels to come forward; |
| • Publication of numerous press articles in the national daily newspapers dealing with the dangers connected with askarels; |
| • Preparation and distribution of a pamphlet aimed at users of high and medium voltage inviting them to come forward; |
| • Two information missions abroad (France and Canada) were undertaken on the ways and means of implementing and ensuring the sound environmental disposal of PCB wastes. |

The disposal procedures available in these two countries were:

| |
|---|
| - High temperature incineration of PCB wastes in a special centre; |
| - Geological or subterranean storage; |
| - Burial of wastes after vitrification; |
| - Surface storage. |

Among these possible disposal procedures, the interministerial group opted for surface storage in the first phase, then high temperature incineration as a final solution in the long term; surface storage presents numerous advantages in the sense that it is a simple and effective method, is not expensive and can be carried out using local resources.

This method does not, however, allow for the final disposal of these wastes, and the risks entailed would have to continue to be managed.

High temperature incineration is the final solution to the problem. definitively. This method is very costly however and requires technology not yet introduced into the country.

For financial and safety considerations, it was thought preferable to defer this solution.

**Regulatory measures**

Before the publication of the decree, regulatory measures were put in place by a series of circulars, as follows: (10 September 1985):

- A technical instruction from the Ministry of Health, aimed at medical personnel, on what to do in the case of accidental contamination by PCBs;

- Interministerial circular No.121 CAB of 4 December 1985, which invited the owners of electrical equipment using askarels to make themselves known, prescribes safety regulations, applicable to electrical apparatus in service and defines the regulations regarding the handling, transport and storage of askarels and askarel wastes;

- Circular from the Ministry of Light Industry, aimed at industrial units of this sector, giving preventive and intervention methods in the case of an accidental spill;

- Technical instruction from the Ministry of Home Affairs regarding the protection of civil defence personnel.

A decree relating to oils based on PCBs, electrical equipment containing them and material contaminated by this product was prepared and published on 18 August 1987 (Decree No.17-182).

This was a decree which, on the one hand, banned the importation, manufacture, installation, purchase, sale or transfer of electrical equipment using askarels and, on the other, defined the safety regulations for the use of equipment in service. It also set out the management regulations for the storage of wastes contaminated by PCBs and the regulations that are to be observed following an accidental spill of oils based on PCBs.

**Organizational measures**

In addition to the interministerial group, it was decided to set up technical committees at provincial levels whose mission would be to establish an inventory of electrical equipment using askarels and askarel wastes, and to set up the arrangements, at provincial level, for intervention in the case of accidental spills of oil based on PCBs.

This specific form of organization on the one hand provided for an exhaustive inventory to be drawn up of electrical equipment using askarels and, on the other, provided for the rapid mobilization of local resources for intervention in the case of pollution by PCBs.

**Study on the establishment of a national wastes storage centre**

In order to concentrate all PCB wastes countrywide in one place so as to be able to guarantee their safety and to manage them in a sounder manner from a financial and environmental viewpoint, the interministerial group prepared a study on the establishment of a national storage centre for PCB wastes.

The study considered the choice of site before starting, specified the safety measures necessary for the development and use of the centre and assessed the financial implications of this operation.

The conclusions of this study enabled a data sheet to be prepared, which is annexed to the present report (Annex 3).

In 1989, in order to choose the site prior to opening the centre, the interministerial group undertook fact-finding missions to five provinces in the highlands (M'sila, Setif, Bordj Bou Arreridj, Tiaret and Djelfa) and chose a site in the commune of Naama (Province of Tiaret), which presented numerous advantages from the viewpoint of finance and also environmental safety. The interministerial group has currently set out provisions concerning the setting up of the sites. Each province must therefore be responsible for its own storage area, with a view to minimizing the risk associated with transport and to avoid other risks.

**Design of a priority programme for the replacement of electrical equipment using askarels by other types of transformers**

It is clear that the issue of electrical equipment using PCBs can only be finally settled when all the equipment is eventually replaced by other electrical apparatus not using oils based on PCBs.

It is not possible to envisage the replacement in one operation of all the electrical equipment using PCBs that is actually in use, because of the excessive cost of such an operation.

The interministerial group proposed that the replacement should be done gradually. This would mean a first phase of replacing all electrical equipment using PCBs in places open to the public, such as universities, educational establishments, health care centres, public buildings, residential buildings, etc. ...

The interministerial group also proposed that this priority replacement programme should apply to industrial units of the agrofood sector where there are risks of pollution of food products.

The number of transformers involved in this priority programme is around 1,100 units.

Most of these transformers (880) can be replaced by transformers manufactred in Algeria using mineral oil.

In regard to transformers using PCBs installed within buildings (220), their replacement should be by so-called "dry" transformers, or reasons of safety in the event of explosions or fire. These transformers are not manufactured in Algeria and it would be necessary to import them.

A detailed proposal regarding this priority replacement programme was made, in the form of a data sheet annexed to the present document.

## II. CONCLUSION

The measures to be taken consist, on the one hand, of establishing a storage centre for askarel wastes and, on the other, undertaking a priority replacement operation for electrical equipment using askarels located in places frequented by the general public.

As far as the undertaking of a storage centre for PCB wastes is concerned, it should be remembered that is a question of putting in a safe place large quantities of wastes that are highly dangerous and which are currently stored in poor conditions by their owners.

The location proposed for this is a site in the commune of Naama (Province of Tiaret).

Since this is an operation of public interest, the funding of this centre should be provided by the State.

In regard to the management of the centre, for the time being, this should be entrusted to the host Province, pending finalization of a global formula for the management of all toxic wastes, which was the subject of a communication from the Government during the fourth quarter of 1989.

It is understood that the central environmental services will provide all the necessary assistance for the establishment and operation of this centre according to professional standards.

Lastly, for the final disposal of PCB wastes, the only solution is high temperature incineration. A feasibility study for a plant for the specialized incineration of this type of waste must be made.

The centre could also deal with all toxic wastes having the same characteristics as PCB wastes.

## INVENTORY OF EQUIPMENT USING PCBS

| | SOURCE OF INFORMATION | | |
|---|---|---|---|
| EQUIPMENT | SONEL GAZ | ENVIRONMENT | |
| | 1986 | 1989 | 1996 |
| TRANSF. IN SERVICE | 2,455 | 4,761 | 3,666 |
| TRANSF. IN STOCK | | 57 | 80 |
| TRANSF. DISCARDED | 105 | 361 | 909 |
| CONDENSERS IN SERVICE | 939 | 1078 | |
| CONDENSERS DISCARDED | 55 | 97 | |
| SWITCHGEAR | 17 | | |
| QUANTITY OF OIL USED IN THE | | 3,055,610 | |

| | | | |
|---|---|---|---|
| TRANSFORMERS | | TONNES | |
| QUANTITY OF NEW OIL | 77 TONNES | 40 TONNES | |
| QUANTITY OF USED OIL STORED | 28 TONNES | 162 TONNES | 565,944 LITRES |

**STATUS OF ORGANOCHLORINE PESTICIDES IN ALGERIA**

Following the promulgation of the Ministerial Order banning the sale and use of organochlorines, all imports of pesticides are subject to frontier checks, in accordance with the regulations in force, authorizing refusal of entry of any pesticide not on the approval list for Algeria.

Also, all quantities of organochlorines and banned products such as Aldrin, Dieldrine and Heptachlor discovered in the survey initiated by Circular No. 1372/DGE/4083/PES of 14 September 1994, of outdated pesticides, were put under seal by the pesticide brigade under the authority of the Ministry of Agriculture.

| ORGANOCHLORINES | QUANTITY IN Kg |
|---|---|
| DDT | 188925 Kg |
| ALDRINE | 345 Kg |
| ENDRINE | 6000 Kg |
| TOTAL | 195,270 |

**IDENTIFICATION OF THE PROBLEMS POSED BY POPs**

QUESTIONNAIRE FOR PARTICIPANTS
ALGERIA
**Name of country**

| | yes | no | don't know |
|---|---|---|---|
| 1. Are POPs produced in your country ? | | | |
| 2. Are POPs imported into your country ? | | | |
| If so, is the importation | authorized | unauthorized | |
| 3. Are POPs exported from your country? | | | |
| Are POPs used in your country? | | | |

substances: PCB Approximate quantity 3055.610 tonnes

| | | | |
|---|---|---|---|
| Are chemical or non-chemical alternatives available? | YES | | |
| Have alternatives been chosen? | often | occasionally | never |
| Reasons why they have not been chosen | cost | effectiveness | other |
| Are chemical or non-chemical alternatives available? | | | |
| Have alternatives been chosen? | often | occasionally | never |
| Reasons why they have not been chosen: | cost | effectiveness | other |

substances:Organo Pesticides Approx. qty: 190 tonnes

| | | | |
|---|---|---|---|
| Are chemical or non-chemical alternatives available? | | Chemical: substitution by organophosphates | |
| Have alternatives been chosen? | often | occasionally | never |
| Reasons why they have not been chosen | cost | effectiveness | other |

| | | | |
|---|---|---|---|
| 4. Are POPs stored in your country? | yes | no | don't know |
| Please specify if the product is stored as a product, recyclable material or wastes: | Substance PCB | Quantity: 3055.610 tonnes | As: Product PCB Recyclable |

| | | | |
|---|---|---|---|
| Are the storage areas known? | yes | no | |

| | | | |
|---|---|---|---|
| 5. Are POPs released into the environment? | yes | no | don't know |
| If so, in what ways are they released? Released into: | water | air | ground |

| | | | | |
|---|---|---|---|---|
| Origin of release | industrial activity | crop treatment | vector control | Others |
| 6. Are people exposed to POPs? | | yes | no | don't know |
| If so, how? | professional exposure | consumer exposure | residential area exposure | accidents and poisoning |

| | | | | | |
|---|---|---|---|---|---|
| 7. What kind of monitoring takes place in your country? | ambient/air | surface water | groundwater | emission sources | biological |

| | | | | | |
|---|---|---|---|---|---|
| 8. Are there legal restrictions on the use of POPs? | | yes | no | don't know | |
| What kinds of action have been adopted to control the use, production or importation of POPs? | Health standards or regulations | optional programme | Environmental standards or regulations | Directives | Other: |

## BOSNIA AND HERZEGOVINA

### Detailed report for Bosnia and Herzegovina

Comparison of modelling results with measurements
Trends in emissions, depositions and average concentrations in media for 1970 - 1998

### Persistent organic pollutants (POPs)

Emissions in 1998

The calculations for 1970-1998 have been carried out on the basis of emission expert estimates adopted from the POPCYCLING-Baltic project [*Pacyna et al.,* 1999]. The spatial distributions of emissions for 1998 are given in the table below:

| POPs | Total emission (t/y) |
|---|---|
| B[a]P | 4.52 |
| PCCD/Fs | 21.7* |
| HCB | 0.05 |
| PCBs | 0.231 |

*** for PCDD/Fs - g I-TEQ/y**

### Average levels of depositions and concentrations in various media for 1998

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air, pg/m3 | Soil | Vegetation | Sea | Emission flux | Deposition flux, g/km2/y | Total deposition, kg/y |
|---|---|---|---|---|---|---|---|
| | | ng/g d.w. | ng/g d.w | pg/l | g/km2/y | | |
| PCDD/Fs* | 3.42∑10-3 | 9.16∑10-5 | 1.14∑10-3 | 1.42∑10-3 | 4.31∑10-4 | 1.42∑10-4 | 7.13∑10-3 |
| HCB | 54.00 | 0.06 | 0.36 | 7.24 | 0.99 | 0.16 | 8.03 |
| PCBs | 137.00 | 1.00 | 30.70 | 25.00 | 4.60 | 2.97 | 148.95 |

***- I-TEQ**

### Upper and lower estimations of PCB pollution levels for 2010

Using the multi compartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero.

| Air, pg/m3 | | Soil, ng/g d.w. | | Deposition flux, g/km2/y | |
|---|---|---|---|---|---|
| max | min | max | min | max | min |
| 111 | 14.2 | 0.7 | 0.6 | 2.51 | 0.24 |

### Transboundary deposition fluxes and air concentrations of B[a]P in 1998

Contributions of European countries to annual mean and maximum diurnal air concentrations, as well as for deposition fluxes of B[a]P averaged over the country, are summarized in the table below:

| POPs | Annual mean conc. | Maximum diurnal conc. | Deposition fluxes to | Deposition fluxes from |
|---|---|---|---|---|
| B[a]P | 2, ng/m3 | 2, ng/m3 | 2, g/km2/y | 2, g/km2/y |

**PIC consent list**

**2,4,5-T (CAS: 93-76-5)**
Interim Decision on Import no consent
Published: 11/11/1997

**Captafol (CAS: 2425-06-1)**
Interim Decision on Import no consent
Published: 1/7/1997

**Chlorobenzilate (CAS: 510-15-6)**
Interim Decision on Import no consent
Published: 11/11/1997

**Hexachlorobenzene (CAS: 118-74-1)**
Interim Decision on Import no consent
Published: 11/11/1997

**Lindane (gamma-HCH) (CAS: 58-89-9)**
Interim Decision on Import no consent
Published: 11/11/1997

**Parathion (CAS: 56-38-2)**
(all formulations - aerosols, dustable powder (DP), emulsifiable concentrate (EC), granules (GR) and wettable powders (WP) - of this substance are included, except capsule suspensions (CS))
Final Decision on Import no consent
Published: 16/4/1998
Remarks: Not registered.

**Pentachlorophenol (CAS: 87-86-5)**
Interim Decision on Import no consent
Published: 11/11/1997

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 6.3.1992(Sc) |
| CB | 16.03.01 (a) |
| PIC | |
| Rat.PIC | |
| Sign POP | 23 May 2001 |
| Rat POP | |
| Rat. Biodiv | |

## CROATIA

### Persistent organic pollutants (POPs) Emissions in 1998

The calculations for 1970-1998 have been carried out on the basis of emission expert estimates adopted from the POPCYCLING-Baltic project [*Pacyna et al.,* 1999]. The spatial distributions of emissions for 1998 are given in the table below:

| POPs | Total emission (t/y) |
|---|---|
| B[a]P | 4.67 |
| PCCD/Fs | 22.4* |
| HCB | 0.078 |
| PCBs | 0.238 |

*** For PCDD/Fs - g I-TEQ/y**

### Average levels of depositions and concentrations in various media for 1998

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air, pg/m3 | Soil, | Vegetation, | Sea, | Emission flux | Deposition flux, g/km2/y | Total deposition, kg/y |
|---|---|---|---|---|---|---|---|
| | | ng/g d.w. | ng/g d.w | pg/l | g/km2/y | | |
| PCDD/Fs* | 3.88∑10-3 | 1.03∑10-4 | 1.19∑10-3 | 1.53∑10-3 | 3.67∑10-4 | 2.01∑10-4 | 1.22∑10-2 |
| HCB | 59.00 | 0.06 | 0.38 | 6.94 | 1.28 | 0.18 | 10.88 |
| PCBs | 180.00 | 1.30 | 41.00 | 26.60 | 4.44 | 4.11 | 220.40 |

***- I-TEQ**

### Upper and lower estimations of PCB pollution levels for 2010

Using the multi compartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, pg/m3 | | Soil, ng/g d.w. | | Deposition flux, g/km2/y | |
|---|---|---|---|---|---|
| max | min | max | min | max | min |
| 146 | 18.3 | 0.9 | 0.7 | 3.48 | 0.34 |

### Transboundary deposition fluxes and air concentrations of B[a]P in 1998

Contributions of European countries to annual mean and maximum diurnal air concentrations, as well as for deposition fluxes of B[a]P averaged over the country, are summarized in the table below:

| POPs | Annual mean conc. | Maximum diurnal conc. | Deposition fluxes to | Deposition fluxes from |
|---|---|---|---|---|
| B[a]P | 2, ng/m3 | 2, ng/m3 | 2, g/km2/y | 2, g/km2/y |
| | chart | chart | chart | chart |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 8.10.1991(Sc) |
| CB | 09.05.94 (a) |
| PIC | |
| Rat. PIC | |
| Sign POP | 23 May 2001 |
| Rat POP | 11/06/1992 |
| Rat Biodiv | 07/10/1996†rtf |

**PCB inventory**

In Croatia, there are 405 users of 22,532 PCB capacitors and 293 users of PCB transformers (Sinovcevic, 1998).

## CYPRUS

### Pesticide legislation

In Cyprus, pesticides are controlled according to the provisions of specific legislation, enacted in 1967 and implemented since 1973. This legislation was replaced by new and more comprehensive legislation in 1993, known as the "Pest Control Products Law of 1993, N 1(I)/93" and the "Pest Control Products Regulations of 1993".

The provisions of the framework Directive 91/414/EEC and 78/631/EEC of the European Union have been taken into account for the preparation of our national pesticide legislation and hence it may be considered to be in accordance with EU regulations and international procedures.

The Department of Agriculture is responsible for the implementation of the pesticide legislation. The required structure for pesticide registration exists in this Department, i.e. service for administration, evaluation of data and documents and testing of pesticides as well as laboratories for formulation quality control and residue analyses.

The main objectives of the pesticide legislation are the protection of agricultural production, the consumers and human health in general, as well as of the environment by ensuring high quality and proper use of pesticides and minimizing any adverse effect from their use. The law and the relevant regulations provide for the marketing, registration, quality control and labelling of all pesticides in Cyprus. The term pesticide includes all chemicals used for control or prevention of plant pests and diseases intended for agricultural, household and public hygiene use.

According to this legislation, no person shall manufacture, advertise or offer for sale or use any pesticide unless the product has been registered.

Pesticide registration is the responsibility of the Pesticide Control Board, consisted of representatives of the Department of Agriculture, Ministry of Agriculture, Natural Resources and Environment, Ministry of Health, Ministry of Commerce and Industry, as well as of representatives of the Farmers´ Unions, the Importers and the Agriculturalists´ Union.

The Pesticide Control Board, in determining if a pesticide should be registered, reviews the results of a variety of scientific tests submitted by the pesticide manufacturer. These tests include toxicology studies involving acute, subchronic and chronic toxicity, reproductive effects, teratogenicity, mutagenicity, carcinogenicity, skin and eye irritation and pharmanacokinetic studies. Data concerning the behaviour of a pesticide in the environment, including residue tests must also be submitted. In addition, the Cyprus registration authority requires information on the physicochemical properties of the active ingredient and formulation. The manufacturer is also requested to submit a sample for chemical analysis. The sample is then subjected to quality control at the laboratory of the Department of Agriculture specially equipped and trained for this purpose. Routine quality control of a pesticide formulation includes the identification and quantification of the active ingredient, determination of any undesirable impurities such as heavy metals or suspected carcinogens and also examination of the physicochemical properties, such as heat and cold stability and, depending on the formulation type, emulsion, acidity or alkalinity and flowability.

After all required data are submitted by the manufacturer and quality control of the sample shows compliance with the manufacturer´s specifications and also of the United Nations Food and Agriculture Organization (FAO), the Pesticide Control Board will grant registration if it is determined that the benefits associated with a pesticide's use outweigh any potential risks to human health and the environment.

Toxicity classification, packaging and labelling are controlled and regulated according to the provisions of the national legislation, which is in conformity with the EU legislation.

The main requirements for the registration of a pesticide are shown in the form for "application for registration of a pesticide", of which a copy is available upon request.

**PIC consent list** [2]

**Import decisions**

**2,4,5-T (CAS: 93-76-5)**
Final Decision on Import : no consent
Published: 22/9/1997
Remarks: Banned as a pesticide. Pesticide Control Board decision October 1979.

**Aldrin (CAS: 309-00-2)**
Final Decision on Import : no consent
Published: 30/6/1993

**Binapacryl (CAS: 485-31-4)**
Final Decision on Import : no consent
Published: 9/5/2000
Remarks: Decision is based on the Pesticide Control Products Law of 1993, N1 (I) / 93. Decision of the Pesticide Control Board, dated 12/12/1987.

**Captafol (CAS: 2425-06-1)**
Final Decision on Import no consent
Published: 1/7/1997
Remarks: Banned as agricultural pesticide. Pesticide Control Board decision 31/3/1989.

**Chlordane (CAS: 57-74-9)**
Final Decision on Import no consent
Published: 1/7/1997

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import no consent
Published: 1/7/1997

**Chlorobenzilate (CAS: 510-15-6)**
Final Decision on Import no consent
Published: 22/9/1997
Remarks: Pesticides Law 1(I(/93. Total banned as an agricultural pesticide. Pesticide Control Board decision on 23/5/1997.

**Crocidolite (CAS: 12001-28-4)**
Final Decision on Import consent
Published: 1/7/1994
Conditions: Permission by Ministry of Labour and Social Insurance, in exceptional cases for special uses as described in the Asbestos (Health and Safety of Persons at Work) Regulations of 1993.

[2] Database PIC

**DDT (CAS: 50-29-3)**
Final Decision on Import no consent
Published: 30/6/1993

**Dieldrin (CAS: 60-57-1)**
Final Decision on Import no consent
Published: 30/6/1993

**Dinoseb and Dinoseb Salts (CAS: 88-85-7)**
Final Decision on Import no consent
Published: 30/6/1993

**EDB (1,2-dibromoethane) (CAS: 106-93-4)**
Final Decision on Import no consent
Published: 1/7/1997

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import no consent
Published: 30/6/1993

**HCH (mixed isomers) (CAS: 608-73-1)**
Final Decision on Import no consent
Published: 30/6/1993

**Heptachlor (CAS: 76-44-8)**
Final Decision on Import no consent
Published: 1/7/1997

**Hexachlorobenzene (CAS: 118-74-1)**
Final Decision on Import no consent

Remarks: There are no registered pesticides containing HCB as an active ingredient. According to national legislation, imports into Cyprus (of any pesticide containing HCB) are not allowed.

**Lindane (gamma-HCH) (CAS: 58-89-9)**
Final Decision on Import consent
Published: 22/9/1997

Remarks: Severely restricted pesticide. Small quantities of this chemical are still imported from time to time for specific uses, i.e. wood preservative.

**Mercury Compounds (CAS: no single CAS N)**
Final Decision on Import no consent
Published: 1/7/1997

**Methamidophos (CAS: 10265-92-6)**
(Soluble liquid formulations of the substance that exceed 600 g active ingredient/l**)**
Final Decision on Import consent
Published: 17/2/1998

Conditions: General conditions apply.

**Methyl-parathion (CAS: 298-00-0)**
(emulsifiable concentrates (EC) with 19.5%, 40%, 50%, 60% active ingredient and dusts containing 1.5%, 2% and 3% active ingredient)

Final Decision on Import consent
Published: 17/2/1998

Conditions: General conditions apply.

**Monocrotophos (CAS: 6923-22-4)**

(Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
Final Decision on Import consent
Published: 17/2/1998

Conditions: General conditions apply

**Parathion (CAS: 56-38-2)**

(all formulations - aerosols, dustable powder (DP), emulsifiable concentrate (EC), granules (GR) and wettable powders (WP) - of this substance are included, except capsule suspensions (CS))
Final Decision on Import consent
Published: 17/2/1998

Conditions: General conditions apply.

**Pentachlorophenol (CAS: 87-86-5)**

Final Decision on Import no consent
Published: 1/7/1997

Remarks: Not registered for use as a pesticide.

**Phosphamidon (CAS: 13171-21-6/2378)**

(Soluble liquid formulations of the substance that exceed 1000 g active ingredient/l)
Final Decision on Import consent
Published: 17/2/1998

Conditions: General conditions apply.

**Polybrominated Biphenyls (PBBs) (CAS: 13654-09-6)**

Interim Decision on Import no consent
Published: 1/7/1994

Remarks: The import, use, etc., of PBBs in Cyprus is controlled by the Dangerous Substances Law of 1991 and regulations that are under preparation, expected to be enacted in 1994. At present the import is regulated by the Ministry of Commerce and Industry, which is the import licensing authority and which refuses to grant a licence for import of this substance.

**Polychlorinated Biphenyls (PCBs) (CAS: 1336-36-3)**

Interim Decision on Import no consent
Published: 1/7/1994

Remarks: The import , use, etc. of PCBs in Cyprus is controlled by the Dangerous Substances Law of 1991 and regulations that are under preparation, expected to be enacted in 1994. At present, the import is regulated by the Ministry of Commerce and Industry, which refuses to grant a licence for import of this substance.

**Polychlorinated Terphenyls (PCTs) (CAS: 61788-33-8)**

Interim Decision on Import no consent
Published: 1/7/1994

**Atmospheric pollution indicators**

**Persistent organic pollutants (POPs)**

Emissions in 1998
No available emission data

**Average levels of depositions and concentrations in various media for 1998**

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air, pg/m3 | Soil, | Vegetation, | Sea, | Emission flux | Deposition flux, | Total deposition, |
|---|---|---|---|---|---|---|---|
| | | ng/g d.w. | ng/g d.w | pg/l | g/km2/y | g/km2/y | kg/y |
| PCDD/Fs* | 2.40∑10-4 | 4.75∑10-6 | 0.00 | 7.98∑10-5 | 0 | 2.03∑10-5 | 1.80∑10-4 |
| HCB | 48.00 | 0.01 | 0.00 | 3.72 | 0 | 0.02 | 0.19 |
| PCBs | 14.00 | 0.00 | 0.00 | 2.50 | 0 | 0.14 | 1.79 |

***- I-TEQ**

**Upper and lower estimations of PCB pollution levels for 2010**

Using the multicompartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, pg/m3 | | Soil, ng/g d.w. | | Deposition flux, g/km2/y | |
|---|---|---|---|---|---|
| max | min | max | min | max | min |
| 12 | 1.2 | 0 | 0 | 0.13 | 0.01 |

**Transboundary deposition fluxes and air concentrations of B[a]P in 1998**

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 28.5.1992(Ac) |
| CB | 17.09.92 (r) |
| PIC | 11/09/98 |
| Rat.PIC | |
| Sign POP | |
| Rat POP | †12/06/1992† |
| Rat Biodiv | †10/07/1996†rtf |

**Prohibition of pesticides**

Pesticides prohibited for import and use in Cyprus are shown in List 2. These pesticides were prohibited in order to protect human health and the environment.

**List 2. Pesticides prohibited in Cyprus**

| Common name | Date of decision of the Pesticide Control Board |
|---|---|

| | |
|---|---|
| A. MERCURY COMPOUNDS | |
| | |
| Mercuric oxide | |
| Mercurous chloride (calomel) | 15.4.1982 |
| Other inorganic mercury compounds | |
| Alkyl mercury compounds | |
| Alkoxylalkyl & aryl mercury compounds | |
| B. PERSISTEN ORGANO-CHLORINE COMPOUNDS | |
| Aldrin | 08.12.1980 |
| Chlordane | 18.02.1988 |
| Dieldrin | 08.12.1980 |
| DDT | 01.12.1976 |
| Endrin | Not submitted for authorization |
| HCH containing less than 99% of the gamma isomer | 12.12.1987 |
| Heptachlor | Not submitted for authorization |
| Hexachlorobenzene | Not submitted for authorization |
| Camphechlor | Not submitted for authorization |
| Mirex | Not submitted for authorization |
| C. OTHER COMPOUNDS | |
| | |
| Ethylene oxide | 27.12.1983 |
| Nitrofen | 21.10.1981 |
| 1,2 -dibromoethane (EDB) | 20.10.1986 |
| 1,2 - dichloroethano (EDC) | Not submitted for authorization |
| Dinoseb, its acetate and salts | 12.12.1987 |
| Binapacryl | 12.12.1987 |
| Captafol | 31.3.1989 |
| Dicofol containing less than 78% of p.p. dicofol or more than 1g/kg DDT & DDT related compounds | 28.1.87 and 17.5.1999 |
| (a) Maleic Hydrazide its salts, other than its choline, potassium and sodium salts. | 17.5.1999 |
| (b) Choline, potassium and sodium salts of maleic hydrazide containing more than 1mg/Kg of free hydrazine expressed on the basis of the acid equivalent. | 17.5.1999 |
| Quintozene containing more than 1g/kg of HCB or more than 10g/kg pentachlorobenzene | 17.5.1999 |
| Chlordimeform | 5.10.1976 |
| Leptophos | 9.7.1987 |
| D.B.C.P. | 05.11.1977 |
| 2,4,5 - T | 22.10.1979 |
| 2,4,5 - TP | 22.10.1979 |
| Sodium Cyanide | 17.06.1981 |
| Fluoroacetamide | 10.11.1991 |
| Chlorobenzilate | 1.9.1982 severely restricted<br>23.5.1997 total banned |
| Paraguat as dimethyl sulphate | 25.6.1976 |
| Dinoterb | Not submitted for authorization |
| DNOC | The use of DNOC is permitted up to 30.4.2000. Control Board decision on 17.5.1999. |

**Registered pesticides**

There are 281 pesticide active ingredients and 1,050 formulated products registered for use in Cyprus. The pesticide active ingredients registered in Cyprus are shown in the List 1.

**List 1. Active substances authorized in Cyprus for use in agriculture, until October 1999.**

**NO Common name**
Abamectine
Acephate
Acifluorfen
Aclonifen
Acrinathrin
Alachlor
Aldicarb
Allethrin
Alphacypermethrin=alpha-Cypermethrin
Alphamethrin=alpha-Cypermenthrin
Aluminium phosphide
Amitraz
Amitrole (Aminotriazole)
Anilazine
Anthracene oil
Atrazine
Avermectin (see Abamectine)
Azamethiphos
Azinphos - methyl
Azocyclotin
Azoxystrobin
Benalaxyl
Benomyl
Bensultap
Bentazone
Bifenthrin
Bioallethrin
Bitertanol
Bordeaux mixture=Calsium copper sulphate
Brodifacoum
Bromacil
Bromadiolone
Bromopropylate-
Bromuconazole
Bupirimate-
Buprofezin-
Butocarboxim
Cadusafos
Captan
Carbaryl
Carbatene (see Metiram)
Carbendazim
Carbetamide
Carbofuran
Carbosulfan
Carboxin

Chinomethionat
Chloridazon
Chlorophacinone
Chloropicrin
Chlorothalonil
Chlorpropham
Chlorpyrifos
Chlorpyrifos-methyl
Chlorthal-dimethyl
Chlozolinate
Cholecalciferol-
Clodinafop
Clofentezine
Copper hydroxide-
Copper oxychloride
Copper salts of fatty and rosin acids
Copper sulfate
Copper sulfate, tri-basic
Coumachlor
Coumaphene (see Warfarin)
Coumatetralyl
Cuprous oxide
Cyanamide-
Cycloate
Cycloxydim
Cyfluthrin
Beta-Cyfluthrin
Lambda-Cyhalothrin
Cyhexatin
Cymoxanil
Cypermethrin
alpha-Cypermethrin
Cyproconazole
Cyprodinil
Cyromazine
2,4-D
Daminozide
Dazomet
Deltamethrin
Diafenthiuron
Diazinon
Dicamba
Dichlofluanid
1,2-dichloropropane
1,3-dichloropropene
Dichlorvos
Diclofop (-methyl)
Dicofol
Dienochlor
Diethion (see Ethion)
Difenacoum
Difenzoquat (methyl sulfate)
Difethialone
Diflubenzuron-
Dimethoate

Dimethomorph-
Dinobuton
Dinocap-
Diphacinone
Diquat (dibromide)
Diuron-
Dodemorph
Ebufos (see Cadusafos)
Endosulfan
Delta-Endotoxin of Bacillus thuringiensis
Enilconazole (see imazalil)
Esfenvalerate
Ethephon
Ethion
Ethirimol
Ethoprophos
Ethyloleate
Etofenprox
Etridiazole
Famoxadone
Fatty acid potassium salt
Fenamiphos
Fenarimol
Fenazaquin
Fenbutatin oxide
Fenitrothion
Fenoxaprop (ethyl)
Fenoxycarb
Fenpropathrin
Fenpyroximate
Fenthion
Fentin acetate
Fipronil
Flocumafen
Fluazifop-p (butyl)
Fludioxonyl
Flufenoxuron
Flurochloridone
Flusilazole
Flutolanil
Fluvalinate
Folpet
Formothion
Fosetyl (-aluminium)
Gibberellic acid
Glufosinate (-ammonlum)
Glyphosate (incl. Trimesium salt)  Glyphosate (trimeslum) (see Glyphosate)
Haloxyfop-R
Heptenophos
Hexachlorophene
Hexaconazole
Hexaflumuron
Hexythiazox
Hydramethylnon
Hydrogen cyanamide (see Cyanamide)

Hydrolysed proteins
8-Hydroxyquinoline sulfate
Imazalil
Imazamethabenz (-methyl)
Imidacloprid
Indolylbutyric acid
Ioxynil
Iprodione
Isoproturon
Kasugamycin
Lenacil
Lindane
Linuron
Lufenuron
Magnesium phosphide
Malathion
Maleic hydrazide
Mancozeb
Maneb
Mecarbam
Mecoprop-
Metalaxyl
Metaldehyde Metam (potassium) (see Metam-sodium)
Metam (-sodium)
Metazachlor
Methacrifos
Methamidophos
Methidathion
Methiocarb
Methomyl
Methoprene
Methyl bromide
Metiram
Metometuron (see Tribenuron)
Metribuzin
Monocrotophos
Monolinuron
MSMA
Myclobutanil
Naphtalene
1-Naphthylacetic acid
Napropamide
Naptalam
Ofurace
Omethoate
Oxadiazon
Oxadixyl
Oxamyl
Oxine-copper
Oxycarboxin
Oxyfluorfen
Paclobutrazol
Paraffin oil
Paraquat
Parathion

Parathion-methyl
Penconazole
Pencycuron
Pendimethalin
Permethrin
Petroleum oils
Phenamiphos (see Fenamlphos)
Phenmedipham
Phenthoate
2-Phenylphenol (Incl. Sodium salt)
Phorate
Phosalone
Phosmet
Phosphamidon
Pirimicarb
Pirimiphos-methyl
Plant oils
Potassium soap (see Fatty acids potassium salt)
Prochloraz
Procymidone
Prometryne
Propachlor
Propamocarb
Propaquizafop
Propargite
Propineb
Propoxur
Propyzamide
Prosulfocarb
Prothoate
Pyrazophos
Pyrethrins
Pyridafenthion
Pyridate
Pyrifenox
Pyrimethanil
Pyriproxyfen
Quinalphos
Quintozene
Quizalofop-P
Renriduron (see Rimsulfuron)
Rimsulfuron
Scilliroside
Sethoxydim
Simazine
Sodium dioctyl sulfosuccinate
Sodium fluosilicate
Sodium o-nitrophenolate
Sodium p-nitrophenolate
Sodium 5-nitrogualacolate
Sodium 2-phenylphenate (see 2-Phenylphenol)
Streptomycine
Sulphur
Tebuconazole
Tebufenpyrad

Teflubenzuron
Temephos
Terbumeton
Trebuthylazine
Terbutryn
Tetradifon
Tetramethrin
Thiabendazole
Thiocyclam (hydrogen oxalate)
Thiodicarb
Thiometon
Thiophanate-methyl
Thiram
Tolclofos-methy
Tolylfluanid
Tralkoxydim
Triadimefon
Tiadimenol
Triazophos
Tribenuron (-methyl)
Trichlorfon
Triclopyr
Z-9-Tricosene
Tridemorph
Triflumizole
Triflumuron
Trifluralin
Vinclozolin
Warfarin
Zineb
Zineb ethylene thluram disulphide adduct (see Metiram)
Ziram  Z-9-Tricosene (see under T)
Piperonyl butoxide
Bacillus thuringlensis including: subspecies aizawai subspecies israelensis

**Pesticide control**

According to the Pest Control Products Law (1/1993), which substituted the Law 1/67, the registration of each pesticide specifies the commodities to which the pesticide may be applied, application rates and other use restrictions. The registration is granted for a period of five years and may be extended after the manufacturer submits an application for registration renewal. The registration authority may suspend the registration of a product or ban its use in view of official data that dictate such action be taken. Such data may become available through relevant decisions of the European Union, reports of the US.EPA, other national registration bodies, the International Registry of Potentially Toxic Chemicals (IRPTC) and major pesticide manufacturers.

Quality control of pesticide formulations is carried out before and after registration. Random samples are taken from pesticides shops and formulation plants by authorized personnel of the Department of Agriculture and are subjected to various physicochemical tests at the Department's Pesticide Analytical Laboratory. If a sample fails the quality control tests and does not comply with the relevant provisions of the legislation, its withdrawal from the market is requested and legal action may be taken against the manufacturer.

Quality control of pesticide samples before and after registration is an important part of the measures taken by the Department of Agriculture for establishing the safe and efficient use of pesticides. Towards this goal, the Pesticide Analytical Laboratory undertakes certain studies regarding selected groups of pesticides and examines specific problem cases related to heat stability or presence of undesirable impurities in certain products.

**Control of pesticide residues**

The Pesticide Residues Regulations of 1983, under the Food and Drugs Law of 1967, form the Cyprus statutory instrument for fixing MRLs in and on fruit and vegetables. The Ministry of Health is responsible for the implementation of this legislation (control of the agricultural products in the market and residue analyses). The Cyprus MRLs are in agreement with those fixed by the Codex Alimentarius Commission of the UN and WHO as well as those of the EU Directives.

The analytical laboratory of the Department of Agriculture enforces a programme in which agricultural products are checked at the time of harvest for pesticide residues. It also performs surveys and studies in order to collect data on pesticide use of special concern with emphasis on preventing the marketing of products that contain residues over tolerances. Studies required for the registration of pesticides are carried out by the laboratory.

**Pesticide management - education of users**

Pesticide management is done by means of the proper control of pesticide use, i.e. registration of pesticides, quality control, control of label (instructions, crops, dosage, pre harvest intervals etc) and education.

The main means for education of farmers are the seminars, leaflets, TV and radio programmes as well as articles published by the media. Lot of work is done in this respect by the agronomists of the Department of Agriculture who visit the farmers on a regular basis. A leaflet explaining the good agricultural practice (GAP) was prepared for use by the farmers (greek language).

**Application equipment**

Particular attention is paid by the Department of Agriculture to the proper choice of suitable spray equipment by the farmers, as well as to the regular maintenance of machinery in order to ensure efficient working and avoid such defects as worn nozzles. Various types of equipments are used by the farmers for the application of pesticides, such as:

Hand operated hydraulic sprayers
Power overrated hydraulic sprayers
Air carrier sprayers
Knapsack sprayers
Tractor-mounted or trailed air-carrier sprayers
Electric mist blowers
Fogging
Dusters for dust application

**Aerial application of pesticides**

Air-spraying was used for bait applications against olive fly on olive trees as well as in forestry for gypsy moth control. Air-sprayings, however, were stopped in January 1998 with the exemption of those applied in forestry for the control of gypsy moth. For this reason biological insecticides (i.e. Bt) and insectidies of the group of IGRs are allowed to be used.

The main reasons for this decision was the protection of the environment and keeping the natural balance, as well as the protection of human health.

**Pesticide statistics**

Pesticide statistics are kept by the Department of Agriculture because the imports are controlled and a license is given for each shipment of pesticides.

In 1998 about 3 700 tonnes (formulated products) of all types of pesticides were imported and used in Cyprus of a total value of CY£6,0 millions (CIF prices) in contrast to the year 1960, when the amount was CY£150.000

**EGYPT**

### Conventions and Protocols

| | |
|---|---|
| Montreal | 9.5.1988(R) |
| CB | 08.01.93 (a) |
| PIC | |
| Rat.PIC | |
| Sign POP | |
| Rat POP | |
| | †09/06/1992† |
| Rat Biodiv | †02/06/1994†rtf |
| | |

### POPs inventory

| Location | Common name | Commercial name | Qty. Kgs | Qty. Lts | Year | Origin |
|---|---|---|---|---|---|---|
| 12 Governorates | Fenthion | Lebaycid 50% | | 83575 | 1992 | Bayer AG, Germay |
| Various sites | Flamprop-M-Isopropyl | Suffix 20% | | 434 | 1994 | Cyanamid, USA |
| South Sinai | Flocoumafen | Storm 0.005% | 155 | | 1989 | Cyanamid, USA |
| Sharkia | Fluazifop Butyl | Fusilade 25% | | 136 | 1989 | ICI (Zeneca), UK |
| 10 Governorates | Flumethrin | Bayvarol strips | 232606 | | 1991 | Bayer AG, Germany |
| Menofia | Fluometuron+ Metolachlor | Cotoran Extra | 26 | | 1990 | Ciba (Novartis), |
| Kafr El-Shaykh, Behera | Fluometuron | Cotoran 80% | 32 | | 1990 | Ciba (Novartis), |
| 11 Governorates | Furathiocarb | Deltanet 40% | | 1083 | 1991 | Ciba (Novartis), |
| 10 Governorates | Glufosinate ammonium | Basta 40% | | 20350 | 1992 | Hoechst AG, Germany |
| South Sinai | Glyphosate | Round up 48% | | 2 | 1987 | Monsanto, Belgium |
| Qalyubia, Gharbia | Malathion | Malathion 57% | | 84 | 1990 | Cheminova, Denmark |
| Menofia | Mancozeb | Dithane M 44 | 22 | | 1994 | Rohm & Haas, Italy |
| Kafr El-Shaykh, Ismailia | Methomyl | Lannate | | 435 | 1992 | Du Pont, USA |
| Matruh | Methomyl | Lannate 90% | 40 | | 1990 | Du Pont, USA |
| South Sinai | Methomyl | Nudrin 90% | 3 | | 1989 | Cyanamid, USA |
| Various sites | Metribuzin | Sencor 70% | | 2812 | 1982 | Bayer AG, Germany |
| Qalyubia, Gharbia | Mineral oil | Folk oil 82% | | 1310 | 1987 | Al-Amria Petrol Refining,, Egypt |

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|---|---|---|---|---|---|---|
| Alexandria | Mineral oil | Super Royal 95 | | 495 | 1990 | Societe Co-op de Petrp, Egypt |
| South Sinai | Mixture Metalaxyl + copper | Ridmil plus 50% | 7 | | 1991 | Ciba (Novartis) |
| Gharbia | Molinate | Ordram | | 82 | 1989 | ICI (Zeneca), UK |
| Various sites | Monocrotophos | Azodrin 40% | 0 | 1010 | 1991 | Cyanamid, USA |
| Matruh | Paraquat dichloride | Gramaxone 20% | 0 | 4 | 1987 | ICI (Zeneca), UK |
| Kafr El-Shaykh | Pencycuron | Monceren 25% | 47 | | 1994 | Bayer AG, Germany |
| Kafr El-Shaykh | Phenmidipham | Betanal | | 7264 | 1992 | Shering, Germany |
| Kafr El-Shaykh | Phenthoate | Cidial K | | 283 | 1990 | Isagro, Italy |
| Giza | Phosalone | Zolone 35% | | 2 | 1984 | Rhone-Poulenc, |
| Gharbia | Pirimicarb | Pirimor 50% | 1 | | 1990 | ICI (Zeneca), UK |
| Demyat, Gharbia | Pirimiphos Methyl | Actellic 50% | | 343 | 1989 | ICI (Zeneca), UK |
| Ismailia | Thiabendazole | Tecto 45% | | 766 | 1987 | Merck Sharp, Holand |
| Various sites | Thiobencarb | Saturn 50% | | 1972 | 1991 | Kumiai, Japan |
| Kafr El-Shaykh | Thidiazuron | Dropp (defoliant) | 3 | | 1984 | Shering, Germany |
| 15 Governorates | Tralkoxydim | Grasp 10% | | 24722 | 1992 | ICI (Zeneca), UK |
| Demyat, Minia | Tolclofos-methyl | Rizolex 50% | 23 | | 1990 | Sumitomo, Japan |
| Menofia | Triadimefon | Bayleton | 2811 | | 1991 | Bayer AG, Germany |
| Ismailia, Menofia | Tridemorph | Calixin 75% | | 1742 | 1992 | BASF, Germany |
| Menofia | Trifluralin | Treflan Super | | 5415 | 1984 | DowElanco, USA |
| 11 Governorates | Unknown | Abistan | 87280 | | 1991 | Sandoz, Switzerland |
| Suhag | Fenitrothion | Sumithion 30% | | 7062 | 1984 | Sumitomo, Japan |
| Matruh | Fenitrothion | Sumithion 50% | | 100 | 1991 | Sumitomo, Japan |
| Various sites | Edifenphos | Hinosan 50% | | 3605 | 1991 | Bayer AG, Germany |
| Gharbia | Dinocap | Karathane | 86 | | 1991 | Rohm & Haas, Italy |
| Various sites | Diphacinone | T.C.R. 0.005% | 1030 | | 1994 | Hopkins Agric. Chem, |
| Ismailia | Difenacoum | Rat killer | 4877 | | 1993 | ICI (Zeneca), UK |
| Various sites | Diafenthiuron | Polo 50% | | 558 | 1991 | Ciba (Novartis), |
| South Sinai | Cupric hydroxide | Cupric hydroxide | | 7 | 1985 | Griffin International |
| Gharbia, Giza, Minia | Coumachlor | Tomorine 1% | 1030 | | 1993 | Bayer AG, Germay |

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|---|---|---|---|---|---|---|
| Gharbia | Coumatetralyl | Racumin Tech. | 9350 | | 1990 | Bayer AG, Germany |
| 15 Governorates | Copper Sulphate | Copper sulphate | 36363 | | 1987 | |
| South Sinai | Copper Oxychloride | Copper oxychloride | 34 | | 1991 | |
| Gharbia | Chlorpyrifos | Dursban 485 | 0 | 200 | 1993 | DowElanco, UK |
| Kafr El-Shaykh | Chloridazon | Pyramin 65% | 1821 | 0 | 1992 | BASF AG, Germany |
| Kafr El-Shaykh | Chloridazone | Pyradur | 10081 | 0 | 1989 | BASF, Germany |
| Giza | Carbosulfan | Marshal 25% | 12 | | 1993 | FMC Corp., USA |
| Matruh | Carbofuran | Furadan 10% | 497 | | 1984 | FMC Corp., USA |
| Kafr El-Shaykh, Sharkia | Butachlor | Machete 60% | | 708 | 1991 | Monsanto, Belgium |
| Various sites | Butachlor | Machete 60% | | 3043 | 1991 | Monsanto, Belgium |
| South Sinai | Bromopropylate | Neoron | | 5 | 1987 | Ciba (Novartis), |
| Various sites | Buprofezin | Applaud | 1854 | | 1992 | ICI (Zeneca), UK |
| Ismailia | Bromadiolone | Super Caid 0.005% | 1696 | | 1993 | Lipha Lyon, France |
| 10 Governorates | Bifenox | Modown 4F 48 | | 29821 | 1989 | Rhone-Poulenc, France |

**EUROPEAN COMMUNITY**

**PIC consent list**

European Union

**2,4,5-T (CAS: 93-76-5)**
Interim Decision on Import consent
Published: 20/11/2000

Conditions: Member States that do not consent to import: Austria, Belgium, Denmark, Finland, Germany, Ireland, Italy, Luxembourg, Netherlands, Spain, Sweden and the members of the EEA Agreement: Iceland andLiechtenstein. Member States that consent to import (For import prior written authorization is required):France, Greece, Portugal and the United Kingdom.

Remarks: The following administrative action is being undertaken during the period while a final decision is being considered: - 2,4,5 T is included in the Community programme for evaluation of existing active substances under Council Directive 91/414/EEC of 15 July 1991 concerning the placing of Plant Protection Products on the market (OJ L 230 of 19.8.1991, p. 1). The chemical is already prohibited in the following Member States: Austria, Belgium, Denmark, Finland, Germany, Ireland, Italy, Luxembourg, Netherlands, Spain, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein, in their national legislation. Approximate time needed before a final decision can be reached: by 2003. 2,4,5-T is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (JO L 196 du 16.8.1967, p. 1) as: Xn; R 22 (Harmful; Harmful if swallowed) – Xi; R 36/37/38 (Irritant; Irritating to eyes, respiratory system and skin) – N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Aldrin (CAS: 309-00-2)**
Final Decision on Import Prohibit for plant protection use
Published: 30/6/1995

Conditions: For uses other than plant protection written authorization is required for import into Belgium, Denmark,France, Italy, Netherlands and Spain.

**Binapacryl (CAS: 485-31-4)**
Final Decision on Import no consent
Published: 20/11/2000

Remarks: Legislative or administrative measure- Binapacryl is listed in Annex I to Council Regulation (EEC) No 2455/92 of 23 July 1992 concerning the export and import of certain dangerous chemicals (OJ L 251 of 29.08.1992, p. 13) as banned for use as a plant protection product. It is prohibited to use or place on the market all plant protection products containing binapacryl as an active ingredient according to Council Directive 79/117/EEC of 21 December 1978 prohibiting the placing on the market and use of plant protection products containing certain active substances (OJ L 33 of 8/2/79, p. 36), as amended by Directive 90/533/EEC of 15/10/90 (OJ L 296 of 27/10/90, p.63). Binapacryl is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification,

packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: Repr. Cat. 2; R 61 (Reproductive toxicity in category 2; May cause harm to the unborn child.) - Xn; R 21/22 (Harmful in contact with skin and if swallowed.)

**Captafol (CAS: 2425-06-1)**
Final Decision on Import no consent
Published: 20/11/2000

Remarks: Legislative or administrative measure - Captafol is listed in Annex I to Council Regulation (EEC) No 2455/92 of 23 July 1992 concerning the export and import of certain dangerous chemicals as banned for use as a plant protection product. It is prohibited to use or place on the market all plant protection products containing captafol as an active ingredient according to Council Directive 79/117/EEC of 21 December 1978 prohibiting the placing on the market and use of plant protection products containing certain active substances (OJ L 230 of 8.2.1979, p. 36), as amended by Directive 90/533/EEC of 15/10/90 (OJ L 296 of 27/10/90, p. 63). Captafol is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: Carc. Cat. 2; R 45 (Carcinogen in category 2; May cause cancer.) – R 43 (May cause sensitization by skin contact.) - N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Chlordane (CAS: 57-74-9)**
Final Decision on Import Prohibit for plant protection use
Published: 30/6/1995

Conditions: For uses other than plant protection written authorization is required for import into Belgium, Denmark, France, Italy, Netherlands and Spain.

**Chlordimeform (CAS: 6164-98-3)**
Interim Decision on Import
Published: 30/6/1995

Remarks: National authorization schemes apply.

**Chlorobenzilate (CAS: 510-15-6)**
Interim Decision on Import consent
Published: 20/11/2000

Conditions: Member States that do not consent to import: Belgium, Denmark, Finland, Greece, Ireland, Italy, Luxembourg, the Netherlands, Spain, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein. Member States that consent to import (For import prior written authorization is required.): Austria, France, Germany, Portugal and the United Kingdom.

Remarks: The following administrative action is being undertaken during the period while a final decision is being considered: Chlorobenzilate is included in the Community programme for evaluation of existing active substances under Council Directive 91/414/EEC of 15 July 1991 concerning the placing of Plant Protection Products on the market (OJ L 230 of 19.8.1991, p. 1). The chemical is already prohibited in the following Member States: Belgium, Denmark, Finland, Greece, Ireland, Italy, Luxembourg, Netherlands, Spain, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein, in their national legislation. Approximate time needed before a final decision can be reached: by

2003. Chlorobenzilate is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: Xn; R 22 (Harmful; Harmful if swallowed) – N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Crocidolite (CAS: 12001-28-4)**
Final Decision on Import no consent
Published: 1/7/1994

Remarks: For Austria, Finland and Sweden, decision published 07/95.

**DDT (CAS: 50-29-3)**
Final Decision on Import Prohibit for plant protection use
Published: 30/6/1995

Conditions: For uses other than plant protection, written authorization is required for import into Belgium, Denmark, France, Italy, Netherlands and Spain.

**Dieldrin (CAS: 60-57-1)**
Final Decision on Import Prohibit for plant protection use
Published: 30/6/1995

Conditions: For uses other than plant protection written authorization is required for import into Belgium, Denmark, France, Italy, Netherlands and Spain.

**Dinoseb and Dinoseb Salts (CAS: 88-85-7)**
Final Decision on Import Prohibit for plant protection use
Published: 30/6/1995

Conditions: For uses other than plant protection, written authorization is required for import into Belgium, Denmark, Italy, Netherlands and Spain.

**EDB (1,2-dibromoethane) (CAS: 106-93-4)**
Final Decision on Import Prohibit for plant protection use
Published: 30/6/1995

Conditions: For uses other than plant protection, written authorization is required for import into Belgium, Denmark, Finland, Italy Netherlands and Spain.

**Ethylene dichloride (CAS: 107-06-2)**
Final Decision on Import no consent
Published: 19/10/2001

Remarks: Ethylene dichloride (1,2-dichloroethane) is listed in Annex I to Council Regulation (EEC) No. 2455/92 of 23 July 1992 concerning the export and import of certain dangerous chemicals (OJ L 251, 29.8.1992, p.13), as amended by Council Regulation (EEC) No 3135/94 of 15 December 1994 (OJ L 332, 22.12.1994, p.1) as banned for use as a plant protection product. It is prohibited to use or place on the market all plant protection products containing 1,2-dichloroethane as an active ingredient according to Council Directive 79/117/EEC of 21 December 1978 prohibiting the placing on the market and use of plant protection products containing certain active substances (OJ L33, 8.2.1979, p. 36), as amended by Council Directive 87/181/EEC of 9 March 1987 (OJ L 71, 14.3.1987, p. 33).

**Ethylene oxide (CAS: 75-21-8)**
Final Decision on Import no consent
Published: 19/10/2001

Remarks: Ethylene oxide is listed in Annex I to Council Regulation (EEC) No. 2455/92 of 23 July1992 concerning the export and import of certain dangerous chemicals (OJ L 251, 29.8.1992,p.13), as amended by Council Regulation (EEC) No 3135/94 of 15 December 1994 (OJ L332, 22.12.1994, p.1) as banned for use as a plant protection product. It is prohibited to use or place on the market all plant protection products containing ethylene oxide as an active ingredient according to Council Directive 79/117/EEC of 21 December 1978 prohibiting the placing on the market and use of plant protection products containing certain active substances (OJ L33, 8.2.1979, p. 36), as amended by Council Directive 87/181/EEC of 9 March 1987 (OJ L 71, 14.3.1987, p. 33).

**Fluoroacetamide (CAS: 640-19-7)**
Interim Decision on Import
Published: 30/6/1995

Remarks: National authorization schemes apply.

**HCH (mixed isomers) (CAS: 608-73-1)**
Final Decision on Import Prohibit for plant protection use
Published: 30/6/1995

Conditions: For uses other than plant protection, written authorization is required for import into Belgium, Denmark, France, Italy, Netherlands and Spain.

**Heptachlor (CAS: 76-44-8)**
Final Decision on Import Prohibit for plant protection use
Published: 30/6/1995

Conditions: For uses other than plant protection, written authorization is required for import into Belgium, Denmark,Finland, France, Italy, Netherlands and Spain.

Remarks: For other uses than plant protection, national authorization schemes apply.

**Hexachlorobenzene (CAS: 118-74-1)**
Final Decision on Import no consent
Published: 20/11/2000

Remarks: Legislative or administrative measure- Hexachlorobenzene is listed in Annex I to Council Regulation (EEC) No 2455/92 of 23 July 1992 concerning the export and import of certain dangerous chemicals (OJ L 251 of 29.8.1992, p. 13) as banned for use as a plant protection product. It is prohibited to place on the market or use plant protection products containing hexachlorobenzene as an active ingredient in accordance with Council Directive 79/117/EEC of 21 December 1978 prohibiting the placing on the market and use of plant protection products containing certain active substances (OJ L 33 of 8.2.79, p. 36). Hexachlorobenzene is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: Carc. Cat. 2; R 45 (Carcinogen in category 2; May cause cancer.) - T; R 48/25 (Toxic; Toxic: danger of serious damage to health by prolonged exposure if swallowed.) – N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Lindane (gamma-HCH) (CAS: 58-89-9)**
Interim Decision on Import consent
Published: 20/11/2000

Conditions: Member States that do not consent to import: Denmark, Finland, Netherlands, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein. Member States that consent to import (For import prior written authorization is required.): Austria, Belgium, France, Germany, Greece, Ireland, Italy, Luxembourg, Spain, Portugal and the United Kingdom.

Remarks: The following administrative action is being undertaken during the period while a final decision is being considered: Lindane is included in the Community Programme for evaluation of existing active substances under Council Directive 91/414/EEC of 15 July 1991 concerning the placing of Plant Protection Products on the market (OJ L 230 of 19.8.1991, p. 1) and under Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market (OJ L 123 , 24/04/1998, p. 1). The chemical is already prohibited in the following Member States: Denmark, Finland, the Netherlands, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein, in their national legislation. Approximate time needed before a final decision can be reached: by 2003 as PPP and by 2008 as biocides. Lindane is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: T; R 23/24/25 (Toxic; Toxic by inhalation, in contact with skin and if swallowed.) – Xi; R 36/38 (Irritant; Irritating to eyes and skin.) - N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Mercury Compounds (CAS: no single CAS N)**
Final Decision on Import no consent
Published: 30/6/1995

Conditions: Prohibit for use as plant protection product, antifoulant, wood preservative and slimicide. For other uses,written authorization is required for import into the Netherlands.

**Methamidophos (CAS: 10265-92-6)**
(Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
Interim Decision on Import consent
Published: 20/11/2000

Conditions: Member States that do not consent to import: Denmark, Ireland, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein. Member States that consent to import (For import prior written authorization is required.): Austria, Belgium, Finland, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Spain, Portugal and the United Kingdom.

Remarks: The following administrative action is being undertaken during the period a final decision is being considered: ethamidophos is included in the Community Programme for evaluation of existing active substances under Council Directive 91/414/EEC of 15 July 1991 concerning the placing of Plant Protection Products on the market (OJ L 230 of 19.8.1991, p. 1). The chemical is already prohibited in the following Member States: Denmark, Ireland, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein, in their national legislation. Approximate time needed before a final decision can be reached: by 2003. Methamidophos is classified under Council Directive 67/548/EEC of 27 June

1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: T+; R 28 (Very Toxic; Very toxic if swallowed) – T; R 24 (Toxic; Toxic in contact with skin) – Xi; R 36 (Irritant: Irritating to eyes) - N; R 50 (Dangerous to the environment; Very Toxic to aquatic organisms).

**Methyl-parathion (CAS: 298-00-0)**

(emulsifiable concentrates (EC) with 19.5%, 40%, 50%, 60% active ingredient and dusts containing 1.5%, 2% and 3% active ingredient)
Interim Decision on Import consent
Published: 20/11/2000

Conditions: Member States that do not consent to import: Belgium, Denmark, Finland, Ireland, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein. Member States that consent to import (For import prior written authorization is required.): Austria, France, Germany, Greece, Italy, Luxembourg, Netherlands, Spain, Portugal and the United Kingdom.

Remarks: The following administrative action is being undertaken during the period while a final decision is being considered: Methyl parathion is included in the Community Programme for evaluation of existing active substances under Council Directive 91/414/EEC of 15 July 1991 concerning the placing of Plant Protection Products on the market (OJ L 230 of 19.8.1991, p. 1) and Directive 98/8/EC of the European Parliament and of the council of 16 February 1998 concerning the placing of biocidal products on the market (OJ L 123 of 24.4.1998, p. 1). The chemical is already prohibited in the following Member States: Belgium, Denmark, Finland, Ireland, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein, in their national Legislation. Approximate time needed before a final decision can be reached: by 2003 (as PPP) and by 2008 (as biocides). Methyl parathion is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: T+; R 28 (Very Toxic; Very toxic if swallowed) – T; R 24 (Toxic; Toxic in contact with skin).

**Monocrotophos (CAS: 6923-22-4)**

(Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
Interim Decision on Import consent
Published: 20/11/2000

Conditions: Member States that do not consent to import: Belgium, Denmark, Ireland, Luxembourg, Netherlands, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein. Member States that consent to import (For import prior written authorization is required.): Austria, Finland, France, Germany, Greece, Italy, Spain, Portugal and the United Kingdom.

Remarks: The following administrative action is being undertaken during the period while a final decision is being considered: Monochrotophos is included in the Community Programme for evaluation of existing active substances under Council Directive 91/414/EEC of 15 July 1991concerning the placing of Plant Protection Products on the market (OJ L 230 of 19.8.1991, p. 1). The chemical is already prohibited in the following Member States: Belgium, Denmark, Ireland, Luxembourg, Netherlands, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein, in their national legislation. Approximate time needed before a final decision can be reached: by 2003. Monochrotophos

is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: Muta. Cat. 3; R 40 (Mutagenic Category 3: Possible risks of irreversible effects) – T+; R 26/28 (Very Toxic; Very toxic by inhalation and if swallowed) – T; R 24 (Toxic; Toxic in contact with skin) - N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Parathion (CAS: 56-38-2)**

(all formulations - aerosols, dustable powder (DP), emulsifiable concentrate (EC), granules (GR) and wettable powders (WP) - of this substance are included, except capsule suspensions (CS))
Interim Decision on Import consent
Published: 20/11/2000

Conditions: Member States that do not consent to import: Denmark, Finland, Ireland, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein. Member States that consent to import (For import prior written authorization is required.): Austria, Belgium, France, Germany, Greece, Italy, Luxembourg, Netherlands, Spain, Portugal and the United Kingdom.

Remarks: The following administrative action is being undertaken during the period while a final decision is being considered: Parathion is included in the Community Programme for evaluation of existing active substances under Council Directive 91/414/EEC of 15 July 1991 concerning the placing of Plant Protection Products on the market (OJ L 230 of 19.8.1991, p. 1) and under Directive 98/8/EC of the European Parliament and the Council of 16 February 1998 concerning the placing of biocidal products on the market (OJ L 123 of 24.4.1998, p. 1). The chemical is already prohibited in the following Member States: Denmark, Finland, Ireland, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein, in their national legislation. Approximate time needed before a final decision can be reached: by 2003 (as PPP) and by 2008 (as biocides). Parathion is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: T+; R 27/28 (Very Toxic; Very toxic in contact with skin and if swallowed.) – N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Pentachlorophenol (CAS: 87-86-5)**

Final Decision on Import consent
Published: 20/10/2000

Conditions: Member States that do not consent to import: Austria, Belgium, Denmark, Finland, Germany, Greece, Italy, Luxembourg, Netherlands, Sweden and the members of the EEA Agreement: Iceland and Liechtenstein. Member States that consent to import for restricted uses by way of derogation until 31 December 2008: France, Ireland, Portugal and the United Kingdom.

Member State that consents to import for restricted uses by way of derogation until 1 January 2004: Spain. The following conditions apply: Substances and preparations containing PCP, its salts or esters may be placed on the market for use in industrial installations not permitting the emission and/or discharge of PCP in quantities greater than those prescribed by existing legislation:

(a) in the treatment of wood. Treated wood may not be used inside buildings or for the manufacture or re-treatment of containers intended for growing purposes, packaging that may come into contact with raw materials, intermediate or finished products destined for human and/or animal consumption

(b) in the impregnation of fibres and heavy-duty textiles not intended in any case for clothing or for decorative furnishings

(c) for special exceptions authorized on a case-by-case basis In any case, PCP used alone or as a component of preparations employed within the framework of the above exceptions must have a total hexachlorodibenzoparadioxin (HCDD) content of less than 2 ppm, may not be placed on the market in packages of less than 20 litres and may not be sold to the general public. Without prejudice to other labelling requirements, the packaging of such preparations should be marked clearly and indelibly: 'Reserved for industrial and professional use'.

Remarks: legislative or administrative measure - Pentachlorophenol is listed in Annex I to Council Regulation (EEC) No 2455/92 of 23 July 1992 concerning the export and import of certain dangerous chemicals as a severely restricted chemical (OJ L 251 of 29.8.1992, p. 13). The placing on the market and use of products containing pentachlorophenol, its salts and esters, are prohibited by Council Directive 76/769/EEC of 27/7/76 on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations (O.J.L262/201 of 27/9/76, p. 201), as amended by Directive 91/173/EEC of 21/3/91 (OJ L85 of 5/4/91, p. 34) and Directive 1999/51/EC (OJ L 142 of 5/6/99, p. 22). Pentachlorophenol is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: Carc. Cat. 3; R 40 (Carcinogen in category 3; Possible risks of irreversible effects.) - T+; R 26 (Very Toxic; Very toxic by inhalation.) – T; R 24/25 (Toxic; Toxic in contact with skin and if swallowed.) – Xi; R 36/37/38 (Irritant; Irritating to eyes, respiratory system and skin.) - N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Phosphamidon (CAS: 13171-21-6/2378)**

(Soluble liquid formulations of the substance that exceed 1,000 g active ingredient/l)
Interim Decision on Import consent
Published: 20/10/2000

Conditions: Member States that do not consent to import: Belgium, Denmark, Ireland, Luxembourg, Netherlands and the members of the EEA Agreement: Iceland and Liechtenstein. Member States that consent to import (For import prior written authorization is required.): Austria, Finland, France, Germany, Greece, Italy, Spain, Portugal, Sweden and the United Kingdom.

Remarks: The following administrative action is being undertaken during the period while a final decision is being considered:Phosphamidon is included in the Community programme for evaluation of existing active substances under Council Directive 91/414/EEC of 15 July 1991 concerning the placing of Plant Protection Products on the market (OJ L 230 of 19.8.1991, p. 1). The chemical is already prohibited in the following Member States: Belgium, Denmark, Ireland, Luxembourg, Netherlands and the members of the EEA Agreement:

Iceland and Liechtenstein, in their national legislation. Approximate time needed before a final decision can be reached: by 2003. Phosphamidon is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: Muta. Cat. 3; R 40 (Mutagenic Category 3: Possible risks of irreversible effects) – T+; R 28 (Very Toxic; Very toxic if swallowed) – T; R 24 (Toxic; Toxic in contact with skin) - N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Polybrominated Biphenyls (PBBs) (CAS: 13654-09-6)**

Final Decision on Import consent
Published: 1/7/1994

Conditions: Permit, except for use in textile articles intended to come into contact with the skin (e.g. garment, undergarment, linen).

Remarks: For Austria, Finland and Sweden, decision published 07/95.

**Polychlorinated Biphenyls (PCBs) (CAS: 1336-36-3)**

Final Decision on Import no consent
Published: 1/7/1994

Remarks: For Austria, Finland and Sweden, decision published 07/95. Exceptionally, derogation may be granted for primary and intermediate products on a case-by-case basis. With regard to general prohibition of PCB, the import of any preparation with a PCB content of more than 0,005% is prohibited

**Polychlorinated Terphenyls (PCTs) (CAS: 61788-33-8)**

Final Decision on Import no consent
Published: 1/7/1994

Remarks: For Austria, Finland and Sweden, decision published 07/95. Exceptionally, derogation may be granted for primary and intermediate products on a case by case basis. With regard to general prohibition of PCT, the import of any preparation with a PCT content of more than 0,005% is prohibited.

**Toxaphene (Camphechlor) (CAS: 8001-35-2)**

Final Decision on Import no consent
Published: 20/11/2000

Remarks: Legislative or administrative measure: Toxaphene is listed in Annex I to Council Regulation (EEC) No 2455/92 of 23 July 1992 concerning the export and import of certain dangerous chemicals as banned for use as a plant protection product. It is prohibited to use or place on the market all plant protection products containing toxaphene as an active ingredient according to Council Directive 79/117/EEC of 21/12/1978 prohibiting the placing on The market and use of plant protection products containing certain active substances (OJ L 33 of 8/2/79, p. 36), as amended by Directive 83/131/EEC of 14/3/1983 (OJ L 91 of 9/4/83, p. 35). Toxaphene is classified under Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ L 196 of 16.8.1967, p. 1) as: Carc. Cat. 3; R 40 (Carcinogen in category 3; Possible risks of irreversible effects.) - T; R 25 (Toxic; Toxic if swallowed.) – Xn; R 21 (Harmful; Harmful in contact with skin.) – Xi; R 37/38 (Irritant; Irritating to respiratory system

and skin.) - N; R 50/53 (Dangerous to the environment; Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

**Tris(2,3 dibromopropyl)phosphate (CAS: 126-72-7)**
Final Decision on Import consent
Published: 31/12/1994

Conditions: Permit, except for use in textile articles intended to come into contact with the skin (garment, undergarment, linen).

Remarks: For Austria, Finland and Sweden, decision published 07/95.

**European strategy for PCBs**

## 1. INTRODUCTION AND SCOPE

Dioxins, furans and PCBs (polychlorinated biphenyls) are a group of toxic and persistent chemicals whose effects on human health and on the environment include dermal toxicity, immunotoxicity, reproductive effects and teratogenicity, endocrine disrupting effects and carcinogenicity. An increase in the presence in the environment of these substances coupled with several accidents (Yusho (Japan), Yu-cheng (Chinese Taipei), Seveso (Italy), Belgium) have triggered deep concern from the international community for their reduction and control. Moreover, there is considerable public, scientific and regulatory concern over the negative effects on human health and on the environment of long-term exposure to even the smallest amounts of dioxins and PCBs.

Over the past two decades, the Commission has proposed wide-ranging legislation aimed at directly or indirectly reducing the release of these compounds into the environment, with the objective of reducing human exposure and protecting human health and the environment. Recent exposure data show that measures introduced to control dioxin releases have resulted in a substantial reduction in intake of these compounds : levels in humans have been decreasing since the mid-1980s. Since 1995, this tendency has been levelling out and even slightly rising levels have been observed.

There is a pressing need for further action to avoid environmental and adverse health effects from dioxins and PCBs, because: bioaccumulation is continuing along the trophic chain and releases go on from landfills, polluted soils or sediments. The sharp decrease of “background levels” in the environment in the last 20 years will probably not be repeated in the coming decades.

The toxic properties seem to have been underestimated and new epidemiological, toxicological and mechanistic data have emerged in particular with respect to neurodevelopmental, reproductive and endocrine effects, which indicate that dioxins and some PCBs have a broader impact on health than previously assumed, even in very low doses and in particular on the most vulnerable groups like breast-fed infants and the foetus, which is directly exposed to the accumulated maternal body burdens.

The dietary exposure to dioxins and dioxin-like PCBs exceeds the Tolerable Weekly Intake (TWI) or the Tolerable Daily Intake (TDI) for a considerable part of the European population: on 30 May 2001 the Scientific Committee on Food (SCF) of the EU adopted an opinion on the Risk Assessment of dioxins and dioxin-like PCBs in food. The Committee established a group TWI for dioxins and dioxin-like PCBs of 14 pg Toxic Equivalent (WHO-TEQ) /kg bodyweight. This TWI is in line with the provisional Tolerable Monthly Intake of 70 pg/kg bodyweight/month established by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) at its fifty-seventh meeting (Rome, 5-14 June 2001) and concurs with the lower end of the range TDI of 1-4 pg WHO-TEQ/kg body weight, established by the World Health

Organization (WHO) Consultation in 1998. Representative recent dietary intake data indicate that the average dietary 4 intakes of dioxins and dioxin-like PCBs in the EU is in the range of 1.2-3 pg/kg bodyweight and day, which means that a considerable part of the European population would still exceed the TWI or TDI. The European Community has acquired new obligations by becoming a contracting party to several conventions in the field of dioxin and PCB (see 4.2).

The enlargement of the European Union to include Accession Countries is likely to increase the average exposure in the EU. Indeed, the accession countries are likely to produce higher emissions than the EU at the present time through variation in legislation and due to the vast abundance of obsolete industrial plants. They are probably high contributors to the total dioxin emissions into the European environment. This puts an emphasis on the need to ensure compliance with the relevant environmental acquis in the Accession Countries.

In view of the general concern and the new elements that have been described, it has been deemed necessary to develop a Community Strategy for dioxins and PCBs. The Commission has therefore adopted this strategy in order to secure better protection of human health and of the environment from the effects of dioxins and PCBs.

The scope of this Strategy will cover the polychlorinated dibenzodioxins (PCDDs) commonly known as dioxins, polychlorinated dibenzofurans (PCDFs) commonly known as furans, and polychlorinated biphenyls (PCBs). As a way of simplification, throughout the document, the word dioxin will comprise dioxins and furans. Among the PCBs, in term of toxicity, special attention will be given to a small group of so-called « dioxin-like PCBs » 1 which exhibit dioxin-like toxicity.

## 2. OBJECTIVES OF THE STRATEGY

The objectives of the Strategy are: to assess the current state of the environment and the ecosystem; to reduce human exposure to dioxins and PCBs in the short term and to maintain human exposure at safe levels in the medium to long term; to reduce environmental effects from dioxins and PCBs.

The quantitative objective is: to reduce human intake levels below 14 picograms WHO-TEQ per kg bodyweight per week. 1 namely those with no chlorine in the ortho positions (= coplanar PCB) or those with only one chlorine in one of the four ortho positions (= mono-ortho chlorinated PCB) 5

## 3. THE PROBLEM OF DIOXINS AND PCBS

### 3.1 Chemical properties, sources and pathways

Dioxins, furans and PCBs are three of the 12 UNEP internationally-recognized Persistent Organic Pollutants (POPs). POPs are organic compounds of mainly anthropogenic origin that are characterized by their lipophilicity, semi-volatility and resistance to degradation. These characteristics predispose these substances to long environmental persistence and to long-range transport. They are also known for their ability to biomagnify and bioconcentrate under typical environmental conditions, thereby potentially achieving toxicologically relevant concentrations.

Due to their toxic characteristics they pose a threat to humans and to the environment. It is important to highlight that dioxins and PCBs have similar chemical properties and hazardous characteristics but the sources of release are different. Therefore, an effective approach to controlling and reducing their release into the environment should address both of them, but taking into account the differences.

Dioxins are formed essentially as unintentional by-products in a number of chemical processes as well as in almost every combustion process. Soils and sediments are important reservoir sources given the persistence of these pollutants in the environment. The most important route for human exposure to dioxins is food consumption, contributing for more than 90 per cent of total exposure, of which products of fish and other animal origin account for approximately 80 per cent of the overall exposure.

PCBs, and that is the main difference with dioxins, are intentionally produced chemicals that were manufactured for decades before the ban in marketing and use was adopted in 1985 due to their reproductive toxicity and bio-accumulative effects.

The main part of these products, which are very persistent and bioaccumulable in fat of biota, is now spread in soils, sediments and in the whole aquatic environment ("historical pollution"). There are two types of use of PCBs :

(1) Closed uses: dielectric fluids in electrical equipment. From these uses, the main sources of release are : leakage, fires, accidents, illegal dumping and inadequate disposal.

(2) Open uses: as pesticide extenders, flame retardants, sealants, paints,... From these uses the main sources of release are: landfilling, migration, air emissions from evaporation. Other less significant sources are waste incineration, sewage sludge application to land, combustion of waste oils, as well as PCB reservoirs, such as marine and river sediments and harbour sludges.

The fact that dioxins are more toxic than PCBs, but that the quantities of PCBs released into the environment are several times higher has to be taken into account.

### 3.2. Human health effects

A number of types of cancer, as well as total cancer incidence, have been related to accidental and occupational exposure to dioxins (mostly TCDD 2 ). In addition, an increased prevalence of diabetes and increased mortality due to diabetes and cardiovascular diseases have been reported. In children exposed to dioxins and/or PCBs in utero, effects on neurodevelopment, neurobehaviour and effects on thyroid 2 2,3,7,8-tetrachlorodibenzo-p-dioxin6 hormone status have been observed at exposures at or near background levels. At higher exposures, due to accidental and occupational exposure, children exposed transplacentally to PCBs and dioxins show skin defects (such as chloracne), tooth mineralization defects, developmental delays, behaviour disorders, decrease in penile length at puberty, reduced height among girls at puberty and hearing loss. A shift in sex ratio towards females has been observed at the Seveso site when fathers were exposed to TCDD. Humans, sea birds and aquatic mammals are priority targets and victims, as they are at the end of the aquatic trophic chain of these products which bioaccumulate in animal fat. Although dioxin is known as a human carcinogen, cancer is not considered to be the critical effect for the derivation of the Tolerable Intake. The critical effects are neurobehavioural changes, endometriosis and immunosuppression. PCBs are classified as probable human carcinogens and produce a wide spectrum of adverse effects in animals, including reproductive toxicity, immunotoxicity and carcinogenicity.

### 3.3 Ecotoxicology

A wide range of toxicological effects has been observed in wildlife exposed to dioxins in their environment. They range from chronic to acute and include reduction in reproductive success, growth defects, immunotoxicity and carcinogenicity.

However, outside the laboratory, it has not often been possible to demonstrate a clear cause/effect relationship between the observed effects and the exposure to dioxins.

Early life stages (eggs, embryos, larval stages) of most species studied tend to be most sensitive to dioxin toxicity, because the chemicals act on a number of systems important to growth and development, such as Vitamin A and sex hormone metabolism.

## 4. PROGRESS IN ADDRESSING THE PROBLEM

### 4.1. Achievements

According to the "European Dioxin Emission Inventory, Stage II" (LUA-NRW 3 , 2001), launched by the Commission, considerable improvement of the general situation concerning emissions to air during the last decade has occurred, which is due to comprehensive abatement measures carried out in the most industrialized Member States. This improvement is reflected by decreasing dioxin concentrations in ambient air and declining depositions.

Furthermore, the above-mentioned report assessed the emission trend 1985-2005 and foresees that for those industrial processes that are considered as the most relevant emission sources a 90 per cent reduction of dioxin emissions to air will be nearly realized in 2005. This is to a large part due to the successes regarding particular emission sources which already by 1985/1990 were target of active dioxin-abatement policy. In 1985, dioxin emissions from industrial sources represented 77 per cent of the total (industrial + non-industrial) dioxin emissions.

In order to get a clearer insight and to be able to address the problem in an efficient way the Commission has financed several studies (Annex 2) and has proposed a 3 Landesumweltamt Nordrhein-Westfalen7 number of Directives (Annex 1) that reduce the releases of dioxins and PCBs into the environment thereby reducing human exposure to these compounds: Waste incineration: In 1989, for the first time the EU adopted legislation to reduce dioxin emissions from municipal waste incineration by setting up so-called operational conditions, leading to a significant reduction in dioxin emissions.

In response to the target set by the 5th EAP, the Directive 94/67/EC on the incineration of hazardous waste has been added : for the first time an emission limit value (ELV) was set at Community level. In view of the importance of waste incineration as a source of dioxin emissions, the Commission has proposed a new Directive on incineration of waste which will become applicable to existing plants in summer 2005. This new directive, which sets an ELV for all waste incinerators, aims to reduce as far as possible negative effects on the environment caused by the incineration and co-incineration of waste and also targets the incineration of non-hazardous waste, which was once the largest source of emissions of dioxins into the atmosphere. The dominant source of dioxins in the EU has traditionally been uncontrolled waste incineration. The Directives on waste incineration ensure that this will no longer be the case.

**Integrated Pollution Prevention and Control (IPPC)**

Other relevant industrial sectors that generate dioxins are covered by the IPPC

Directive and the BREFs 4 address dioxins explicitly, giving clear indications on achievable ELVs. The Directive is an “integrated” (ie, simultaneously addressing all environmental media – air, water, soil) approach to industrial emission control, such as dioxin emissions. All installations covered by Annex I to the Directive, including installations with dioxin emission potentials are required to obtain a permit from the authorities in the EU countries. The permits must be based on the concept of Best Available Techniques (BAT) and must include ELVs for certain pollutants such as dioxins. The Directive provides for the establishment of a European Pollutant Emission Register, which is a monitoring and harmonization mechanism

designed to collate and publish every three years an inventory of the principal industrial emissions, including dioxin emissions to the air and their sources. Existing installations have to comply by October 2007.

**The Seveso Directives on the control of major-accident hazards**

The Seveso Directives are of critical significance for the protection of communities in the surroundings of relevant installations, and seek to avoid serious accidents such as the Seveso disaster in 1976. Directive 96/82/EC, replacing Directive 82/501/EEC, aims at the prevention of major-accident hazards involving dangerous substances such as dioxins and, secondly, as accidents still continue to occur, it aims at the limitation of the consequences of such accidents.

Releases to water Directive 76/464/EEC establishes the framework for laying down emission limit values and environmental quality standards at EU level for certain categories of substances, including dioxins and PCBs. The Water Framework Directive 4 Best Available Techniques Reference documents8 2000/60/EC integrated the provisions under 76/464/EEC and provides for the progressive reduction or cessation of discharges, emissions and losses of pollutants to water.

**Restrictions on marketing and use of chemicals**

In 1985, the use of PCBs and PCTs was banned through Directive 85/467/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations.

Shipment and disposal of PCB-containing waste: although PCBs and dioxins are identified as a hazardous waste in Council Directive 91/689/EEC the Commission has recognized the need for additional legislation on the disposal of PCB-containing waste, and has introduced such legislation : Council Directive 75/439/EEC on the disposal of waste oils set a maximum limit of 50 ppm for the PCB content of regenerated oil or oil used as fuel.

Council Regulation (EEC) No 259/93 sets strict control procedures for the shipment of PCB-containing waste, to avoid their illegal dumping. A specific Directive (96/59/EC) for the disposal of PCBs and PCTs aims at disposing completely of PCBs and equipment containing PCBs as soon as possible, and for big equipment before the end of 2010.

This Directive sets the requirements for environmentally sound disposal of PCBs. Member States have to make an inventory of big equipment containing PCBs, adopt a plan for disposal of inventoried equipment, and outlines for collection and disposal of non-inventoried equipment (small electrical equipment very often present in household appliances manufactured before the ban on production of PCBs).

The proposal for a Directive on Waste from Electric and Electronic Equipment, which is now being discussed by the Council and the European Parliament, will certainly have a strong impact on the separate collection and environmentally sound disposal of electrical equipment containing PCBs, as it contains an explicit obligation to segregate the hazardous components of electric and electronic equipment before any subsequent treatment is applied.

The Directive on Landfill of Waste (99/31/EC) has resulted in a significant change in the volume and nature of waste accepted at Europe's landfill sites. It has also led to improvements in design and operating standards, as well as in the after care of new and existing landfills. Therefore it should achieve a significant decrease in the releases of PCBs in landfills.

**Animal nutrition**

As a consequence of two contamination incidents in the animal feed sector (citrus pulp pellets from Brazil with high dioxin contamination in 1998 and highly contaminated kaolinitic clay from certain mines in 1999), maximum limits have been established for dioxins in citrus pulp pellets and kaolinitic clay.

## 4.2. International approach

The international community has called for urgent global actions to reduce and eliminate the release of dioxins and PCBs. Therefore, the Commission actively participates in a number of relevant international activities, of which the following are particularly worth mentioning : 9

- the 1990 declaration adopted by the North Sea Conference undertaking, inter alia, 70 per cent reductions of chlorinated dioxins;
- the revised Protocol to the Barcelona Convention for the protection of the waters of the Mediterranean from land-based sources, where dioxins are included in the list of substances to be controlled;
- the Joint UNECE/WHO-ECEH 5 Task Force on Health Aspects of Long-Range Transboundary Air Pollution organized meetings in order to initiate the preparation of the assessment on health risks of POPs from LRTAP;
- a new exchange of letters between the Commission and the WHO was finalized at the beginning of 2000 to strengthen and intensify the framework of cooperation. During the EC/WHO seminar on cooperation on environment and health issues (Brussels, September 2000), WHO and the EC discussed possible future cooperation in the field of dioxins and PCBs and decisions were reached on concrete actions. The European Community is also a Contracting Party to several Conventions with regard to dioxins and PCBs;
- the Basel Convention is designed to control the transboundary movements of hazardous waste and their disposal. PCBs and dioxins are classified as hazardous wastes;
- the OSPAR Convention for the protection of the marine environment of the north-east Atlantic agreed in 1998 on the objective to cease emission, discharges and losses of hazardous substances by 2020 in order to achieve “close to zero” concentrations of compounds such as dioxins/PCBs in the marine environment;
- the Convention on the protection of the marine environment of the Baltic Sea Area : the contracting parties decided to prohibit, totally or partially, the use of PCBs in the Baltic Sea and its catchment areas;
- the UNECE POPs Protocol to the Convention on Long-Range Transboundary Air Pollution, signed by the EU in Aarhus in June 1998, aims to control and reduce the emissions of a number of POPs which require the most urgent action, such as dioxins and PCBs;
- the Stockholm Convention (POPs Convention), signed by the EU in May 2001 in Stockholm, aims to reduce the total release of dioxins, furans and PCBs, with the goal of their continuing minimization and, where feasible, ultimate elimination.

## 4.3. Gaps

Although a lot of progress has been achieved in reducing the releases of dioxins/PCBs in the environment, the following facts have been stated :

- the target set in the 5th EAP will not be achieved : for the industrial sources a considerable emission reduction has been attained (based on current trends and activities it is foreseen that the target set in the 5th EAP of a 90 per cent reduction will be nearly realized in 2005 compared to the levels in 1985) BUT, for the non-industrial sources (domestic solid fuel burning, domestic waste burning, fires, etc..) the rate of emission reduction is much lower. The relation between industrial and non-industrial sources is shifting towards the growing importance of non-industrial sources;

- one million tonnes of PCBs were and used during the 20th century until their ban in 1985. The main part of these products, which are highly resistant to degradation (>30 years) and bioaccumulable in fat of biota, is now spread in soils, sediments and the whole aquatic ecosystem ("Historical pollution");
- in coming years, much equipment and material containing PCBs will be reaching their waste stage, if they have not done so yet, their waste stage, and correct disposal has to be ensured to avoid additional releases into the environment.

Therefore, and in combination with the new elements described in the introduction, there is a need to further address the problem in order to protect human health. To reduce human intake, it is important to reduce the levels in the food chain because food consumption is the most important route for human exposure (90 per cent of total exposure). The most efficient way to reduce the levels in the food chain is to reduce the contamination in the environment. This should be done by :

(1) avoiding "new releases" into the environment;

(2) addressing "historical pollution".

In order to achieve this, the remaining gaps have been identified on the basis of which an action plan has to be developed. These gaps can be classified into gaps in knowledge, gaps in legislation and gaps in implementation of Community legislation.

**Gaps in knowledge:**

Sources and inventories : regarding the emission sources data gaps still exist causing considerable uncertainties in the emission estimates. The inventory of releases to land and water is not complete : further research and data collection is needed to verify the scale of releases from the source sectors which have a high potential for release.

Emissions in the Accession Countries : important dioxin and PCB sources should be identified in the Accession Countries, which may be high contributors to the total dioxin and PCB emissions into the European environment.

Monitoring programmes should be developed in order to control compliance with existing legislation and to monitor the effects of this strategy, the state of the environment and the trends. These programmes will be essential in order to further identify measures. 11 Measurement methods and standards : a necessary condition for effective control and monitoring mechanisms is the availability of appropriate measurement methods and the comparability of data. At present, methods for analyses of dioxins and dioxin-like PCBs are expensive and slow. Therefore, low-cost and fast methods have to be developed allowing routine analysis of a great number of samples and providing quick, cheap, and reliable results on the presence of those compounds in the environment, feed and food. In order to obtain comparable, consistent, reliable and high-quality measurement results, it is necessary to implement a high quality measurement standard at Community level.

Dioxin-like PCBs : measurement programmes performed in the past focused mostly on dioxins. Yet a variety of other compounds probably having similar adverse health effects have been identified, the so-called dioxin-like PCBs. The available database is insufficient to assess the current situation with respect to dioxin-like PCBs. Therefore, the Commission recently launched a study to collect information on concentrations of dioxin-like PCBs in food, feed and in environmental samples across Europe.

Risk Assessment : the European Scientific Committee on Animal Nutrition (SCAN) adopted an opinion on “Dioxins in Feed” on 6 November 2000 and the Scientific Committee on Food (SCF) adopted an opinion on “Risk Assessment of dioxins and dioxin-like PCBs in Food” on 22 November 2000. The SCF updated its opinion on 30 May /2001 based on new scientific information available since the adoption of the SCF opinion of 22 November 2000. However, for the non dioxin-like ("classical" or "non-coplanar") PCBs which have another toxicological profile, which circulate more easily through muscles and blood and affect directly the nervous

system and brain development (namely for foetus and young children) and which could be several orders of magnitude more concentrated than dioxins in aquatic biota such as fish and shellfish, a risk assessment should be carried out.

Public information is needed to inform the public, to allay public concern, to raise awareness about the risks associated with exposure to these compounds and about the role they have to play to prevent further contamination of the environment. It is also important to allow « self identification » of at-risk groups.

Further research is needed on environmental fate and transport, ecotoxicology and human health, agrofood industry, source inventories, analytical aspects, decontamination measures and monitoring. The most important gaps in knowledge concern : (1) transfer and degradation processes (a better understanding and quantification of the fundamental transfer processes by which dioxins and PCBs move between the different environmental media and of the degradation processes occurring within these media is needed); (2) bioaccumulation and bio-magnification processes; (3) domestic incineration of wood (there is an information deficit concerning the amount and the composition of wooden fuels used for room heating and cooking purposes); (4) reservoir sources (the contribution to human exposure, the behaviour and degradation processes and decontamination methods require examination); (5) open uses of PCBs; (6) carry-over rates and transfer factors for dioxins and PCBs from soil and feed to animal tissues and products (milk, eggs).

**Gaps in legislation :**

Legislation to limit and control the presence of dioxins and PCBs in feed and food: In 1998, citrus pulp pellets (CPP) from Brazil with high dioxin contamination were found. Comprehensive investigations revealed that the use of highly contaminated lime (calcium hydroxide) used for the production of citrus pulp pellets was the source of the dioxin contamination of this CPP. It turned out that the highly contaminated lime used was a by-product of a chemical production process.

In 1999, in Belgium, the contamination of fat used to produce feeding stuffs caused severe contamination of different animal products. Investigations found that the discharge of a technical PCB mixture at fat collection sites used for producing feeding stuffs had caused this dioxin contamination. In the same year, grass meal with high dioxin contamination was found in Germany. Here, the dioxin contamination came from the drying process: in an open system, all kinds of wood were burnt, including waste wood with chemical contamination from former paintings or use of preserved wood.

Also in 1999, kaolinitic clay, used as “anticaking agent” in feeding stuffs and as carrier for the production of mineral feed was found to be highly contaminated if it originated from certain mines. Gradually it became obvious that a natural source was discovered. Possibly, geothermal processes formed this unique pattern of dioxins over time from organic material and chlorine.

In June 2000, dioxin levels were found in certain premixtures containing choline chloride, which is used as an animal feed additive. Investigations tracing back the source of contamination revealed that it was not the pure choline chloride itself but the carrier which was contaminated. Although the carrier was declared as corn cob meal, analysis demonstrated that it was not only composed of corn but also of rice husks and/or sawdust presumably treated with a wood preservative. The congener pattern found in the contaminated lots was consistent with the pattern typical of pentachlorophenol contamination, which is used as a wood preservative. During the year 2000, the trace elements zinc oxide and copper oxide from certain origins were found to be contaminated with dioxins at increased levels. These incidents clearly indicate the need to establish legislation in order to limit and control the presence of dioxins and PCBs in feed and food.

**Gaps in implementation of Community legislation**

The PCB Directive has not been adequately implemented and several infringement cases have been launched against Member States for failure to implement the obligations under this Directive. In the case of PCBs, there is currently a deadline of 2010 for destruction and disposal (pursuant to Directive 96/59/EC on the disposal of PCBs and PCTs) of big equipment. However, Member States are experiencing problems in establishing the mandatory inventories of PCB-containing equipment and preventing the illegal dumping and inadequate disposal of PCBs.

## 5. BASIS FOR COMMUNITY ACTION

- The Treaty establishing the European Community provides in Article 152 that a high level of human health protection shall be ensured in the definition and implementation of all Community policies and activities and in Article 174 that Community policy on the environment is to contribute to preserving, protecting and improving the quality of the environment and to protecting human health.
- The Feira European Council held on 19 and 20 June 2000 reaffirmed the need to ensure a high level of protection of human health in the definition and13 implementation of all Union policies. Food safety policy must apply to the entire animal and human food chain and food legislation meeting the most stringent public health criteria should be in place as soon as possible. The European Council asked the Commission to propose harmonized maximum levels for contaminants, in particular for dioxins.
- The European Parliament in its plenary session on 4 October 2000 discussed a proposal for a Directive of the European Parliament and of the Council on undesirable substances and products in animal nutrition. On this occasion, the European Parliament called upon the Commission to set maximum limits for dioxins and PCBs in all feeding stuffs without delay.
- The European Parliament (DG Research : Scientific and Technological Options Assessment) financed the study "Dioxins and PCBs : Environmental and Health Effects" (Bipro-Irce, July 2000) aimed at developing political and technical options for an integrated and systematic approach to secure better protection of human health and of the environment from the effects of dioxins and PCBs. The study aimed to effectively contribute to the European discussion and to support a European dioxin and PCB strategy.
- The European Parliament (Committee on the Environment, Public Health and Consumer Policy) prepared a report on the implementation of Directive 96/59/EC on the disposal of PCBs, and adopted a Resolution in January 2001. The Parliament recommended that the immediate priority should be to implement the existing legislation and called on Member States to make additional efforts to fulfil their obligations. Finally, the Parliament considered that the PCB Directive should be a test case for a better development of more effective policies on other highly toxic substances.
- The Precautionary Principle : precaution underlies the concern of the Commission and is embedded within this Strategy.
- In the Fifth Environment Action Programme entitled "Towards sustainability", presented by the European Commission to the Council, and approved by the Council in 1993 the need to reduce emissions of dioxins is specifically mentioned in relation to air pollution and the treatment of waste. In particular, a target is set for a 90 per cent reduction of dioxin emissions to air from identified sources by the year 2005 compared to 1985 levels.
- In the Sixth Environment Action Programme entitled "Environment 2010:Our Future, Our Choice" the overall Environment-Health objective is to achieve a quality of the

environment where the levels of man-made contaminants do not give rise to significant impacts on or risks to human health.

- In the White Paper on Food Safety, the Commission identified the obvious need to define standards for contaminants throughout the chain from feed to food. In the Action Plan on Food Safety annexed to the White Paper on Food Safety, the setting of maximum levels for several contaminants including dioxins and PCBs for foodstuffs, was one of the measures to be implemented with a view to achieving the highest possible level of health protection. Unavoidably, complementary to the measures to be proposed at the level of food and feed, the need for source directed measures reducing the contamination of the environment has been identified 14.

## 6. STRATEGY

To secure better protection of human health and of the environment from the effects of dioxins and PCBs, an integrated and systematic approach is needed. Therefore, the Commission proposes a strategy :

(1) to reduce the presence of dioxins and PCBs in the environment;

(2) to reduce the presence of dioxins and PCBs in feed and food.

This strategy aims to fill the identified gaps, to improve the link between data collection and a consistent Community response system, to adjust the existing sectoral legislation in order to achieve the Environment-Health objectives of the 6th EAP and to develop incentive measures promoting exchange of information and experience among Member States.

Full enforcement of existing Community legislation by the Member States is a prerequisite for achieving the objectives pursued by this strategy. Furthermore, the success of the strategy will critically depend on the action taken at local and regional levels by communities and Member States.

### 6.1. Strategy to reduce the presence of dioxins and PCBs in the environment

All assessments have stressed the urgent need to reduce the sources of environmental contamination by these compounds to the lowest possible as the most appropriate way to reduce human exposure. Therefore, a set of actions has to be identified for the short- to medium-term and for the long-term.

**SHORT- to MEDIUM-TERM ACTIONS (5 years)**

This set of actions relates to Hazard Identification, Risk Assessment, Risk Management, Research, Communication to the public and Cooperation with third countries and international organizations.

**(A) Hazard Identification**

Further identification of Dioxin and PCB sources

A complete inventory of sources and more knowledge on the share of the different dioxin sources is essential. “The European Dioxin Emission Inventory, Stage II”, (LUA-NRW,2001), launched by the Commission, identified the need for further investigation or actions on specific sources. The Commission will therefore take the following actions :

**Hospital waste incinerators** : a comprehensive inventory of these facilities, including their main operational data, will be generated in the short-term and those countries still relying on the on-site incineration of hospital waste will be encouraged to change to other, less emissive waste management systems and treatment methodologies as soon as possible. This will be supported through the new Directive 2000/76/EC on the incineration of waste as new hospital waste incinerators will have to comply with the obligations of the Directive in December 2002 and all the existing incinerators by December 2005.

Iron ore sintering might become the most relevant industrial sector. The importance of this source will be further enhanced by the facilities located in Accession Countries. Emission measurements at the plants still not tested will be carried out. As dioxin emissions from sintering plants may be reduced considerably by primary measures, the Commission will help to spread this knowledge to the respective contacts in the iron and steel industry. The BREF 6 on the production of iron and steel - established under the IPPC 7 Directive (96/61/EC) - describes such primary measures and is already available on the internet (http://eippcb.jrc.es). The Commission will further promote the use and implementation of BAT in this sector.

Electric arc furnaces might be the only industrial source with constant or increasing emissions to air. However, through application of suitable abatement technologies which have already been developed this trend could be stopped in the future. The same BREF as mentioned in the paragraph above also provides information on dioxins from electric arc furnaces. The Commission will further promote the use of BAT in this sector within the framework of the exchange of information coordinated by the European IPPC Bureau.

**Non - ferrous metal industry** : the facilities for zinc recovery from electric arc furnace (EAF) filter dusts have proven to be major dioxin emission sources. All facilities for zinc recovery from EAF dusts and similar materials and dioxin emissions from these installations will be determined. The BREF of the non-ferrous metal sector mentions the techniques for reduction of dioxin emissions in this sector, which the Commission will further promote.

**Miscellaneous industrial sources** : there is a vast number of miscellaneous industrial installations with small dioxin releases per facility, but together contributing considerably to the annual dioxin emissions in Europe, such as secondary smelters for non-ferrous metals (aluminium, copper), iron foundries (cupola furnaces), cement production. The Commission will encourage the licensing authorities to evaluate possible dioxin emissions from these "low emissive" installations on a case-by-case basis taking into account the information available on BAT for those sectors.

For the categories of installations with the highest dioxin emission potential, the IPPC Directive envisages the adoption of emission limit values for dioxins when the need for Community action has been identified on the basis, in particular, of the exchange of information provided for in Article 16.

**Non-industrial emission sources** : concerning domestic solid fuel combustion, the Commission intends to set up an emission inventory for all EU and Accession Countries and to carry out further research and an accurate quantification on domestic wood and coal combustion. Within the framework of the Risk Communication Strategy (see 6.1.E), better information will be provided to the public on the environmental effects and the abuse of inappropriate materials as fuels for heating purposes and on the risks of domestic waste burning ("backyard burning"). More research on the natural sources of dioxins (clay, mines, etc..) and their share in the overall release into the environment will be promoted. Recently, concern was raised on the emission of dioxins, among a range of other substances, from the burning of animal carcasses 6 Best Available Techniques Reference document 7 Integrated Pollution Prevention and Control16 on pyres as a result of foot and mouth disease.

The Commission will consider whether this choice of disease control strategy is sustainable in view of the practical difficulties it presents in containing its environmental impact in a time frame that is consistent with rapid and effective disease control. The aim will be to ensure that unacceptable emission of hazardous substances into the environment and consequently in feed and the food chain do not occur.

The Inventory of releases to land and water is still incomplete. Further research and data collection will be carried out to verify the scale of releases from the source sectors which have a high potential for release. Not just measurements of concentrations, but also further research on details of activity and processes will be included.

For the PCB sources the Commission will accelerate the establishment of PCB inventories, as required by Directive 96/59/EC and will gain more knowledge on the different open uses of PCBs. For that purpose, the Commission intends to launch a study on the open uses of PCBs. The PCB problem has been seen as an historic one, but recent studies indicate that there may be significant contemporary emissions from a number of industrial processes. Therefore, more recent data are required to assess whether PCBs are formed in the processes or whether the findings are due to re-emission of existing PCBs.

**(B) Risk Assessment**

**Non dioxin-like PCBs**

The Commission will address to the SCF 8 a request for evaluation of the "non dioxin-like PCB's ("classical" or "non-coplanar" PCBs) which have another toxicological profile, which circulate more easily through muscles and blood and affect directly the nervous system and brain development and which could be several orders of magnitude more concentrated than dioxins in aquatic biota such as fish and shellfish.

**Development of measurement methods**

It is necessary to perform more measurements in order (1) to control compliance with existing legislation and also (2) to monitor the effects of executed measures, the state of the environment and the trends. Therefore, scientific research and technological development on low-cost and easily applied routine tests for the measurement of dioxin and dioxin-like PCB contamination in environmental samples in feed and food, as well as research in the field of continuous measurements of dioxin emissions to air, will be promoted. Moreover, guidelines and standards for sampling, data generation and reporting will be developed.

During the EC/WHO seminar (Brussels, September 2000) the WHO and the EC decided jointly to organize a workshop to evaluate rapid screening methods and to identify the research needs in this area.

**Establishment of environmental indicators, including bio-indicators**

In order to monitor the impact of regulatory controls on the environment and on human exposure to dioxins and PCBs, indicators will be developed. The selection of environmental indicators for monitoring purposes will be a short- to medium term 8 Scientific Committee on Food17 action, even though its monitoring is a long-term action. Key organisms, products or compartments will be selected to monitor their dioxin and PCB concentration. This will be done in close cooperation with the Joint Research Centre, the European Environment Agency and the WHO.

**(C) Risk Management**

**Prevention measures**

Priority will be given to specific actions preventing the formation and release of dioxins and PCBs : the Commission will promote the development and use of substitute or modified materials, products and processes to prevent the formation and release of dioxins and PCBs, taking into consideration the general guidance on prevention and release reduction measures in Annex C to the UNEP POPs 9 Convention. This will be done by funding research in this field and by coordinating the exchange of information and experiences among Member States.

**Control of emissions**

To reduce the total releases derived from anthropogenic sources of dioxins and PCBs with the goal of their continuing minimization and, where feasible, ultimate elimination the Commission shall take the following measures according to the obligations of the UNEP POPs Convention :

- promote the exchange of information and experiences among Member States as concerns the current application of available, feasible and practical measures that can expeditiously achieve a realistic and meaningful level of release reduction or source elimination;
- promote the use of BAT and technology transfer in sectors with dioxin and PCB emission potential : the Commission has organized an exchange of information between experts, industry and environmental organizations, coordinated by the European IPPC Bureau. Within this framework, the Commission will encourage the Member States to phase in existing IPPC installations well before the deadline of October 2007. The Commission will also encourage the representatives of Member States and the industries concerned to continue to fully participate in the ongoing information exchange on BAT, and pay special attention to the sectors with dioxin/PCB emission potential, thereby ensuring that the final BREFs will contain progressive BAT conclusions regarding dioxins/PCBs. The Commission will encourage organizations representing the industries concerned, as well as public authorities, to continue to raise awareness within the industries concerned of the obligations under the IPPC Directive, so that operators are well prepared to implement BAT at the latest by October 2007;
- support voluntary measures for the prevention of accidents : commercial enterprises can voluntarily participate in an environmental management system according to Council Regulation (EEC) No 1836/93 (EMAS) or according to ISO 14000. This action is an additional effort to reduce emissions from accidents in spite of existing legal regulations which are laid down in the Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances. Therefore the18 Commission will encourage the development of codes of "best risk management practices" to prevent accidents in the relevant industries.

Clean Air for Europe programme (CAFE) : an important goal for CAFE, as far as dioxin emissions to air are concerned, is to ensure that the various inventories (EIONET, CORINAIR, EPER, EMEP) are harmonized. The identification of measures to reduce dioxin emissions to the air is another area in which links with CAFE are foreseen. The sectoral coordination group to be set up under CAFE will foster information exchange between CAFE, the sectoral integration dossiers and specific sectoral emission reduction policies (such as IPPC). Dioxins will be one of the files to be represented on this group.

**Control of the quality of the environment**

In order to address the problem of fraudulent dumping of PCBs in the environment, the Commission will initiate a debate within the Community to assess the suitability of public or private subsidies for disposal granted to the holders of PCB-containing equipment to prevent any illegal dumping.

The Commission will take all necessary steps to control dioxins and PCBs in all the environmental compartments :

**Water** : The Commission supports two studies on priority substances, including dioxins and PCBs, in the field of water policy with regard to emissions, discharges and losses, source identification, proposals for measures, and quality standards. The "Marine Global Strategy" will include monitoring of micropollutants such as dioxins and PCBs in water, sediment and the ecosystem.

**Soil** : The Commission will establish the cartography of highly polluted soils and sediments. A complete map with accurate results can only be foreseen within 5-10 years. As the dioxin/PCB contamination of feed and food is highly dependent on the soil and sediment contamination, this will provide competent autorities with an important tool to limit the contamination of the feed and food chain as much as possible.

**Waste** : in order to ensure that stockpiles consisting of or containing PCBs and wastes, including products and articles upon becoming wastes, consisting of, containing or contaminated with dioxins and PCBs, are managed in a manner protective of human health and the environment, the Commission shall take the following measures according to the obligations of the Stockholm Convention :

_ Support the development of appropriate strategies for identifying (a) stockpiles consisting of or containing PCBs and (b) products and articles in use and wastes consisting of, containing or contaminated with dioxins and PCBs;

_ Support the identification, to the extent practicable, of stockpiles consisting of or containing PCBs on the basis of the above-mentioned strategies;

_ Endeavour to develop appropriate strategies for identifying sites contaminated by dioxins and PCBs.

The Commission will promote the exchange of information between inspectorates of the different Member States on the subject of PCB waste and compliance with current EU regulations. In the context of the BAT Reference document on waste recovery and disposal activities, to be prepared in 2002 to 2004, special attention will be given to determining BAT for the treatment of waste materials contaminated by PCBs and dioxins.

The Commission supports a study entitled "Dioxins and other POPs in wastes and their potential to enter the food chain" in order to fill the data gaps on the subject of the re-use of contaminated waste in the production of feeding stuffs. Lands have been heavily contaminated by disposal of dioxin and PCB-containing waste.

As one of many possible preventive measures of further contamination of the soils, the Commission is considering amending Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture in order to ensure a high level of environmental protection. A careful assessment of the opportunity of including threshold limit values in sewage sludge for dioxins and PCBs will be carried out.

**(D) Research**

The Commission will encourage all types of research that will contribute to reducing the impact of dioxins and PCBs. It will also bring together researchers across projects to exchange information and will facilitate coordination among Member States. In orde:

(1) to further identify measures to reduce the contamination;

(2) to predict the effects of regulatory controls; and

(3) to be able to monitor the environment (both on ecotoxicological and epidemiological aspects) in the future an integrated approach to research, thus ensuring value for money and appropriate coverage of the key issues is needed. This strategy sets a guidance list of priorities for further research (Annex III) both for the Commission and for the Member States.

**(E) Communication to the public**

To allay public concern, to raise awareness and to inform the public reliable, accurate, clear and comprehensible information will be provided on the Commission’s activities, on possible effects and risks, on uncertainties, etc … During the EC/WHO seminar (Brussels, September 2000), the WHO and the EC decided to jointly define elements of an appropriate risk communication strategy on the subject of dioxins and related compounds and to develop approaches, involving various fields of science as well as all stakeholders.

Within the CAFE programme, active dissemination and communication to the public of technical information and policy development will be given a high profile, to ensure the full involvement of the public in the development and implementation of policy.

To educate the public : the general public has not only to be informed, but has to play an active role in the prevention of releases into the environment. The influence of the public in

the emissions of dioxins can generally only come from a certain awareness concerning the domestic incineration of wood, waste, etc…(the public will be educated on the environmental effects and the abuse of inappropriate materials as fuels for heating purposes - such as treated wood, coal for domestic combustion - and on the risks of domestic waste burning), but the influence of the public in the release of PCBs can be much more important, as household electrical appliances are a very important source of PCBs and households can ensure that their electrical appliances are given to authorized undertakings that will dispose of them in an environmentally sound manner (the public will be eductated on the20 disposal of PCB-containing equipment).

Therefore, exchange of information and experience among Member States as regards education, training and awareness-raising will be promoted by the Commission.

**(F) Cooperation with third countries and international organizations**

Emissions in the Accession Countries are likely to be higher than in the EU. The Commission intends to launch a project in order to identify important dioxin sources and to carry out measurements in the Accession Countries. Cooperation with WHO is essential to avoid duplication of work and will continue in the future. As a contracting party to several conventions in the field of dioxins and PCBs, the Commission will continue international cooperation on this subject.

**LONG-TERM ACTIONS (10 years )**

An important part of this strategy will be a long-term preparation:

(1) to further identify source directed actions; and

(2) to evaluate the efficacy of existing legislation.

In order to implement the "Environment-Health" objectives in the 6th EAP, a set of actions are identified which relate to data collection, monitoring and surveillance and further identification of measures.

**(A) Data collection on the level of dioxin/PCB contamination in air, water (sediment) and soil :**

– The Commission will support the collection of existing data and the setting up of a Geographical Information System (GIS) for the selected indicators. This GIS will be integrated in the global environment GIS strategies. Consequently "hot spots" of high contamination levels will be identified.

– The Commission will support the collection of epidemiological and toxicological data in the same database in order to be able to establish a link between environment and health.

**(B) Monitoring and surveillance of the level of dioxin/PCB contamination in air, water (sediment) and soil :**

– The Commission will support the establishment of programmes to monitor the level of contamination. It is important to set up a very detailed and common procedure of continuous monitoring of the selected indicators in the selected areas. Having a common methodology of monitoring for all areas, the results will be comparable and an overall trend could be discerned across the EU.

– The Commission will conduct surveys and measurements of the status and trends in contamination in order to measure progress in reducing the presence of dioxins and PCBs in the environment.

– The Commission will investigate the possibility of linking epidemiological data collection and monitoring of the environment within the framework of the 6th EAP implementation.

– The Commission will examine the opportunity of developing a rapid alert and reaction system for acute or emergent environmental dioxin and PCB dangers21 within the framework

of the 6th EAP. This system will help to establish information consultation and coordination procedures between Member States.

**(C) Identification of measures :**

The above-mentioned information will provide a comprehensive picture of the environmental dioxin/PCB problem and a good understanding of the trend, which will permit further policy making and evaluation. The Commission will then further identify :

- source directed measures to further reduce the environmental contamination and to guarantee that maximum levels in food and feed can be respected and target levels achieved within a certain period of time;
- measures to improve consumer protection : regular revisions of feed and food limits, adjusted to environmental contamination trends and to risk assessment (including vulnerable groups) will be proposed, as well as transitory restriction for consumption of natural food from "hot spots" and with high bio-accumulation rate.

### 6.2. Strategy to reduce the presence of dioxins and PCBs in feed and food

Food of animal origin is a predominant source of human exposure to dioxins and PCBs. As food contamination is directly related to feed contamination, an integrated approach is followed to reduce dioxin/PCB incidence all along the food chain, i.e. from feed materials through food-producing animals to humans.

Taking measures with regard to feed is therefore a decisive step towards reducing human intake. Measures in food and feed solely based on establishing maximum levels would not be sufficiently effective in reducing the level of feed and food contamination unless the levels are set so low that a large part of the feed and food supply would be declared unfit for animal/human consumption.

Besides the important measures to limit the release of dioxins and PCBs into the environment, other measures aiming at the reduction of dioxins and dioxin-like PCBs in feed and food are envisaged to come into application in the course of the year 2002.

These legislative measures concerning feeding stuffs and foodstuffs consist of three pillars:

- the establishment of maximum levels at a strict but feasible level in food and feed;
- the establishment of action levels acting as a tool for “early warning” of higher than desirable levels of dioxin in food or feed
- the establishment of target levels, over time, to bring exposure of a large part of the European population within the limits recommended by the Scientific Committees.

**Establishment of maximum limits:**

The establishment of maximum limits at a strict but feasible level, gradually decreasing with time, in order to discard the unacceptably highly contaminated products. The establishment of such a limit is a necessary tool for management and to ensure uniform application across the EU.

From a toxicological point of view, limits should include dioxins and dioxin-like PCBs. However, as the data on the occurrence of dioxin-like PCBs are still very limited, in particular for feeding stuffs but also for foodstuffs, this approach may lead to unrealistic limits because the contribution of the dioxin-like PCBs to the total contamination load is different for different food and feed matrices and may be high (up to 4 times the dioxin contribution).

But not acting immediately for dioxin-like PCBs should not prevent immediate action for dioxins. Therefore, measures are proposed for dioxins (PCDD/F) only, awaiting more comprehensive data for dioxin-like PCBs. An active approach is pursued to obtain these data and build up a reliable database in order to allow a revision of the limits for dioxins before the

end of the year 2004 to cover also dioxin-like PCBs, and this in accordance with the toxicological evaluation.

In order to ensure that all operators in the food and feed chain continue to make efforts and take all the necessary measures to limit the presence of dioxins in feed and food, it is envisaged that substantially stricter maximum limits be set within a period of five years.

With regard to feeding stuffs, on 20 July 2001 the Commission submitted draft measures establishing maximum levels for dioxins and furans in several feed materials and feeding stuffs for an opinion to the Standing Committee for Feeding Stuffs. Not having received a favourable opinion on the proposed draft measures, in August 2001 the Commission referred these proposed measures to the Council for adoption 10 .

With regard to foodstuffs, on 25 July 2001 the Commission submitted draft measures establishing maximum levels for dioxins and furans in several foodstuffs for an opinion to the Standing Committee for Foodstuffs. Also not having received a favourable opinion on the proposed draft measures, in August 2001 the Commission also referred these proposed measures to Council for adoption 11 .

For the classical ("non dioxin-like") PCBs which show a different toxicological profile, a risk assessment will be carried out and will be followed by discussions on limit values proposals in the coming years, at least in sea food, which is the main source of human exposure in the EU.

**Action levels and target levels :**

Permanent monitoring of the presence of dioxins and PCBs in feed and food across the EU is necessary. In case of an abnormal increase in the level, those compounds, sources and/or pathways of contamination have to be identified. Once identified, the measures to prevent or reduce contamination from this source could be determined and applied.

In order to determine what has to be considered as an abnormal increased level, an action level is set. Action levels are designed to trigger a proactive approach from competent authorities and operators to identify sources and pathways of 10 Proposal for a Council Directive amending Council Directive 1999/29/EC on undesirable substances and products in animal nutrition (COM (2001) 493 of 28 August 2001) 11 Proposal for a Council Regulation amending Regulation (EC) No 466/2001 setting maximum levels for certain contaminants in foodstuffs. (COM (2001) 495 of 28 August 2001) contamination and to take measures to eliminate them. Exceeding the action level would also automatically imply an analysis of the dioxin-like PCBs in order to build up quickly a reliable database, besides the regular random analysis of the presence of dioxin-like PCBs in food and feed.

Target levels are the levels to be achieved in food and feed whereby it can be reasonably assumed that the dietary exposure of a large majority of the European population will be within the tolerable weekly intake for dioxins and dioxin-like PCBs. These target values will be set in the light of more accurate information on the impact of the environmental measures on the reduction of the presence of dioxins and dioxin-like PCBs in the different feeding stuffs and foodstuffs, more occurrence data, etc. Target values will act as the driving force for measures necessary to further reduce emissions into the environment.

A Commission Recommendation on action and target levels in feed and food addressed to the member States will be adopted at the same time as the Directive and Regulation on maximum limits The measures to reduce the emissions of dioxins and PCBs resulting in a downward trend in their presence in the environment, food and feed, together with the active approach pursued to reduce the presence of dioxins in feed and food, based on the continued efforts of the operators, will cause the contamination levels for the different feed/food groups to shift to lower levels and to ultimately reach the target levels. Therefore, a regular review, gradually decreasing the maximum limits and action levels will be necessary.

## 7. CONCLUSIONS

Dioxins and PCBs are occupying a predominant situation in the consciousness of European citizens because these compounds are known to have severe and far-reaching environmental and health effects. Despite the existing legislation and the progress already achieved in reducing emissions and human exposure, deficiencies still remain. An integrated and systematic approach is lacking. There is an urgent need for action to further reduce emissions and avoid environmental and adverse health effects from dioxins and PCBs.

Therefore it is essential that the Commission adopt a strategy to reduce the presence of those compounds in the environment, in feed and food, including short- to medium-term and long-term actions. Such an integrated approach would have to guarantee that the dioxin and PCB problem is totally under control in 10 years. At that point, this strategy will have to be assessed and eventually revised to take account of the latest progress. The results of this strategy could then be applied to reduce the presence of other persistent hazardous substances in the environment.

**ANNEX I**

**EXISTING COMMUNITY LEGISLATION REGARDING DIOXINS AND PCBs**

**Waste incineration**

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

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

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

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

**Waste**

– Council Directive 75/442/EEC of 15 July 1975 on waste

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

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

– Council Directive 99/31/EC of 26 April 1999 on the landfill of waste

– Council Directive 75/439/EEC of 16 June 1975 on the disposal of waste oils integrated pollution prevention and control

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

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

**Water**

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

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

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

**Restricions on marketing and use of chemicals**

– Council Directive 85/467/EEC of 1 October 1985 amending for the sixth time (PCBs/PCTs) Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations

– Council Directive 91/173/EEC of 31 March 1991 amending for the ninth time Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations

**Other PCB legislation**

– Council Directive 76/403/EEC of 6 April 1976 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (banning the use of PCBs in open applications such as printing inks and adhesives)

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

**Major accident hazards**

– Council Directive 82/501/EEC of 24 June 1982 on the major-accident hazards of certain industrial activities

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

**Animal nutrition**

– Council Directive 1999/29/EC of 22 April 1999 on the undesirable substances and products in animal nutrition

– Commission Regulation (EC) No 2439/1999 of 17 November 1999 on the conditions for the authorization of additives belonging to the group “binders, anti-caking agents and coagulants” in feedingstuffs, as amended by Commission Regulation (EC) No 739/2000 of 7 April 2000. 26

**ANNEX II**

**DIOXIN/PCB STUDIES FINANCED BY THE COMMISSION**

_ « The European Dioxin Inventory : Identification of Relevant Industrial Sources of Dioxins and Furans in Europe », by North Rhine-Westphalia State Environment Agency, 1997

_ "The European Dioxin Emission Inventory - Stage II", by LUA-NRW, January 2001

_ « Releases of Dioxins and Furans to Land and Water in Europe », by AEA Technology, September 1999

_ « Compilation of EU Dioxin Exposure and Health Data », by AEA Technology, England, October 1999

_ « Evaluation of occurrence of PCDD/PCDF and POPs in wastes and their potential to enter the food chain », by the University of Bayreuth at the Department of Prof. Hutzinger, September 2000

_ "Exploration of possible future POP control areas", AEA Technology Environment, September 2000

_ "Dioxins and other POPs in wastes and their potential to enter the foodchain - stage II",

_ « PCDD/Fs, PCBs, PBBs and PBDD/Fs : environmental pathways for human exposure », by Arbeitsgemeinschaft Dioxin Projekt

_ "Environmental cycling of selected persistent organic pollutants in the Baltic region (POPCYCLING-BALTIC)"

_ "Gobal mass balance of persistent semi-volatile organic compounds : an approach with PCB as an indicator (GLOBAL-SOC)"

_ "Measuring and modelling the dynamic response of remote mountain lake ecosystems to environmental change : a programme of mountain lake research (MOLAR)"

**EXPOSURE AND RISK ASSESSMENTS PERFORMED BY THE COMMISSION**

_ “Assessment of dietary intake of dioxins and related PCBs by the population of EU Member States », Scientific Co-operation on questions relating to Food – Task 3.2.5. – 7 June 2000

_ “Dioxin contamination of feedingstuffs and their contribution to the contamination of food of animal origin”, Opinion of the Scientific Committee on Animal Nutrition adopted on 6 November 2000

_ “Risk assessment of Dioxins and Dioxin-like PCBs in Food”, Opinion of the Scientific Committee for Food (SCF) adopted on 22 November 2000

_ Update of the “Risk Assessment of Dioxins and Dioxin-like PCBs in Food “ based on new information available since the adoption of the SCF opinion of 22 nd November 2000; Opinion of the Scientific Committee for Food adopted on 30 May 2001

_ "Risks of environmental dioxins: Linking epidemiology with toxicity studies to strengthen accurate risk assessment", February 2000

**ANNEX III**

**RESEARCH PRIORITIES Dioxins and PCBs**

H = high priority
m = medium priority

## 1. Environmental fate and transport

Atmospheric environment

| | |
|---|---|
| Vapour/particle partitioning of individual PCDD/F congeners | m |
| Particle size distribution data for PCDD/Fs associated with particles | m |
| Measurements of wet and dry deposition | H |
| Modelling studies of PCDD/F behaviour in the atmospheric environment | H |
| Long range transport (over Europe) | H |

Terrestrial environment

| | |
|---|---|
| Define the rates of transport and degradation in soils | m |
| The significance of root uptake especially the interspecies variability | H |
| PCDD/Fs transferred to plant via soil splash and animal trampling | m |
| Assessment of air to soil transfer and of the various deposition mechanisms to vegetation (wet, dry particle, and dry gaseous) | H |
| Fate and transport of PCBs and PCDD/Fs in landfills | H |
| Studies on the levels of PCDD/Fs associated with burning PCP treated wood | H |
| Studies on the levels and sources of PCDD/Fs in composted material and the environmental fate of the PCDD/Fs in the composted material and in sewage sludge | H |
| _ Modelling studies of PCDD/F behaviour in the terrestrial environment H<br>_ Appropriate plants to be used as bio-accumulators of PCBs and PCDD/Fs H<br>_ More measurements of background concentrations of PCBs and PCDD/Fs in vegetation and animal tissue and definition of reference values | H |

Aquatic environment : general research has been very extensive, therefore it is proposed to focus on more specific gaps

| | |
|---|---|
| Quantify input of PCDD/Fs from soil runoff at catchment level | m |
| _ Further information about the stability of PCBs and PCDD/Fs in sediments under different redox environments especially if the toxicity of the PCBs and PCDD/F mixture increases through degradation | m |
| Development of standardised sampling strategies for determining representative PCDD/F concentrations in fish and sediments | H |
| Partitioning of PCDD/Fs between the particulate and dissolved organic phases in the water column; apply experimental work to field situations | m |
| Availability of organic carbon-associated PCDD/Fs in sediments for aquatic ecosystem | H |
| Modelling studies of PCB and PCDD/F bio-accumulation/bio-magnification in the aquatic environment and the food chain | H |
| Degradation of PCBs into metabolites in water and sediments | H |

## 2. Ecotoxicology and human health

| | |
|---|---|
| Estimates of human exposure to dioxin and PCBs through ingestion, inhalation, skin contact | H |
| the effects of chronic or periodic exposure to PCBs (and metabolites) and to dioxins | H |

| | |
|---|---|
| identification of particular vulnerable species as bio-indicator for the monitoring and protection of “at risk” habitats or sites | H |
| elaboration of a methodology to set limit values for lower effect levels in fauna | H |
| upgrading knowledge on bio-accumulation factors in the trophic chain | H |
| Establish a Toxic Equivalent Factor for non-coplanar PCB congeners with thyroid interaction or neurotoxicity. | H |
| significance of climate, agricultural practices and dietary regimes to PCB and dioxin exposure in Southern Member States of the EU, which differ from those of the Northern Member States | H |
| Epidemiological studies, including target groups like foetus, infants, etc … | H |
| Identification of biomarkers of health effects in humans and animals | m |

## 3. Agrofood industry

| | |
|---|---|
| Studies on the carry-over and establishing pertinent transfer factors for the different PCBs and PCDD/F from soil, sediment and feedingstuffs to animals tissues, including fish (e.g meat, fat) and products (e.g milk and eggs). Particular attention needs to be paid to the dioxin-like PCBs : | H |
| Determination of transfer factors for PCDD/F from soil and feedingstuffs to animal tissues and products for cattle (ruminants) | m |
| Determination of transfer factors for dioxin-like PCBs from soil and feedingstuffs to animal tissue and products (milk) for cattle (ruminants) | H |
| Determination of transfer factors for PCDD/F and PCBs (in particular dioxin-like PCBs) from soil and feedingstuffs to animal tissues and products (eggs) for poultry | H |
| Determination of transfer factors for PCDD/F and PCBs (in particular dioxin-like PCBs) from feedingstuffs to animal tissues and products for pigs | H |
| Determination of transfer factors for PCDD/F and PCBs (in particular dioxin-like PCBs) from sediment and feedingstuffs for fish | H |
| A characteristic profile of dioxin like compounds congener in beef | m |
| Assessment of agricultural or industrial practices (such as hot air feedstuff drying, use of chemical substances like solvents, pelleting aids etc…for the production of feedingstuffs, fermentation, …) for their potential to produce PCDD/Fs | H |
| Quantification of potential PCB and PCDD/F input into animal feedstuff via recyclates such as used eadible oils & fats, slaughterhouse wastes etc… | H |
| PCDD/F in manure | m |

## 4. Source inventories

| | |
|---|---|
| Source data on PCBs | H |
| Contribution of waste and recycling of waste (including processes) to total emissions into environment /foodchain | H |
| Contribution of products to total emission into the environment (eg cosmetics, pesticides, textiles, plastics, paper, …) | H |
| Domestic incineration of wood and coal combustion (domestic + industrial) | H |
| Reservoir sources (behaviour, degradation processes, decontamination methods,..) | H |
| Natural sources of dioxins and their share in the overall release into the environment | m |
| New sources of PCBs as by-products of chemical industry | m |
| Dioxin from accidental and incidental fires (buildings, vehicles, waste, etc..)…. | m |

## 5. Analytical aspects

| | |
|---|---|
| Investigation on cheaper,faster and reliable analytical alternatives and their limitations | H |
| A standard approach to interpreting data sets containing values below the Limit of Detection (LOD) | m |
| Inter-calibration of dioxin laboratories in order to ensure consistent results across Europe | H |
| guidelines/standards for sampling, data generation and reporting | H |

## 6. Decontamination measures

| | |
|---|---|
| Decontamination methods for products (mothermilk, fish oil, …) | H |
| Decontamination methods for soils and sediments | H |

## 7. Monitoring

| | |
|---|---|
| Development of a Geographical Information System (GIS) integrated in the global environment GIS strategies | H |

**Inventory of PCBs in the European Community**

A recent estimation (in 1994) concerning the European PCB quantitative has been carried out by DGXI, which has commissioned a consultant to carry out the study. This evaluation envisages assessing the distribution of PCBs within each country belonging to the European Community and the total overall volume of PCBs within Europe with a view to total PCB elimination by 2010 (EC 96/59). PCB wastes have been split into three different categories: *liquid PCBs* (pure PCBs or askarel)*, solid PCBs, PCB contaminated oils.*

The total volume of liquid PCBs in the European Community, according to the DGXI estimates, is supposed to be around 200 000 tonnes. These PCBs come from already-existing transformers and condensers, which will have to be disposed of. Germany, France and Italy play the leading role and have the largest amount of PCBs, exceeding the figure of 40 000 tonnes each, whereas Greece, Portugal and Ireland seem to have the lowest PCB concentration. The total amount of solid PCBs (transformers and big condensers) has been estimated at around 400 000 tonnes.

The following table shows, for each EC member country, the percentage of PCB contaminated oils within the total overall quantity of mineral oil transformers, which is not specified. France and southern European countries have the highest percentage of contaminated oil.

| Liquid PCBs (tonnes) | | |
|---|---|---|
| Country | Transformers | Big capacitors |
| Belgium | 10,000 | < 2,000 |
| France | 45, 000 | >2,500 |
| Germany | 30,000 | 12,000 |
| U.K. | 3,000 | <6,000 |
| Ireland | 100 | <250 |
| Spain | 22, 000 | 3,000 |
| Portugal | 2,500 | 500 |
| Italy | 45,000 | <7,000 |
| Greece | 2,500 | 500 |
| TOTAL | » 160,000 | » 33,000 |
| Total amount » 200 000 | | |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 17.10.1988(Ap) |
| CB | 07.02.94 (AA) |
| PIC | 11/09/98 |
| Rat.PIC | |
| Sign POP | 23 May 2001 |
| Rat POP | |
| | 13/06/1992 |
| Rat Biodiv | 21/12/1993 |

**FRANCE**

## Overall situation [3]

In 1999, France undertook to ratify and implement the Protocols to the Barcelona Convention "stressing the importance of signing, ratifying and applying the conventions and Protocols that had been prepared" [report of the Eleventh Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its Protocols, Malta, 27-30 October 1999. UNEP(OCA)/MED IG. 12/9, para.79].

France has ratified four of the Protocols, but has not yet signed either the Offshore Protocol or the Hazardous Wastes Protocol. It is a large producer of radioactive waste, covered by the Hazardous Wastes Protocol. By signing and ratifying this Protocol, France would undertake to end the shipment of radioactive waste and other special industrial waste in countries of the Mediterranean Basin not members of the European Union.

In early 2000, wishing to strengthen international legislation on protection of the marine environment after the Erika disaster, the French Prime Minister, Lionel Jospin, announed that France "will sign without delay the Protocols to the Barcelona Convention on offshore activities and waste". (Interministerial Committee on the Sea – Interministerial Committee on Land Use Planning – Nantes, 28 February 2000, p.5).

The Rhône is the river that releases by far the largest volume of water into the Mediterranean (54.01 billion $m^3$/year). In France, the average volume of waste water treated is only 49 per cent and in some under-equipped regions such as Provence-Alpes-Côte d'Azur even this figure is difficult to attain. Because of its strong water flow, the Rhône has considerable diluting power that hides a significant contribution to organic pollution of urban and industrial origin in the Mediterranean.

In a recent report, the Authority for the Rhône-Mediterranean-Corsica basin laid emphasis on two priorities needed for achieving a satisfactory ecological status : a reduction in the level of nitrogenous inputs (122,552 tonnes/year) and a decrease in organic micropollution.

There are very few data on the flow of organic micropollutants. Nevertheless, the information available allows the flow of some contaminants to be estimated : 80 tonnes of hydrocarbons/year; 16.7 tonnes of PAH/year; 268 kg. of polychorinated biphenyls (PCBs)/year; 562 kg. of hexachlorocyclohexane (HCH)/year; 263 kg. of DDT/year; 14.3 tonnes of triazine/year; 281 kg. of hexachlorobenzene (HCB)/year; 30 kg. dieldrine/year. These figures do not include the considerable industrial pollution from the Fos/Marseille area. The majority of industries in this area discharge their pollutants directly into the Mediterranean. A programme to evaluation 132 micropollutants is being prepared. This report of public interest will not, however, link an industry to a list of substances discharged in order to protect the manufacturing secrets of the industries concerned.

"*Qualité des Eaux du Rhône, Evolution 1969-1995*", July 1999, Water Authority for the Rhône-Mediterranean-Corsica basin.

France produces 53 million tonnes of household waste, 94 million tonnes of non-hazardous industrial waste, 354 million tonnes of inert waste, 375 million tonnes of agricultural waste, and nine million tonnes of hazardous industrial waste. (IEFN (French Environment Institute), 1999)

[3] Extract Greenpeace France

At their Twelfth Ordinary Meeting, to be held in Monaco from 14 to 17 November 2001, the Contracting Parties to the Barcelona Convention will adopt the "Operational document for the Implementation of the Strategic Action Programme (SAP) to Eliminate Pollution in the Mediterranean Sea from Land-based Activities". Greenpeace has asked the French Government to adopt this Plan and implement it at the national level. Furthermore, as the SAP calls for the elimination of dioxins and furans, incineration, which is a major source of emission of these substances, should be abandoned.

**Hot spots**

Two important French hot spots are in the Rhône basin and are mainly due to the petrochemical industry.

**Lyon and the "chemicals corridor"**

Lyon is the spearhead of the chemicals industry. Located together south of Lyon in what is commonly called the "chemicals corridor" are 16 dangerous factories classified Seveso. Six of them are subsidiaries of the TotalFinaElf group and a large part of industrial activity in this area focuses on the group's refineries and its two steam cracking plants at Feyzin, which produce ethylene and propylene.

In this area there are many chemicals-related activities, for example, the production of plastics, paints, glues and pharmaceuticals. The two leading enterprises are Atofina (TotalFinaElf) and Rhodia (Rhône-Poulenc/Aventis).

**Marseille and Fos / Etang de Berre**

At the other end of the Rhône, there is the brackish-water lake of Berre, surrounded by the cities of Fos, Martigues, Lavera, Vitrolles, Marignane, Rognac, Berre, La Mède, Istres and the two industrial zones of Port-de-Bouc and Port Saint Louis. The zone includes:

- refineries : BP Lavera, Shell Berre, Esso Refinery Fos-sur-Mer, Total La Mède;

- petrochemical industries: Atofina, BP Chemicals, Basell (BASF and Shell) Fos, Lyondell Chimie (Bayer);

- metal works : secondary steel works at Sollac (Usinor) and aluminium at Pechiney.

**Coastal hot spots**

The whole of the French Mediterranean coast shows signs of serious contamination by organic pollutants including polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), dichlorodiphenyltrichlorethane (DDT) and its by-products, hexachlorocyclohexane (HCH) and its by-products, and tributylethane (TBT).

These compounds can be found both in coastal sediment and in molluscs. In the bay of Marseille, IFREMER (French Institute for Marine Research and Exploitation) measured 19,075 µg/kg of PAH. Greenpeace found up to 234,000 µg/kg of TBT in sludge from the port of Marseille. Near Montpellier, the lake of Thau, which is used for oyster and shellfish farming, is contaminated by PCBs (966 µg/kg) and PAH ( µg/kg). The river Arc, which flows directly into the sea, contains up to 76,900 µg/kg of toluene in its sediment. "RNO 1998 – *Surveillance du milieu marin*", study by RNO, published in 1998, IFREMER/MATE.

**PIC Convention**

**Import Decisions**

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import consent
Conditions: For plant protection use, written authorization is required.

Remarks: Non-registered plant protection product.

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import consent
Conditions: For plant protection use, written authorization required.

Remarks: Non-registered plant protection product.

**Designated national authorities**

| | |
|---|---|
| DNA Industrial Chemicals and Pesticides<br>Monsieur le Directeur<br>Direction de la prévention des pollutions et des risques / Bureau des substances et préparations chimiques<br>Ministère de l'aménagement du territoire et de l'environnement<br>Paris 07 SP, 75302<br>20 av. de Ségur<br>Fax +33 1 42191468<br>Phone +33 1 42191585 | DNA Pesticides<br>Monsieur le Directeur<br>Bureau de contrôle des produits phytosanitaires, Sous-Direction de la protection des végétaux<br><br>Ministère de l'agriculture et de la fôret<br>Paris CEDEX 13, 75646<br>175, rue du Chevaleret<br>Fax +33 1 45708169<br>Phone +33 1 15841313 |

**PCB inventory France**

**Composition of the working group:**

Competent authorities : Ministry of the Environment – Industry
Public authorities :
Production, transport and distribution of electricity
Transport
Telecom
Private sector
Firms engaged in maintaining transformers
Firms engaged in treating used oils
Firms engaged in destroying PCBs
Firms engaged in manufacturing transformers
Large private companies
Automobile sector

Duration : 15 months

**Criteria for the disposal of PCB transformers**

Two criteria have been adopted : the age and the sensitivity of the sectors where they are used, the level of maintenance.

| Age of transformer | Time limit for destruction |
|---|---|
| > 30 years | 2 years |
| > 25 years | 4 years |
| > 20 years | 6 years |
| > 15 years | 8 years |

**Risk sectors**

Hospitals, clinics, retirement homes, medical centres
Schools and universities
Shopping centres
Agrofood-related industrial activities
Water and sewage services
Offices open to the public

**Exemptions**

Installations in industrial zones where maintenance is carried out properly.

**Technical measures proposed**

Mandatory declaration of any element testing positive for PCB
Inventory of non-classified transformer repairers
Inventory of non-classified scrap metal sites
Measurement of volume of PCBs present in the soil bordering zero-classified scrap metal installations
Sampling and measurement of PCBs in greenhouse heating and dehydration plants

**Inventory statistics**

Summary table of the amount of PCBs by type of elimination
Volume of metal to be decontaminated
Liquids to be incinerated
Breakdown of equipment by age
Breakdown of transformers by sector of activity
Trend in destruction according to the disposal criteria
Cost of treatment
Cost of replacement
Cost of upgrading

**Inventory data**

**1 – "Pure" PCBs (PCB > 60%)**

| | Number | Liquid PCB ( tonnes) | Solid PCB ( tonnes ) |
|---|---|---|---|
| Transformers | 75,000 | | |

| | | | |
|---|---|---|---|
| Condensers | 500,000 | 5,350 | 16,500 |

Breakdown by age

| Age | Percentage of total number |
|---|---|
| < 30 years | 100 % |
| 10 years < age < 20 years | 50 % |
| < 10 years | 11 % |

Breakdown by sector :

50 per cent of all PCB transformers are in industrial plants.

**2 – Mineral oil transformers**

Number of transformers > 50 ppm : 600,000, of which 42 per cent are in the production, transport and electricity distribution sectors.

Level of contamination :

| | |
|---|---|
| > 2 000 ppm | 5 % |
| 2000 ppm > PCB > 1000 ppm | 5 % |
| 1000 ppm > PCB > 50 ppm | 90 % |

Volume of PCBs in the mineral oils :
Average per transformer : 0.2 T oil
Average volume of PCBs per transformer : 0.1 to 0.2 ks
Total PCBs : 50 to 100 tonnes

**Working group's summary**

Elimination of PCB transformers at the end of their industrial life.

Advance destruction of transformers containing PCBs is not ecologically rational and might lead to uncontrolled destruction.

Identification of the dispersed sources of pollution from open sites (small condensers, transportable radiators, additives, fireproofing additives, adhesive agents, plasticizers, insecticides, bactericides, waterproofing, recycling of paper and paperboard, spreading of sewage sludge, recirculation through dredging, discharge into the atmosphere, etc.

Strengthen control of recycling and treatment channels.

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 4.12.1987(Ap) |
| CB | 07.01.91 (AA) |
| PIC | 11/09/98 |
| Rat.PIC | non |
| Sign POP | 23 May 2001 |
| Rat POP | non |
| Sign Biodiv | 13/06/1992 |

| | |
|---|---|
| Rat Biodiv | 01/07/1994 |
| Barcelona | |

**Atmospheric pollution**

**Persistent organic pollutants (POPs)**

**Emissions in 1998**

The calculations for 1970-1998 have been carried out on the basis of emission expert estimates adopted from the POPCYCLING-Baltic project [*Pacyna et al.,* 1999]. The spatial distributions of emissions for 1998 are given in the table below:

| POPs | Total emission (t/y) |
|---|---|
| B[a]P | 26.4 |
| PCCD/Fs | 1119* |
| HCB | 1.285 |
| PCBs | 20.347 |

*** for PCDD/Fs - g I-TEQ/y**

**Average levels of depositions and concentrations in various media for 1998**

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air, pg/m$^3$ | Soil, | Vegetation | Sea, | Emission | Deposition | Total deposition, |
|---|---|---|---|---|---|---|---|
| | | ng/g d.w. | ng/g d.w | pg/l | flux g/km$^2$/y | flux, g/km$^2$/y | kg/y |
| PCDD/Fs* | $9.56\sum10^{-3}$ | $2.20\sum10^{-4}$ | $4.03\sum10^{-3}$ | $2.06\sum10^{-3}$ | $2.03\sum10^{-3}$ | $4.02\sum10^{-4}$ | $2.21\sum10^{-1}$ |
| HCB | 56.00 | 0.06 | 0.57 | 5.73 | 2.34 | 0.21 | 113.91 |
| PCBs | 304.00 | 2.00 | 91.10 | 45.20 | 38.32 | 5.00 | 2652.58 |

***- I-TEQ**

**Upper and lower estimations of PCB pollution levels for 2010**

Using the multicompartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, pg/m$^3$ | | Soil, ng/g d.w. | | Deposition flux, g/km$^2$/y | |
|---|---|---|---|---|---|
| max | min | max | min | max | min |
| 273 | 15.8 | 1.4 | 1.2 | 4.44 | 0.27 |

**Transboundary deposition fluxes and air concentrations of B[a]P in 1998**

Contributions of European countries to annual mean and maximum diurnal air concentrations, as well as for deposition fluxes of B[a]P averaged over the country, are summarized in the table below:

| POPs | Annual mean conc. | Maximum diurnal conc. | Deposition fluxes to | Deposition fluxes from |
|---|---|---|---|---|
| B[a]P | 2, ng/m3 | 2, ng/m3 | 2, g/km2/y | 2, g/km2/y |
| | chart | chart | chart | chart |

Comparison of modelling results with measurements

This section presents the comparison of modelling results with measurements carried out at the EMEP measurement sites during 1989-1998, found in the literature and obtained from personal contacts with national experts.

**HCB**

**Concentrations in air, ng/m$^3$**

| Location | Year | Measured | | | Calculated | | |
|---|---|---|---|---|---|---|---|
| | | mean | min | max | mean | min | max |
| France | 1992 | | 0.09 | 2.4 | 0.047 | 0.038 | 0.057 |
| France | 1993 | | 0.05 | 0.48 | 0.049 | 0.039 | 0.059 |

* These data were systematized in the Technical Note []

**PCDD**

**Municipal solid waste incineration in France**

For municipal solid waste incineration ADEME estimated an annual emission of around 400 g I-TEQ/year from the arithmetic mean value of the emission factors. Using the published concentrations and multiplying them with a typical specific flue gas volume of 5,000 m•/tonne waste and with a yearly operation time of 8000 hours the annual emissions obtained are: 435 g I-TEQ/year for 1997, 350 g I-TEQ/year for 1998 and 227 g I-TEQ/year for 1999.

Abatement measures as well as closures of plants have reduced the emissions from municipal solid waste incinerators in France considerably and the actual situation in 2000 is likely to improve further. For the year 2000, annual emissions are assessed to be around 200 g I-TEQ/year. It appears unlikely that all existing plants will be retrofitted until 2005 to comply with the emission limit value of 0,1 ng I-TEQ/m•, but if the trend observed during the recent years continues a further emission reduction by 50 per cent seems to be realistic.

**Dioxin emissions from the French metallurgical industries**

The results of the measurements carried out at iron ore sintering plants and secondary non-ferrous metal producing facilities within the French dioxin programme were published in terms of annual emission freights only. These values can be converted to emission concentrations if the specific production values of the investigated plants are known. For the six French sintering plants, emissions of 93 g I-TEQ/year are reported by the French dioxin survey. Thus, as in other countries with integrated steel works, the French iron ore sintering process constitutes a considerable emission source too.

A number of electric arc steel works were revealed to be rather strong dioxin emitting sources as well. Overall, 36 g I-TEQ/year were calculated mainly from the measurement results of six plants. Another 11,5 g I-TEQ were assigned to secondary aluminium production, whereas copper and lead production facilities were estimated to cause emissions of little more than 2 g I-TEQ/year each. Slightly higher emissions of 3,4 g I-TEQ/year are released from iron foundries; coke ovens and some other installations in the metallurgical industries appeared to be of minor importance. One particular facility of the non-ferrous metal sector was revealed to be by far the most relevant single source, it was estimated to emit about 200 g I-TEQ/year.

According to the company, a three-step abatement programme was carried out to reduce the emissions less than 1 ng I-TEQ/m•. Measurements confirmed an emission reduction of more than 90 per cent.

**Other French dioxin emission sources**

Regarding other emission sources, a considerable lack of knowledge still exists with respect to clinical waste incineration. There are three incinerators specially designed for hospital waste incineration. These installations presumably use a pyrolysis reactor combined with a post-combustion unit. Additionally, one plant for hazardous waste incineration is mentioned.

About 20 plants for municipal solid waste incineration are used for co-combustion of hospital waste. Besides these plants, on-site combustion facilities might also still be in operation. The number of these small facilities was decreasing considerably during the last decade from about 1,400 installations in 1991 to about 400 after 1994. How many on-site facilities are operated actually seems to be uncertain. No data have yet been published on the distribution of hospital waste to the different types of plants and on measurement results from on-site incinerators. Dioxin emissions from co-incinerated hospital waste were already considered within the estimate for municipal solid waste incinerators. For 1995, a revised dioxin emission level between 10 and 50 g I-TEQ/year was estimated, the value at the lower end of this range being more probable due to continuing closures of small on-site incinerators and abatement measures at the co-incineration plants.

## GREECE

### PIC consent list

**Chlordimeform (CAS: 6164-98-3)**

Final Decision on Import no consent

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import consent
Conditions: As ingredient of rodenticides, written authorization is required.

### Atmospheric pollution indicators

**Detailed report for Greece**
**Persistent Organic Pollutants (POPs)**
Emissions in 1998
Average levels of depositions and concentrations in various media for 1998
Upper and lower estimations of PCB pollution levels for 2010
Transboundary deposition fluxes and air concentrations of B[a]P in 1998
Comparison of modelling results with measurements
Trends in emissions, depositions and average concentrations in media for 1970 - 1998

### Persistent organic pollutants (POPs)

Emissions in 1998

The calculations for 1970-1998 have been carried out on the basis of emission expert estimates adopted from the POPCYCLING-Baltic project [*Pacyna et al.,* 1999]. The spatial distributions of emissions for 1998 are given in the table below:

| POPs | Total emission (t/y) |
|---|---|
| B[a]P | 2.89 |
| PCCD/Fs | 122* |
| HCB | 0.175 |
| PCBs | 0.221 |

*** for PCDD/Fs - g I-TEQ/y**

### Average levels of depositions and concentrations in various media for 1998

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air, pg/m$^3$ | Soil, | Vegetation, | Sea, | Emission flux | Deposition flux, g/km$^2$/y | Total deposition, kg/y |
|---|---|---|---|---|---|---|---|
| | | ng/g d.w. | ng/g d.w | pg/l | g/km$^2$/y | | |
| PCDD/Fs* | $3.05\sum10^{-3}$ | $4.89\sum10^{-5}$ | $8.42\sum10^{-4}$ | $4.55\sum10^{-4}$ | $9.10\sum10^{-4}$ | $1.47\sum10^{-4}$ | $1.97\sum10^{-2}$ |
| HCB | 53.00 | 0.02 | 0.24 | 4.51 | 1.31 | 0.07 | 9.63 |
| PCBs | 71.00 | 0.40 | 13.70 | 9.40 | 1.82 | 1.40 | 170.24 |

***- I-TEQ**

**Upper and lower estimations of PCB pollution levels for 2010**

Using the multicompartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, pg/$m^3$ | | Soil, ng/g d.w. | | Deposition flux, g/$km^2$/y | |
|---|---|---|---|---|---|
| max | min | max | min | max | min |
| 58 | 6.8 | 0.2 | 0.2 | 1.21 | 0.1 |

**Transboundary deposition fluxes and air concentrations of B[a]P in 1998**

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 29.12.1988(R) |
| CB | 04.08.94 (r) |
| PIC | 11/09/98 |
| Rat.PIC | |
| Sign POP | 23 May 2001 |
| Rat POP | |
| | †12/06/1992 |
| Rat Biodiv | †04/08/1994 |

**PCDD**

**Greece — Measurements EAF steel plant, rotary kiln, hospital waste incinerator**

The very first PCDD/F emission measurements at industrial installations in Greece are reported. Sampling and analysis was done by an experienced German research institute in cooperation with a Greek company. Of the facilities investigated, an electric arc furnace (EAF) steel plant proved to have the highest annual emission of about 1 g I-TEQ/year.

By extrapolation of this emission using the production rate of the measured plant and the statistically reported entire Greek production, it may be assumed that 4-5 g I-TEQ will be released to air from Greek EAF furnaces annually. A lower annual emission, but much higher flue gas concentrations exceeding the scheduled European emission limit of 0,1 ng I-TEQ/m• by more than a factor 3,000, were found at a hospital waste incinerator.

This finding is a confirmation of the Stage I assessment regarding this process. Annual emissions of about 35 g I-TEQ/year can be estimated from statistical data. Finally, a rotary kiln process for drying residual materials from olive oil production was found to be negligible with regard to emissions of dioxins and furans.

## ISRAEL

**Overall situation :**[4]

In 1999, the representative of Israel declared that "it was the responsibility of decision-makers both in the public and private sectors to ensure that, at a time of intensive economic growth, development did not harm the Mediterranean's fragile environment". [report of the Eleventh Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its Protocols, Malta, 27-30 October 1999. UNEP(OCA)/MED IG. 12/9, para.94)

Israel has not yet ratified or implemented any of the Protocols to the Barcelona Convention, with the exception of the Emergency Protocol, despite its repeated undertakings to do so.

As is the case in the majority of Mediterranean countries, many industries in Israel have been polluting the Mediterranean and Israel's coastal regions for decades.

Ratifying the Barcelona Convention and drawing up plans to implement the Protocols on land-based sources of pollution and trade in hazardous waste are crucial steps towards a sustainable future.

**Hot spots :**

All Israel's rivers, but particularly the Kishon and Yarkon, receive a number of substances that poison their waters. These rivers discharge their pollutants directly into the Mediterranean.

One other hot spot is around the Ramat-Hovav incinerator, where the surrounding communities, including the Bedouin, suffer from respiratory diseases.

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 30.6.1992(Ac) |
| CB | 04.12.94 (r) |
| PIC | 20 May 1999 |
| Rat.PIC | |
| Sign POP | 30 Jul 2001 |
| Rat POP | |
| | †11/06/1992 |
| Rat Biodiv | †07/08/1995 |

**There are no PIC import decisions from this country!**

[4] Extract Greenpeace France

## ITALY

### Overall situation

Italy has ratified four of the six Protocols to the Barcelona Convention but still has still ratify the Offshore and Hazardous Wastes Protocols.

Like many other countries, Italy is facing a crisis regarding waste. Each year, Italy produces 108 million tonnes of waste, of which approximately 30 million tonnes are urban waste. There is no sign of a slowing down in the generation of waste.

Eighty per cent of Italy's waste goes to landfill sites, 7 per cent is incinerated and the remaining 13 per cent is recycled through sorting. Waste is sorted more in the north of Italy (23 per cent) than in the south (1 to 2 per cent) (ANPA (National Environmental Protection Agency) and ONR (National Waste Monitoring Centre) June 2001).

Apart from the sheer problem of mass generation of waste, the Italian waste management system is facing a problem of illegal traffic in waste. This problem underlines the urgent need for ratification and implementation of the Hazardous Wastes Protocol by Italy and also by all the other Mediterranean countries.

Around 40 million tonnes of waste generated in Italy go into illegal channels, sustaining an "ecomafia" that pockets around €6 billion a year. (Parliamentary Commission on the waste cycle and illegal activities, 28 March 2001)

### Hot spots

At the recent meetings of the Parliamentary Commission on the waste cycle and illegal activities, it was found that the regions most implicated in the waste trade were Campania, Lazio, Calabria and Sicily.

### PIC consent list

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import no consent

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import no consent
Conditions:For other uses, written authorization required.

### Atmospheric pollution indicators

Detailed report for Italy
Persistent Organic Pollutants (POPs)
Emissions in 1998
Average levels of depositions and concentrations in various media for 1998
Upper and lower estimations of PCB pollution levels for 2010
Transboundary deposition fluxes and air concentrations of B[a]P in 1998

**Persistent organic pollutants (POPs)**

Emissions in 1998
The calculations for 1970-1998 have been carried out on the basis of emission expert estimates adopted from the POPCYCLING-Baltic project [*Pacyna et al.,* 1999]. The spatial distributions of emissions for 1998 are given in the table below:

| POPs | Total emission (t/y) |
|---|---|
| B[a]P | 13.9 |
| PCCD/Fs | 799* |
| HCB | 0.795 |
| PCBs | 6.054 |

*** for PCDD/Fs - g I-TEQ/y**

**Average levels of depositions and concentrations in various media for 1998**

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air, pg/m$^3$ | Soil, | Vegetation | Sea, | Emission flux | Deposition flux, | Total deposition, |
|---|---|---|---|---|---|---|---|
| | | ng/g d.w. | ng/g d.w | pg/l | g/km$^2$/y | g/km$^2$/y | kg/y |
| PCDD/Fs* | $1.01\sum10^{-2}$ | $1.74\sum10^{-4}$ | $2.16\sum10^{-3}$ | $1.35\sum10^{-3}$ | $2.62\sum10^{-3}$ | $4.16\sum10^{-4}$ | $1.27\sum10^{-1}$ |
| HCB | 60.00 | 0.06 | 0.29 | 4.96 | 2.61 | 0.16 | 48.33 |
| PCBs | 246.00 | 2.40 | 36.10 | 30.50 | 22.24 | 4.05 | 1103.33 |

*** - I-TEQ**

**Upper and lower estimations of PCB pollution levels for 2010**

Using the multicompartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, pg/m$^3$ | | Soil, ng/g d.w. | | Deposition flux, g/km$^2$/y | |
|---|---|---|---|---|---|
| | | | | | |
| max | min | max | min | max | min |
| 210 | 18.4 | 1.5 | 1.4 | 3.49 | 0.28 |

**Transboundary deposition fluxes and air concentrations of B[a]P in 1998**

Contributions of European countries to annual mean and maximum diurnal air concentrations, as well as for deposition fluxes of B[a]P averaged over the country, are summarized in the table below:

| POPs | Annual mean conc. | Maximum diurnal conc. | Deposition fluxes to | Deposition fluxes from |
|---|---|---|---|---|
| B[a]P | 2, ng/m3 | 2, ng/m3 | 2, g/km2/y | 2, g/km2/y |
| | chart | chart | chart | chart |

**Comparison of modelling results with measurements**

This section presents the comparison of modelling results with measurements carried out at the EMEP measurement sites during 1989-1998, found in the literature and obtained from personal contacts with national experts.

**PCDD/F**

**Soil concentrations, pg I-TEQ/g**

| Location | Measured | | | Calc. | Reference |
|---|---|---|---|---|---|
| | Year | Range | Average | | |
| Italy | 1993 | 1.9 - 3.1 | 2.4 | 0.18 | *Buckley-Golder et al.*, 1999 |

**HCB**

**Concentration in vegetation, ng/g**

| Location | Year | Measured | | | Calculated | | | References |
|---|---|---|---|---|---|---|---|---|
| | | mean | min | max | mean | min | max | |
| Northen Italy | 1991-1992 | - | 1.4 | 9.8 | 0.32 | 0.25 | 0.98 | *Coleman et al, 1994* |
| Southern Italy, Naples | 1991-1992 | 2.2 | - | - | 0.32 | 0.25 | 0.98 | *Coleman et al, 1994* |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 19.9.1988(R) |
| CB | 07.02.94 (r) |
| PIC | 11/09/98 |
| Rat.PIC | |
| Sign POP | 23 May 2001† |
| Rat POP | |
| | †05/06/1992† |
| Rat Biodiv | †15/04/1994†rtf |

## LEBANON

### Overall situation

In 1999, Berj Hatjian, Director General of the Ministry of the Environment, stated that "The Lebanese Government's vision was governed by six rules. First, the reference agencies should accept and involve the public as a legitimate partner. Second, careful planning and performance evaluation were essential, making use of any mistakes as lessons for the future. Third, every effort should be made to listen to the audience. Fourth, the importance of honesty, frankness and openness had to be recognized, since they were the key to success. Fifth, intra- and inter-governmental coordination and collaboration should be promoted, and sixth, attention should be given to the needs of the media, the major transmitter of information to the general public" [report of the Eleventh Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its Protocols, Malta, 27-30 October 1999. UNEP(OCA)/MED IG.12/9, para. 102]

Lebanon became a Contracting Party to the Barcelona Convention in 1975 and approved the amendments in 1995. Despite its approval of the amendments to the Protocols, Lebanon has not made great progress in ratifying them. It has only ratified two of the seven legal instruments : the Emergency Protocol and the Specially-Protected Areas Protocol.

All along Lebanon's coast there are waste dumps that allow toxic substances to flow into the marine environment on a daily basis. More than 100,000 m3 of industrial waste are discharged into the sea every day by Lebanese industries, and more than 25,000 tonnes of solid industrial waste are discharged into the environment each year, according to a report by Dar El-Handsah in 1997 for the Lebanese Ministry of the Environment.

Domestic waste water, mixed with untreated industrial waste, is discharged directly into the Mediterranean through outfall pipes along the Lebanese coast. In addition, many industrial plants along the coast discharge their wastewater and solid waste directly into the sea or, indirectly, via the rivers.

In 1997, samples of effluent and water were taken along the Lebanese coast. The analysis of 111 samples showed high concentrations of heavy metals such as cadmium and chromium. These toxic waters exacerbate the degradation of the marine environment and have a direct impact on human health. A study of the Lebanese coast in July and August 2001 showed that no measures had been taken to counteract the degradation of the marine environment and the coastal zones.

The implementation of the Strategic Action Plan (SAP) to eliminate pollution of the Mediterranean from land-based activities has highlighted the following:

The elimination of dioxin and furans by incineration, which is a major source of emission of these substances, should be abandoned.

The degradation of the environment caused by other polluting industries in Lebanon. Medical waste incinerators are an important source of contamination by dioxins. Five hospitals officially use polluting incinerators in residential areas, although they represent a risk for human health and cause degradation of the environment.

The Lebanese Chemical Company, situated in Selaata on Lebanon's northern coast, produces phosphorus fertilizers and discharges 25,000 m3 of wastewater into the

Mediterranean each day.

**Toxic hot spots**

Uncontrolled discharges on the Lebanese coast, such as that at Bourj Hamoud, cause further degradation of the marine environment. There are five vast waste dumps along the coast : those in Saida, Tyr, Tripoli, Normandy and, more notorious, Bourj Hamoud, and they symbolize the waste crisis in Lebanon.

**FAO pesticides Inventory**

| Country | Location | Common name | Commercial name | Qty. Kgs | Qty. Lts | Year | Origin | Comments |
|---|---|---|---|---|---|---|---|---|
| Lebanon | Talamara | Fenitrothion | Fenitrothion | 0 | 6800 | | various | disposed of FAO/TCP funding |
| Lebanon | Bekaa valley | Unknown | various | 2500 | 0 | | Various | disposed of FAO/TCP funding |
| Lebanon | Unknown | Unknown | various | 179350 | 0 | | ? | estimated |
| Lebanon | Various | Amitraz | Mitac of AGRIPEST | 0 | 0 | 1992 | AgrEvo | disposed of FAO/TCP funding |

**PIC consent list**

**Import decisions**

**Aldrin (CAS: 309-00-2)**
Final Decision on Import no consent
Published: 6/30/93

**Chlordane (CAS: 57-74-9)**
Final Decision on Import no consent
Published: 6/30/93

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import no consent
Published: 12/31/93

**DDT (CAS: 50-29-3)**
Final Decision on Import no consent
Published: 6/30/93

**Dieldrin (CAS: 60-57-1)**
Final Decision on Import no consent
Published: 6/30/93

**Dinoseb and Dinoseb Salts (CAS: 88-85-7)**
Interim Decision on Import no consent
Published: 6/30/93

Remarks: Need more time.

**EDB (1,2-dibromoethane) (CAS: 106-93-4)**
Final Decision on Import no consent
Published: 6/30/93

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import no consent
Published: 6/30/93

**HCH (mixed isomers) (CAS: 608-73-1)**
Final Decision on Import no consent
Published: 6/30/93

**Heptachlor (CAS: 76-44-8)**
Final Decision on Import no consent
Published: 6/30/93

**Mercury Compounds (CAS: no single CAS N)**
Final Decision on Import no consent
Published: 6/30/93

**Designated National Authorities**

DNA Pesticides
Monsieur le Directeur
Comité National ICP
Ministère de l'Agriculture
Beirut,
Building of the Green Project

**UN/ECE reported official emission data :**

No available data .

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 30.3.1993(Ac) |
| CB | 21.12.94 (r) |
| PIC | |
| Rat.PIC | |
| Sign POP | 23 May 2001 |
| Rat POP | 12/06/1992 |
| Rat Biodiv | 15/12/1994 |

**FAO database inventory**

| Location | Common name | Commercial name | Qty. Kgs | Qty. Lts | Year | Origin | Comments |
|---|---|---|---|---|---|---|---|
| Talamara | Fenitrothion | Fenitrothion | 0 | 6800 | | various | disposed of FAO/TCP funding |
| Bekaa | Unknown | Various | 2500 | 0 | | Various | disposed of FAO/TCP |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| valley | | | | | | | funding |
| Unknown | Unknown | Various | 179350 | 0 | | ? | estimated |
| Various | Amitraz | Mitac of AGRIPEST | 0 | 0 | 1992 | AgrEvo | disposed of FAO/TCP funding |

**LIBYA**

**PIC consent list**

There are no PIC import decisions from this country!

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 11.7.1990(Ac) |
| CB | 12.07.01 (a) |
| PIC | |
| Rat.PIC | |
| Sign POP | |
| Rat POP | |
| | †29/06/1992 |
| Rat Biodiv | †12/07/2001 |

**FAO database inventory**

| Location | Common name | Commercial name | Qty. Kgs | Qty. Lts | Year | Origin |
|---|---|---|---|---|---|---|
| Tripoli-Benghazi-Locust | gamma-HCH | Lindane | 150 | 0 | 1970 | ? |
| Tripoli-Benghazi-Locust | Malathion | Malathion | 0 | 9358 | 1980 | ? |
| Tripoli-Benghazi-Locust | Marstan | Marstan | 150 | 0 | 1970 | ? |
| Tripoli-Benghazi-Locust | Milcurb | Milcurb | 250 | 0 | 1973 | ? |
| Tripoli-Benghazi-Locust | Mitnan | Mitnan | 0 | 53 | | ? |
| Tripoli-Benghazi-Locust | Nemacun | Nemacur | 75 | 0 | | ? |
| Tripoli-Benghazi-Locust | PhosÈthyl-aluminium | Aliette | 658 | 0 | | ? |
| Tripoli-Benghazi-Locust | Ronilan | Ronilan | 85 | 0 | | ? |
| Tripoli-Benghazi-Locust | Trifluralin | Treflan | | 4867 | | ? |
| Tripoli-Benghazi-Locust | Unknown | Senchen | 470 | 0 | | ? |
| Tripoli-Benghazi-Locust | Unknown | Dosonox | 3440 | 0 | | ? |
| Tripoli-Benghazi-Locust | Vydate | Vydate | 280 | 0 | | ? |
| Tripoli-Benghazi-Locust | Dieldrin | Dieldrin | 20 | 0 | 1975 | ? |
| Tripoli-Benghazi-Locust | Cupzavitame | Cupzavitame | 8 | 0 | | ? |
| Tripoli-Benghazi-Locust | Carboxin | Vitax | 7928 | 0 | | ? |
| Tripoli-Benghazi-Locust | Carbaryl | Sevin | 16200 | 0 | 1971 | ? |
| Tripoli-Benghazi-Locust | Benomyl | Benlate | 230 | 0 | | ? |
| Tripoli-Benghazi-Locust | Basamid | Basamid | 20 | 0 | 1978 | ? |

## MALTA

### General comments

Malta has ratified all the Protocols to the Barcelona Convention, with the exception of the Offshore Protocol due to its petroleum exploitation interests.

Despite ratification of the majority of the Protocols to the Barcelona Convention, Malta's environment is a victim of the waste crisis in Malta. Decades of poor waste management have led to vast mountains of waste on both Malta and Gozo islands.

This waste includes building and demolition waste, as well as household, hospital and hazardous waste. It contains toxic substances and potentially radioactive substances. Waste from private hospitals and clinics helps to keep these dumps growing and makes them even more dangerous.

Landfill sites are not controlled and constitute a serious threat to public health and the environment due to the contamination of the water table, the marine pollution and toxic emissions they cause.

There are currently six incinerators on Malta and Gozo. The largest hospital incinerator is to be replaced by a cleaner one.

The process of elaborating a waste management strategy that would include the rehabilitation of landfill sites has been initiated. The Government's objective is to build an incinerator by 2013.

In Malta, several thousand tonnes of chemical substances are discharged into the Mediterranean each year through waste water. Eighty per cent of untreated waste water is directly discharged into the sea at Xaghra, leading to contamination of the surrounding coast by …….

### Hot spots

Samples taken from the landfill site at Maghtab have shown the presence of high levels of toxic substances, including dioxins at levels exceeding 10,000 times that in uncontaminated soil.

### PIC consent list

**2,4,5-T (CAS: 93-76-5)**
Final Decision on Import no consent
Published: 2/4/1998

**Aldrin (CAS: 309-00-2)**
Final Decision on Import no consent
Published: 30/6/1993

**Captafol (CAS: 2425-06-1)**
Final Decision on Import no consent
Published: 2/4/1998

**Chlordane (CAS: 57-74-9)**
Final Decision on Import no consent
Published: 31/12/1993

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import no consent
Published: 31/12/1993

**Chlorobenzilate (CAS: 510-15-6)**
Final Decision on Import no consent
Published: 2/4/1998

**DDT (CAS: 50-29-3)**
Final Decision on Import no consent
Published: 30/6/1993

**Dieldrin (CAS: 60-57-1)**
Final Decision on Import no consent
Published: 30/6/1993

**Dinoseb and Dinoseb Salts (CAS: 88-85-7)**
Final Decision on Import no consent
Published: 30/6/1993

**EDB (1,2-dibromoethane) (CAS: 106-93-4)**
Final Decision on Import no consent
Published: 31/12/1993

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import no consent
Published: 30/6/1993

**HCH (mixed isomers) (CAS: 608-73-1)**
Final Decision on Import no consent
Published: 30/6/1993

**Heptachlor (CAS: 76-44-8)**
Final Decision on Import no consent
Published: 31/12/1993

**Hexachlorobenzene (CAS: 118-74-1)**
Final Decision on Import no consent
Published: 2/4/1998

**Mercury Compounds (CAS: no single CAS N)**
Final Decision on Import no consent
Published: 31/12/1993

**Pentachlorophenol (CAS: 87-86-5)**
Final Decision on Import no consent
Published: 2/4/1998

**Atmospheric pollution indicators**

Detailed report for Malta
Persistent Organic Pollutants (POPs)
Emissions in 1998
Average levels of depositions and concentrations in various media for 1998
Upper and lower estimations of PCB pollution levels for 2010
Comparison of modelling results with measurements
Trends in emissions, depositions and average concentrations in media for 1970 - 1998

**Persistent organic pollutants (POPs)**

Emissions in 1998
No available emission data
Average levels of depositions and concentrations in various media for 1998

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air, pg/$m^3$ | Soil, | Vegetation, | Sea, | Emission flux | Deposition flux, | Total deposition, |
|---|---|---|---|---|---|---|---|
| | | ng/g d.w. | ng/g d.w | pg/l | g/$km^2$/y | g/$km^2$/y | kg/y |
| PCDD/Fs* | $1.18\sum10^{-3}$ | $1.60\sum10^{-5}$ | 0.00 | $2.71\sum10^{-4}$ | 0 | $7.58\sum10^{-5}$ | $3.00\sum10^{-5}$ |
| HCB | 39.00 | 0.00 | 0.00 | 3.35 | 0 | -0.04 | -0.02 |
| PCBs | 35.00 | 0.00 | 0.00 | 7.40 | 0 | 0.39 | 0.20 |

*** - I-TEQ**

**Upper and lower estimations of PCB pollution levels for 2010**

Using the multicompartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, pg/$m^3$ | | Soil, ng/g d.w. | | Deposition flux, g/$km^2$/y | |
|---|---|---|---|---|---|
| max | min | Max | min | max | min |
| 520 | 28.1 | 4 | 3.4 | 8.96 | 0.56 |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 15.9.1988(Ac) |
| CB | 19.06.00 (a) |
| PIC | |
| Rat.PIC | |
| Sign POP | 23 May 2001† |
| Rat POP | |
| | †12/06/1992† |
| Rat Biodiv | †29/12/2000†rtf |

## MOROCCO

**PIC consent list**

**Aldrin (CAS: 309-00-2)**
Final Decision on Import no consent
Published: 30/6/1993

**Chlordane (CAS: 57-74-9)**
Final Decision on Import no consent
Published: 30/6/1995

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import no consent
Published: 30/6/1994
Remarks: No request for registration.

**DDT (CAS: 50-29-3)**
Final Decision on Import no consent
Published: 30/6/1993

**Dieldrin (CAS: 60-57-1)**
Final Decision on Import no consent
Published: 30/6/1993

**Dinoseb and Dinoseb Salts (CAS: 88-85-7)**
Final Decision on Import consent
Published: 30/6/1993
Remarks: Use on weeds in legumes; limited quantity 500-1000 kg/year.

**EDB (1,2-dibromoethane) (CAS: 106-93-4)**
Final Decision on Import no consent
Published: 30/6/1994
Remarks: No request for registration.

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import no consent
Published: 30/6/1993

**HCH (mixed isomers) (CAS: 608-73-1)**
Final Decision on Import no consent
Published: 30/6/1993

**Heptachlor (CAS: 76-44-8)**
Final Decision on Import no consent
Published: 30/6/1995

**Mercury Compounds (CAS: no single CAS N)**
Final Decision on Import no consent
Published: 30/6/1994

**FAO pesticides inventory**

| Common name | Commercial name | Chem Grp | Toxicity | Qty. Kgs |
|---|---|---|---|---|
| Fenitrothion | Fenitrothion | OP | II | 1 |
| Fenthion | Fenthion | OP | II | 917 |
| Flamprop Isopropyl | Flamprop Isopropyl | Arylalanine | III | 2663 |
| Flubenzimine | Flubenzimine | - | PM8 | 25 |
| Fluometuron | Fluometuron | Urea | III | 482 |
| Fluazifopbuthyl | Fluazifopbuthyl | aryloxyphenoxy propionic acid | III | 348 |
| Fluoroxypur | Fluoroxypur | arylalkanoic acid | IV | 500 |
| Fosetyl Aluminium | Fosetyl Aluminium | Fungicide | III | 11 |
| gamma-HCH | Lindane | OC | II | 51650 |
| Glyphosate | Glyphosate | OP | III | 21 |
| HCH | HCH | OC | II | 1955065 |
| Guazatine | Guazatine | Guanidine | II | 13 |
| Heptachlor | Heptachlor | OC | II | 2626 |
| Lenacile | Lenacile | Uracil | III | 22 |
| Lindale (perhaps Lindane) ? | Lindale (perhaps Lindane) ? | OC | II | 25805 |
| Linuron | Linuron | Urea | III | 99 |
| Malathion | Malathion | OP | III | 2653 |
| Mancozeb | Mancozeb | Dithiocarb | IV | 4417 |
| Maneb | Maneb | Dithiocarb | III | 5023 |
| Metabenzthiazuron | Metabenzthiazuron | Urea | IV | 17 |
| Metalaxyl | Metalaxyl | acylalanine | III | 9 |
| Metam Sodium | Metam Sodium | Methyl isocyanate Pre | II | 19 |
| Metaldehyde | Metaldehyde | Molluscicide | III | 35 |
| Metamidophos | Metamidophos | ? | ? | 10 |
| Methomyl | Methomyl | oxime carb | Ib | 76 |
| Methiocarb | Methiocarb | carb | Ib | 4 |
| Mevinphos | Mevinphos | OP | I | 1 |
| Mixture 2,4-D+2,4-MCPA | 2,4-D+2,4-MCPA | Phenoxy Acetic Acid | II | 10 |
| Mixture 2,4D+MCPA | 2,4D+MCPA | Phenoxy Acetic Acid | II | 7 |
| Mixture 2,4-D+Mecoprop | 2,4-D+Mecoprop | Phenoxy Acetic Acid | II | 100 |
| Mixture Atrazine+Metalachlor | Atrazine+Metalachlor | Triazine | III | 100 |
| Mixture Azinphos+Dichlod. | Azinphos+Dichlod. | OP | Ib | 38 |
| Mixture Carbatene+Manebe | Carbatene+Manebe | Thiocarb | III | 141 |
| Mixture Cuivre+Manebe | Cuivre+Manebe | Thiocarb | III | 3 |
| Mixture Cuivre+Manebe+Carbat | Cuivre+Manebe+Carbat | Thiocarb | III | 100 |
| Mixture Cuivre+Propinebe | Cuivre+Propinebe | Thiocarb | III | 2174 |
| Mixture DDT+Endrine | DDT+Endrine | OC | II | 1040 |
| Mixture Carbendazim Manebe | Carbendazim Manebe | Carb | III | 1 |
| Mixture Isocarbam+Lenacil | Isocarbam+Lenacil | Uracil | III | 338 |
| Mixture | Lenacil+Isocarbamide | Uracil | III | 274 |

| | | | | |
|---|---|---|---|---|
| Lenacil+Isocarbamide | | | | |
| Mixture Lindane+Manebe | Lindane+Manebe | OC | II | 30 |
| Mixture Malathion+Dimethoate | Malathion+Dimethoate | OP | III / II | 49 |
| Mixture Dimethoate+Malathion | Dimethoate+Malathion | OP | II | 39 |
| Mixture Manebe Carbatene | Mixture Manebe Carbatene | Thiocarb | III | |
| Mixture Prophenophos+DDT | Prophenophos+DDT | OC | II | 10 |
| Mixture Thiophanate / Manebe | Thiophanate / Manebe | Carb / Thiocarb | III / III | 1 |
| Mixture thiophanate+Manebe | Thiophanate+Maneb | Thiocarb | III | 1 |
| Mixture Triazophos+DDT | Triazophos+DDT | OP / OC | II | 69 |
| Mixture Zinebe+Cuivre | Zinebe+Cuivre | Thiocarb | III | 2575 |
| Monocropthos | Monocropthos | OP | Ib | 632 |
| Octyl Phenol | Octyl Phenol | ? | ? | 43 |
| Omethoate | Omethoate | OP | Ib | 1 |
| Niclosamide | Niclosamide | Molluscicide | III | 1353 |
| Oxychlorure | Oxychlorure | Copper Oxychloride | III | 1375 |
| Oxydemeton Methyl | Oxydemeton Methyl | OP | Ib | 745 |
| Paraquat | Paraquat | Bipyrid | II | 44 |
| Parathion methyl | Parathion methyl | OP | Ia | 334 |
| Parathion | Parathion | OP | Ia | 28752 |
| Permethrin | Permethrine | Pyr | II | 292 |
| Parathion+Huile | Parathion+Huile | OP | Ia | 133 |
| Phenamiphos | Phenamiphos | OP | Ia | 5 |
| Phendimephame | Phendimephame | ? | ? | 209 |
| Phosalone | Phosalone | OP | II | 2 |
| Phosphamidon | Phosphamidon | OP | Ia | 4765 |
| Phoxim | Phoxim | OP | II | 178 |
| Pirimicarb | Pirimicarb | Carb | II | 119 |
| Pirimiphos Ethyl | Pirimiphos Ethyl | OP | II | 1 |
| Polychlorcamphene | Polychlorcamphene | ? | ? | 33 |
| Procymedone | Procymedone | Dicarboximide | III | 65 |
| Prometryn | Promethrine | Triazine | III | 22 |
| Propineb | Propinebe | Dithiocarb | III | 33 |
| Propoxur | Propoxur | Carb | II | 26 |
| Propyzamine | Propyzamine | ? | ? | 32 |
| Pyrazophos | Pyrazophos | OP | II | 5 |
| Sodium Hexafluoro Silicate | Sodium Hexafluoro Silicate | Inorganic Fluoride | II | 48 |
| Strychnine | Strychnine | Rodenticide | Ib | 5260 |
| Simazine | Simazine | Triazine | III | 5 |
| TCA | TCA | OC | III | 611 |
| Tebutame | Tebutame | Amide | III | 303 |
| Tetrachlorvenphos | Tetrachlorvenphos | OP | III | 21 |
| Tetradifon | Tetradifon | Chloro Phenyl Sulphone | III | 672 |
| Temephos | Temephos | OP | III | 20 |
| Thiometon | Thiometon | OP | Ib | 1466 |

| | | | | |
|---|---|---|---|---|
| Thiophanate | Thiophanate | Carb | III | 50 |
| Tirogan | Tirogan | ? | ? | 11 |
| Thiram | Thiram | dithiocarb | III | 10 |
| Thiram | Thiram | dithiocarb | III | 405 |
| Triadimefon | Triadimefon | azole | III | 25 |
| Triazophos | Triazophos | OP | Ib | 756 |
| Triadimenol | Triadimenol | azole | III | 11 |
| Triadimenol | Triadimenol | azole | III | 1 |
| Triallate | Triallate | Thiocarb | III | 1 |
| Trichlorfon | Trichlorfon | OP | II | 86 |
| Tridemorph | Tridemorphe | Morpholine | II | 2 |
| Trifluralin | Trifluralin | dinitroaniline | IV | 7 |
| Unknown | Hydrolisat Proteine | - | - | 2110 |
| Unknown | Inconnu | ? | ? | 3083 |
| Unknown | M.S. | ? | ? | 44 |
| Unknown | Mercure | ? | toxic | 40 |
| Unknown | Oligo Elements | ? | ? | 278 |
| Unknown | OPs | OP | ? | 55 |
| Unknown | Soufre | Sulphur | III | 1589 |
| Unknown | Trimedlure | ? | ? | 33 |
| Unknown | Huile | ? | ? | 679 |
| Unknown | Bore | ? | ? | 8398 |
| Unknown | Chlore | ? | ? | 30 |
| Unknown | Chlorimoforme | ? | ? | 3 |
| Unknown | Cuivre | Copper Oxy Chloride ? | ? | 44352 |
| Unknown | EER | ? | ? | 60 |
| Unknown | Ethovinphos | ? | ? | |
| Unknown | Fluosilicate Soude | Inorganic Fluoride | II | 1000 |
| Warfarin | Warfarin | Coumarin | Ib | 165 |
| Zineb | Zineb | Dithiocarb | IV | 2706 |
| Ziram | Ziram (i.e. Zirame) | Dithiocarb | IV | 25 |
| Ziram | Zirame | Dithiocarb | IV | 3959 |
| Fenarimol | Fenarimol | Pyrimidimyl | III | 161 |
| Ethion | Ethion | OC | II | 5 |
| Ethoprophos | Ethoprophos | OP | Ia | 122 |
| Endrin | Endrin | Thiocarb | III | 122 |
| Endothion | Endothion | OP | PM5 | 3 |
| Endosulfan | Endosulfan | OC | II | 3232 |
| DNOC | DNOC | Nitro Phenol | Ib | 810 |
| Dodine | Dodine | Guanidine | III | 60 |
| Dinocap | Dinocap | DiNitro Phenol Deriv | III | 29 |
| Dioxacarb | Dioxacarbe | Carb | ? | 440 |
| Dimethoate | Dimethoate | OP | II | 6504 |
| Dieldrine | Dieldrine | OC | Ib | 130 |
| Dieldrine | Dieldrine | OC | Ib | 750 |
| Difenacoum | Difenacoum | coumarin | Ia | 2 |
| Dicofol | Dicofol | OC | III | 1673 |
| Dichlorvos | Dichlorvos | OP | Ib | 36232 |
| Dichlofop Methyl | Dichlofop Methyl | Phenoxy Acetic Acid Deriv | III | 28 |

| | | | | |
|---|---|---|---|---|
| Dibromochloropropan | Dibromochloropropan | OC | | 25 |
| Diazinon | Diazinon | OP | II | 42 |
| Deltamethrine | Deltamethrine | Pyr | II | 627 |
| DDT | DDT | OC | II | 2062 |
| Cypermethrin | Cypermethrine | Pyr | II | 82 |
| Coumatetralyl | Coumatetralyl | Coumarin | Ib | 5 |
| Coumachlor | Coumachlor | Coumarin | Ib | 50 |
| Contaminated seed | Ble coumafene | Coumarin | Ib | 167 |
| Contaminated seed | Ble coumafene | Coumarin | Ib | 1 |
| Chlorpyrifos | Chlorpyriphos | OP | II | 12655 |
| Chlorphacinone | Chlorphacinone | Indandione | Ia | 25 |
| Chloridazon | Chloridazon | Pyridazinone | III | 7 |
| Chlormequat Chloride | Chlormequat Chloride | Quat Ammon | III | 1 |
| Chlorofenamidine | Chlorofenamidine | ? | ? | 2 |
| Chlorophacinone | Chlorophacinone | coumarin | Ia | 17 |
| Chlorophacinone | Chlorophacinone | coumarin | Ia | 170 |
| Chloropropylate | Chloropropylate | OC | PM8 | 1 |
| Chlorfen sulphide | Chlorfen sulphide | OC | PM 4 | 57 |
| Chinomethionat | Chinomethionat | Fungicide | III | 43 |
| Carbophenothion | Carbophenothion | ? | ? | 325 |
| Carbophenothion | Carbophenothion | ? | ? | |
| Carbofuran | Carbofuran | Carb | Ib | 1404 |
| Carbendazim | Carbendazime | benzimidazole | III | 2 |
| Carbaryl | Carbaryl | Carb | II | 10194 |
| Carbaryl | Carbaryl | Carb | II | 185 |
| Captan | Captan | N-trihalomethylthio | IV | 57 |
| Bupirimate | Bupirimate | Pyrimidine | III | 66 |
| Bromadiolone | Bromadiolone | Coumarin | Ia | 85 |
| Bromacil | Bromacil | Uracil | III | 69 |
| Brodifacoum | Brodifacoum | Coumarin | Ia | 65 |
| Bioallethrine | Bioallethrine | Pyr | II | 600 |
| Binapacryl | Binapacryl | Nitrophenol | PM8 | 54 |
| Bentazon | Bentazon | Herbicide | III | 5 |
| Benomyl | Benomyl | benzimidazole | III | 913 |
| Azinphos Methyl | Azinphos | OP | Ib | 3 |
| Azinphos Methyl | Azinphos | OP | Ib | 575 |
| Azinphos Methyl | Azinphos Methyl | OP | Ib | 84 |
| B.T. | B.T. | Bacterium | EPA III | 4330 |
| Atrazine | Atrazine | Triazine | III | 15 |
| Amitraz | Amitraze | amidine | III | 3 |
| Alloxidime Sodium | Alloxidime Sodium | ? | ? | 1 |
| Acide Folique | Acide Folique | Vitamin B | | 7 |
| 2,4-D | 2,4-D | aryloxyalkanoic acid | II | 2393 |
| 2,4 MCPA | 2,4 MCPA | arylalkanoic acid | III | 36 |
| 2,4+2,4-MCPA | 2,4+2,4-MCPA | Phenoxy Acetic Acid | III | 36 |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 28.12.1995(R) |
| CB | 28.12.95 (a) |
| PIC | |

| | |
|---|---|
| Rat.PIC | |
| Sign POP | 23 May 2001† |
| Rat POP | |
| | †13/06/1992† |
| Rat Biodiv | †21/08/1995†rtf |

**MONACO**

### PIC consent list

There are no PIC import decisions from this country!

### Conventions and Protocols

| | |
|---|---|
| Montreal | 12.3.1993(Ac) |
| CB | 31.08.92 (a) |
| PIC | |
| Rat.PIC | |
| Sign POP | 23 May 2001† |
| Rat POP | |
| | †11/06/1992† |
| Rat Biodiv | †20/11/1992†rtf |

**SLOVENIA**

**PIC consent list**

**2,4,5-T (CAS: 93-76-5)**
Final Decision on Import : consent
Published: 5/6/1998
Remarks: Prohibited for plant protection use. Not registered.

**Aldrin (CAS: 309-00-2)**
Final Decision on Import : no consent
Published: 5/6/1998
Remarks: Not registered.

**Captafol (CAS: 2425-06-1)**
Final Decision on Import : consent
Published: 5/6/1998
Remarks: Prohibited for plant protection use. Not registered.

**Chlordane (CAS: 57-74-9)**
Final Decision on Import : no consent
Published: 5/6/1998
Remarks: Not registered.

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import : no consent
Published: 5/6/1998
Remarks: Not registered.

**DDT (CAS: 50-29-3)**
Final Decision on Import : consent
Published: 5/6/1998
Remarks: Prohibited for plant protection use. Not registered.

**Dieldrin (CAS: 60-57-1)**
Final Decision on Import : no consent
Published: 5/6/1998
Remarks: Not registered.

**Dinoseb and Dinoseb Salts (CAS: 88-85-7)**
Final Decision on Import : consent
Published: 5/6/1998
Remarks: Prohibited for plant protection use. Not registered.

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import : consent
Published: 5/6/1998
Remarks: Prohibited for plant protection use. Not registered.

**Heptachlor (CAS: 76-44-8)**
Final Decision on Import : no consent
Published: 2/2/1999
Remarks: Not registered.

**Hexachlorobenzene (CAS: 118-74-1)**
Final Decision on Import : no consent
Published: 5/6/1998
Remarks: Not registered.

**Lindane (gamma-HCH) (CAS: 58-89-9)**
Final Decision on Import : consent
Published: 5/6/1998
Remarks: Prohibited for plant protection use. Not registered.

**Mercury Compounds (CAS: no single CAS N)**
Final Decision on Import : no consent
Published: 2/2/1999
Remarks: Not registered

**Monocrotophos (CAS: 6923-22-4)**
(Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
Final Decision on Import : consent
Published: 5/6/1998
Conditions: General conditions apply.

**Parathion (CAS: 56-38-2)**
(all formulations - aerosols, dustable powder (DP), emulsifiable concentrate (EC), granules (GR) and wettable powders (WP) - of this substance are included, except capsule suspensions (CS))
Final Decision on Import : consent
Published: 5/6/1998
Conditions: General conditions apply.

**Pentachlorophenol (CAS: 87-86-5)**
Final Decision on Import : consent
Published: 5/6/1998
Remarks: Prohibited for plant protection use. Not registered.

**Phosphamidon (CAS: 13171-21-6/2378)**
(Soluble liquid formulations of the substance that exceed 1000 g active ingredient/l)
Final Decision on Import : consent
Published: 5/6/1998
Conditions: General conditions apply.

## Atmospheric pollution indicators

Detailed report for Slovenia
Persistent Organic Pollutants (POPs)
Emissions in 1998
Average levels of depositions and concentrations in various media for 1998
Upper and lower estimations of PCB pollution levels for 2010
Transboundary deposition fluxes and air concentrations of B[a]P in 1998
Comparison of modelling results with measurements
Trends in emissions, depositions and average concentrations in media for 1970 - 1998

## Persistent organic pollutants (POPs)

Emissions in 1998

The calculations for 1970-1998 have been carried out on the basis of emission expert estimates adopted from the POPCYCLING-Baltic project [*Pacyna et al.,* 1999]. The spatial distributions of emissions for 1998 are given in the table below:

| POPs | Total emission (t/y) |
|---|---|
| B[a]P | 2.41 |
| PCCD/Fs | 11.6* |
| HCB | 0.015 |
| PCBs | 0.123 |

*** for PCDD/Fs - g I-TEQ/y**

**Average levels of depositions and concentrations in various media for 1998**

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air | Soil | Vegetation | Sea | Emission flux | Deposition flux | Total deposition |
|---|---|---|---|---|---|---|---|
| | $pg/m^3$ | ng/g d.w. | ng/g d.w | pg/l | $g/km^2/y$ | $g/km^2/y$ | kg/y |
| PCDD/Fs* | $6.97\sum10^{-3}$ | $1.79\sum10^{-4}$ | $3.63\sum10^{-3}$ | $3.17\sum10^{-3}$ | $6.34\sum10^{-4}$ | $3.63\sum10^{-4}$ | $6.60\sum10^{-3}$ |
| HCB | 65.00 | 0.09 | 0.63 | 9.45 | 0.84 | 0.31 | 5.68 |
| PCBs | 262.00 | 2.00 | 65.50 | 51.30 | 6.76 | 7.90 | 143.92 |

*** - I-TEQ**

**Upper and lower estimations of PCB pollution levels for 2010**

Using the multicompartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, $pg/m^3$ | | Soil, ng/g d.w. | | Deposition flux, $g/km^2/y$ | |
|---|---|---|---|---|---|
| max | min | max | min | max | min |
| 131 | 6.4 | 0.6 | 0.5 | 1.31 | 0.07 |

**Transboundary deposition fluxes and air concentrations of B[a]P in 1998**

**PCB inventory**

The use of PCBs in Slovenia increased after 1960, when an ISKRA condenser factory was built in Semic, Bela Krajina (about 80 km south-east from the capital Ljubljana) (Polic and Leskovsek, 1996). PCBs were introduced into the production process in 1962 (until 1970 Clophen A-50 and A-30 supplied by Bayer, FRG and between 1970 and 1985 Pyralen 1500 supplied by Prodelec, France). The consumption of PCBs by ISKRA in period 1962-1985 totalled about 3 700 tonnes with a PCBs waste rate of 8-9 per cent in the form of waste impregnates, condensers, etc. By 1974, 130 tonnes of waste containing around 70 tonnes of pure PCBs were dumped at various waste sites within five km round the factory. After 1975, waste impregnates were collected and sent to France for treatment (170 t), whereas smaller waste condensers were still disposed of at a local waste site.

Measurements in 1982 showed very high concentration of PCBs in the environmental compartments (air, water, sediments), as well as in food and in animal and human tissues (Polic and Kontic, 1987).

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 6.7.1992(Sc) |
| CB | 07.10.93 (a) |
| PIC | 11/09/98 |
| Rat.PIC | 17/11/99 |
| Sign POP | 23 May 2001† |
| Rat POP | |
| | †13/06/1992† |
| Rat Biodiv | †09/07/1996†rtf |

## SPAIN

### Overall situation

In 1999, the Spanish Minister for the Environment, Isabel Tocino "expressed support for the implementation of the Strategic Action Programme (SAP and hoped that priority would be given to combating pollution caused by the discharge of substances that were toxic, persistent and liable to bioaccumulate". [Report of the Eleventh Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its Protocols, 27-30 October 1999. UNEP (OCA)/MED IG. 12/9, para.40]

Spain has ratified four of the six Protocols to the Barcelona Convention. The Offshore Protocol is in the process of being ratified, but Spain refuses to ratify the Protocol on trade in hazardous wastes because it includes radioactive waste according to the terms of the Convention. If some other European countries such as France, which is a large producer of radioactive waste, ratify the Protocol, this would be an incentive for Spain to initiate the procedure.

Although Spain has undertaken to end pollution of the Mediterranean from land-based sources by ratifying the LBS Protocol, incineration technology is still one of the central pillars of its waste management plans. There are 19 household waste incinerators in Spain and several municipal, medical and hazardous waste incinerators are on the Mediterranean coast, mainly in Catalonia.

The "National Urban Waste Management Plan" for 2000-2006 promotes incineration technologies and four new incinerators are already planned at the national level.

Between 1995 and 1999, analyses carried out on human blood samples showed an increase of 44.5 per cent in dioxins, 48 per cent in cadmium, 209 per cent in chromium, and 13 per cent in mercury (González, C., Kogevina, M. Gadea, E., Huici, A., Bosch, A., Bleda, M., Papke, O., 2000. Biomonitoring study of people living near or working at a municipal solid-waste incineratory before and after two years of operation, Arch.

### Hot spots

Andalusia, Algeciras (Cadiz), Carboneras (Almeria) and Catalonia are particularly polluted regions of Spain. Furthermore, the Balearic Islands are facing a waste crisis as a result of the tourism industry and the lack of adequate management of wastewater and urban waste. The mouths of the rivers Llobregat and Besos are deemed to be toxic hot spots and the mouth of the river Segura is probably the most polluted area in Spain. On the coast of Murcia, the bays of Cartagena and Portman have been destroyed by polluting industrial technologies.

### PIC consent list

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import consent

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import consent
Conditions: Written authorization required.

**Atmospheric pollution indicators**

Detailed report for Spain
Persistent Organic Pollutants (POPs)
Emissions in 1998
Average levels of depositions and concentrations in various media for 1998
Upper and lower estimations of PCB pollution levels for 2010
Transboundary deposition fluxes and air concentrations of B[a]P in 1998
Comparison of modelling results with measurements
Trends in emissions, depositions and average concentrations in media for 1970 - 1998

**Persistent organic pollutants (POPs)**

Emissions in 1998
The calculations for 1970-1998 have been carried out on the basis of emission expert estimates adopted from the POPCYCLING-Baltic project [*Pacyna et al.,* 1999]. The spatial distributions of emissions for 1998 are given in the table below:

| POPs | Total emission (t/y) |
|---|---|
| B[a]P | 9.61 |
| PCCD/Fs | 305* |
| HCB | 1.172 |
| PCBs | 8.721 |

*** for PCDD/Fs - g I-TEQ/y**

**Average levels of depositions and concentrations in various media for 1998**

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air | Soil | Vegetation | Sea | Emission flux | Deposition flux | Total deposition |
|---|---|---|---|---|---|---|---|
| | $pg/m^3$ | ng/g d.w. | ng/g d.w | pg/l | $g/km^2/y$ | $g/km^2/y$ | kg/y |
| PCDD/Fs* | $2.92\sum10^{-3}$ | $4.27\sum10^{-5}$ | $1.46\sum10^{-3}$ | $7.46\sum10^{-4}$ | $6.09\sum10^{-4}$ | $1.07\sum10^{-4}$ | $5.35\sum10^{-2}$ |
| HCB | 57.00 | 0.04 | 0.28 | 4.47 | 2.34 | 0.11 | 52.90 |
| PCBs | 144.00 | 0.80 | 22.00 | 22.90 | 18.37 | 1.44 | 684.15 |

*** - I-TEQ**

**Upper and lower estimations of PCB pollution levels for 2010**

Using the multicompartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, $pg/m^3$ | | Soil, ng/g d.w. | | Deposition flux, $g/km^2/y$ | |
|---|---|---|---|---|---|
| max | min | max | min | max | min |
| 68 | 11.9 | 0.9 | 0.7 | 4.13 | 0.65 |

**Transboundary deposition fluxes and air concentrations of B[a]P in 1998**

Contributions of European countries to annual mean and maximum diurnal air concentrations, as well as for deposition fluxes of B[a]P averaged over the country, are summarized in the table below:

| POPs | Annual mean conc. | Maximum diurnal conc. | Deposition fluxes to | Deposition fluxes from |
|---|---|---|---|---|
| B[a]P | 2, ng/m3 | 2, ng/m3 | 2, g/km2/y | 2, g/km2/y |
| | chart | chart | chart | chart |

**Comparison of modelling results with measurements**

This section presents the comparison of modelling results with measurements carried out at the EMEP measurement sites during 1989-1998, found in the literature and obtained from personal contacts with national experts.

**PCDD/F**

**Soil concentrations, pg I-TEQ/g**

| Location | Measured | | | Calculated | Reference |
|---|---|---|---|---|---|
| | Year | Range | Average | | |
| Spain | 1996-1997 | juil-14 | 12 | 0.17 | *Schumacher et al., 2000* |

**Concentrations in vegetation, pg I-TEQ/g**

| Location | Measured | | | Calculated | Reference |
|---|---|---|---|---|---|
| | Year | Range | Average | | |
| Spain | 1996-1997 | 0.52 - 1.0 | 0.7 | 4.5 | *Schumacher et al., 2000* |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 25.7.1988(Ac) |
| CB | 07.02.94 (r) |
| PIC | 11/09/98 |
| Rat.PIC | |
| Sign POP | 23 May 2001† |
| Rat POP | |
| | †13/06/1992† |
| Rat Biodiv | †21/12/1993†rtf |

**SYRIAN ARAB REPUBLIC**

**PIC consent list**

**2,4,5-T (CAS: 93-76-5)**
Final Decision on Import : no consent
Published: 6/4/1998

**Aldrin (CAS: 309-00-2)**
Final Decision on Import : no consent
Published: 30/6/1993

**Captafol (CAS: 2425-06-1)**
Final Decision on Import : no consent
Published: 6/4/1998

**Chlordane (CAS: 57-74-9)**
Final Decision on Import : no consent
Published: 30/6/1993

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import : no consent
Published: 30/6/1993

**Chlorobenzilate (CAS: 510-15-6)**
Final Decision on Import : no consent
Published: 6/4/1998

**DDT (CAS: 50-29-3)**
Final Decision on Import : no consent
Published: 30/6/1993

**Dieldrin (CAS: 60-57-1)**
Final Decision on Import : no consent
Published: 30/6/1993

**Dinoseb and Dinoseb Salts (CAS: 88-85-7)**
Final Decision on Import : no consent
Published: 30/6/1993

**EDB (1,2-dibromoethane) (CAS: 106-93-4)**
Final Decision on Import : no consent
Published: 30/6/1993

**Fluoroacetamide (CAS: 640-19-7)**
Final Decision on Import : no consent
Published: 30/6/1993

**HCH (mixed isomers) (CAS: 608-73-1)**
Final Decision on Import : no consent
Published: 30/6/1993

**Heptachlor (CAS: 76-44-8)**
Final Decision on Import : no consent
Published: 30/6/1993

**Hexachlorobenzene (CAS: 118-74-1)**
Final Decision on Import : no consent
Published: 6/4/1998

**Lindane (gamma-HCH) (CAS: 58-89-9)**
Final Decision on Import : consent
Published: 6/4/1998

**Mercury Compounds (CAS: no single CAS N)**
Final Decision on Import : no consent
Published: 30/6/1993

**Methamidophos (CAS: 10265-92-6)**
(Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
Final Decision on Import : consent
Published: 6/4/1998

**Monocrotophos (CAS: 6923-22-4)**
(Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
Final Decision on Import : no consent
Published: 6/4/1998

**Parathion (CAS: 56-38-2)**
(all formulations - aerosols, dustable powder (DP), emulsifiable concentrate (EC), granules (GR) and wettable powders (WP) - of this substance are included, except capsule suspensions (CS))
Final Decision on Import : no consent
Published: 6/4/1998

**Pentachlorophenol (CAS: 87-86-5)**
Final Decision on Import : no consent
Published: 6/4/1998

**Phosphamidon (CAS: 13171-21-6/2378)**
(Soluble liquid formulations of the substance that exceed 1000 g active ingredient/l)
Final Decision on Import : consent
Published: 6/4/1998

**FAO database inventory**

| Location | Common name | Commercial name | Qty. Kgs | Qty. Lts | Year | Origin |
|---|---|---|---|---|---|---|
| Different Provinces | Methoxychlor Dust | Methoxychlor Dust | 166801 | 0 | | Italy - Ansol |
| Aleppo | Metiram | Polygram Compy | 0 | 1 | 1984 | Germany - Passev |
| Al-Hasaka, Ras Aleen | Mevinphos | Phosdrin | 0 | 9 | 1986 | UK - Shell |
| Al-Malkia | Mixture Permethrin+Sulfur | Pounce Dust | 1100 | 0 | 1985 | USA - FMC |

| | | | | | | |
|---|---|---|---|---|---|---|
| Damascus | Mixture Paraquat-Monolinoron | Gramanol | 0 | 8 | 1986 | UK - ICI |
| Al-Bokamal, Maiden | Phenthoate | Cidial | 0 | 146 | 1990 | Italy - Monty Arezol |
| Al-Hasaka | Propargite | Propargite-ULV | 0 | 3625 | 1985 | USA - PONY Royal |
| Different Provinces | Sulphur 80% | Elosal | 305 | 0 | 1982 | Germany - Hoechst |
| Al-Jazera | Thiometon | Ekatin | 0 | 15 | | Sweden - Kino Gard |
| Different Provinces | Thiophanate Methyl | Topsin-M Sol | 0 | 33817 | 1989 | Japan - Mitsoy |
| Al-Kameshle | Triazophos | Hostathion | 0 | 9 | 1983 | Germany - Hoechst |
| Aleppo | Trichlorfon | Detrofon - WP | 1125 | 0 | 1978 | Hungary - Shimo Limpex |
| Homs-Aleppo | Eptam | Erdican | 0 | 1007 | 1977 | Italy -Entrashim |
| Al-Shaddada | Endosulfan | Endosulfan- Leq | 0 | 50 | | Italy - HillaFarm |
| | Endosulfan | Endosulfan- Pw | 328 | 0 | | Italy - HillaFarm |
| Different Provinces | Dodine | Ifozin | 11747 | 0 | 1989 | Hungary - Shimo Limpex |
| Jabla | Dithianon | Delan | 94 | 0 | | Germany - Shell |
| Eastern Area | Dinobuton | Acrex | 0 | 2980 | 1987 | Sweden - Kino Gard |
| Idlep | Dimethoate | Roxion - ULV | 0 | 4450 | 1986 | Germany - Silla Mark |
| Een Al-Arab | Dimethoate | Cynodon | 0 | 5 | 1987 | Sweden -Kino Gard |
| Hamah | Diflubenzuron | Dimilin | 0 | 1870 | 1985 | Holland - Dovar |
| Aleppo | Diclofop Methyl | Illoxan | 0 | 50 | 1990 | Germany - Hoechst |
| Hamah | DDT | DDT | 1500 | 0 | | Ispany-Ojeh Mexacan |
| Al-Hasaka | Chlorpyrifos | Dursban -ULV | 0 | 6 | 1991 | USA - Dawillanko |
| Different Provinces | Chlorpyrifos | Chlorpyrifos Dust | 94682 | 0 | 1984 | Lebanon - Adonis |
| Al- Rakka | Benomyl | Benlate | 4 | 0 | | Hungary-Shimo Limpex |
| Different Provinces | Benomyl | Benomyl | 1302 | 0 | | Hungary - Shimo Limpex |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 12.12.1989(Ac) |
| CB | 22.01.92 (r) |
| PIC | 11/09/98 |
| Rat.PIC | |
| Sign POP | |
| Rat POP | |
| | †03/05/1993† |
| Rat Biodiv | †04/01/1996†rtf |

**TUNISIA**

There are no PIC import decisions from this country.

**FAO database inventory**

| Location | Common name | Commercial name | Qty. Kgs | Qty. Lts | Year |
|---|---|---|---|---|---|
| Beja | Fenitrothion | Fenitrothion | 0 | 19400 | |
| Gabes | Fenitrothion | Fenitrothion | 0 | 800 | |
| Gafsa | Fenitrothion | Fenitrothion | 0 | 2100 | |
| Jendouba | Fenitrothion | Fenitrothion | 0 | 7800 | |
| Kasserine | Fenitrothion | Fenitrothion | 0 | 400 | |
| Kebili | Fenitrothion | Fenitrothion | 0 | 4984 | |
| Lekef | Fenitrothion | Fenitrothion | 0 | 2400 | |
| Mahdia | Fenitrothion | Fenitrothion | 0 | 1118 | |
| Medenine | Fenitrothion | Fenitrothion | 0 | 12000 | |
| Nabeul | Fenitrothion | Fenitrothion | 0 | 1600 | |
| Sfax | Fenitrothion | Fenitrothion | 0 | 10200 | |
| Sidi Bouzid | Fenitrothion | Fenitrothion | 0 | 400 | |
| Siliana | Fenitrothion | Fenitrothion | 0 | 800 | |
| Sousse | Fenitrothion | Fenitrothion | 0 | 64000 | |
| Tataouine | Fenitrothion | Fenitrothion | 0 | 8000 | |
| Tunis | Fenitrothion | Fenitrothion | 0 | 5000 | |
| Beja | HCH | HCH | 300 | 0 | |
| Gabes | HCH | HCH | 21000 | 0 | |
| Gafsa | HCH | HCH | 60000 | 0 | |
| Jendouba | HCH | HCH | 2000 | 0 | |
| Kairouan | HCH | HCH | 11000 | 0 | |
| Kasserine | HCH | HCH | 450 | 0 | |
| Lekef | HCH | HCH | 4000 | 0 | |
| Medenine | HCH | HCH | 22000 | 0 | |
| Monastir | HCH | HCH | 3000 | 0 | |
| Sfax | HCH | HCH | 12000 | 0 | |
| Sidi Bouzid | HCH | HCH | 1500 | 0 | |
| Siliana | HCH | HCH | 1250 | 0 | |
| Sousse | HCH | HCH | 100000 | 0 | |
| Tunis | HCH | HCH | 50000 | 0 | |
| Zaghouan | HCH | HCH | 4000 | 0 | |
| Gabes | Malathion | Malathion | 0 | 400 | |
| Gafsa | Malathion | Malathion | 0 | 10000 | |
| Jendouba | Malathion | Malathion | 0 | 1600 | |
| Kairouan | Malathion | Malathion | 0 | 1250 | |
| Kasserine | Malathion | Malathion | 0 | 13000 | |
| Kebili | Malathion | Malathion | 0 | 22800 | |
| Lekef | Malathion | Malathion | 0 | 13000 | |
| Medenine | Malathion | Malathion | 0 | 8400 | |
| Sfax | Malathion | Malathion | 0 | 17300 | |
| Siliana | Malathion | Malathion | 0 | 1400 | |
| Sousse | Malathion | Malathion | 0 | 20000 | |
| Tataouine | Malathion | Malathion | 0 | 19000 | |

| | | | | | |
|---|---|---|---|---|---|
| Tunis | Malathion | Malathion | 0 | 16000 | |
| Zaghouan | Malathion | Malathion | 0 | 3600 | |
| Beja | Unknown | Unknown | 0 | 25300 | |
| Ben Arous | Unknown | Unknown | 0 | 1000 | |
| Gabes | Unknown | Unknown | 0 | 1600 | |
| Gafsa | Unknown | Unknown | 0 | 1000 | |
| Jendouba | Unknown | Unknown | 0 | 10600 | |
| Kairouan | Unknown | Unknown | 0 | 1250 | |
| Kasserine | Unknown | Unknown | 0 | 2575 | |
| Kebili | Unknown | Unknown | 0 | 3251 | |
| Lekef | Unknown | Unknown | 0 | 4600 | |
| Mahdia | Unknown | Unknown | 0 | 382 | |
| Medenine | Unknown | Unknown | 0 | 2600 | |
| Monastir | Unknown | Unknown | 0 | 7500 | |
| Nabeul | Unknown | Unknown | 0 | 1400 | |
| Sfax | Unknown | Unknown | 0 | 9500 | |
| Sidi Bouzid | Unknown | Unknown | 0 | 2100 | |
| Siliana | Unknown | Unknown | 0 | 2550 | |
| Sousse | Unknown | Unknown | 0 | 4500 | |
| Tataouine | Unknown | Unknown | 0 | 1000 | |
| Tunis | Unknown | Unknown | 0 | 5000 | |
| Zaghouan | Unknown | Unknown | 0 | 2400 | |
| Ariana | Unknown | Unknown | 0 | 2000 | |
| Beja | Carbaryl | Sevin | 0 | 30000 | |
| Gabes | Carbaryl | Sevin | 0 | 1200 | |
| Gafsa | Carbaryl | Sevin | 0 | 9400 | |
| Kairouan | Carbaryl | Sevin | 0 | 18500 | |
| Kasserine | Carbaryl | Sevin | 0 | 575 | |
| Kebili | Carbaryl | Sevin | 0 | 3965 | |
| Lekef | Carbaryl | Sevin | 0 | 19000 | |
| Medenine | Carbaryl | Sevin | 0 | 10000 | |
| Sfax | Carbaryl | Sevin | 0 | 26000 | |
| Siliana | Carbaryl | Sevin | 0 | 20000 | |
| Sousse | Carbaryl | Sevin | 0 | 25000 | |
| Tataouine | Carbaryl | Sevin | 0 | 10000 | |
| Tunis | Carbaryl | Sevin | 0 | 5000 | |
| Gafsa | Bendiocarb | Bendiocarb | 0 | 4500 | |
| Sousse | Bendiocarb | Bendiocarb | 0 | 16500 | |
| Tataouine | Bendiocarb | Bendiocarb | 0 | 5000 | |
| Tunis | Bendiocarb | Bendiocarb | 0 | 4000 | |

**Conventions and Protocols**

| | |
|---|---|
| Montreal | 25.9.1989(Ac) |
| CB | 11.10.95 (a) |
| PIC | 11/09/98 |
| Rat.PIC | |
| Sign POP | 23 May 2001† |
| Rat POP | |
| | |
| Rat Biodiv | |

## TURKEY

### Overall situation

In 1999, the Turkish Minister for the Environment, Fevzi Aytekin, undertook to "…develop the Barcelona system into an even more effective tool among Mediterranean countries. This would need to be based on the formulation of strategies defining the role to be played by each country and on greater efforts at the national level to ratify and implement the various instruments of the Barcelona system". [Report of the Eleventh Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its Protocols, 27-30 October 1999. UNEP (OCA)/MED IG. 12/9, para.52]

Turkey has not ratified any of the Protocols to the Barcelona Convention, with the exception of the Emergency Protocol. The Turkish Government has continually postponed ratification of the Barcelona Convention, apparently because of other priorities during parliamentary sessions.

As a result of rapid devlopment in the 1960s and 1970s, Izmit is now one of the most industrialized zones in Turkey. Greenpeace has recorded more than 300 industries in the region, including petrochemical companies which discharge solid and liquid waste directly into the Bay of Izmit, causing environmental pollution and endangering public health.

Some 210,000 m3 of effluent are discharged into the Bay of Izmit daily from eight discharge points. They include chorine from the paper pulp factory at Seka, pesticides from Koruma Tarim, several persistent organic pollutants, including chlorinated dioxins and dibenzofurans from the Pekim Petrochemical complex, and hydrocarbons and copper from the Tupras petrochemical company. In addition, a certain volume of mixed household waste is discharged containing both domestic and industrial wastewater.

Environmental samples were taken from a number of sites in the areas of Zarimca, Zalova and Izmit in the Bay of Izmit. A wide variety of contaminants were identified. A discharge point analysed near the Petkim complex disclosed contamination that strongly suggested the presence of petroleum residues from several sources. Refinery effluents collected from Yarimca showed contamination by hydrocarbons corresponding to refinery processes. High levels of copper in wastewater also correspond to discharges from refinery activities. Greenpeace's analyses of samples taken from near a factory producing organochlorinated pesticides indicate that activities on this site have caused widespread and intensive contamination of the environment, particularly by dichlorodiphenyltrichloroethane (DDT) and hexachlorocyclohexane (HCH). Nevertheless, people still fish in the Bay. The neighbouring communities are affected by these industries, but no official health survey has been conducted.

Other environmental problems are caused by hospital and hazardous waste incinerators in the region, built by the municipal authorities as part of the integrated environmental project for Izmit. The incinerator and its discharge are situated less than two kilometres from the villages of Alikahya and Solakli. The Turkish Ministry of Health has asked the residents to evacuate their village because it is illegal to live less than three kilometres from an incinerator.

Aliaga is also one of the most industrialized zones in Turkey, with factories producing PVC, chlorine, as well as petrochemical industries (Petkim Petrochemical Co., and Tupras), steel works (Ege Steel Industries Co., Cukurova Steel Ind. Co., Habas Steel and Iron Ind. Co., Izmir Steel and Iron Ind. Co., Cebitas Steel and Iron Ind. Co.), factories manufacturing

fertilizers (Ege Fertilizer Ind.), ship demolition yards (Kalkavan Shipbreaking Co., Yazici Shipbreaking Co., Ege Shipbreaking Co.). These are important sources of persistent organic pollutants, some of the most dangerous chemical substances in the world, which governments decided to eliminate under the Stockholm Convention, adopted in May this year.

The communities in the region suffer from the effects on their health such as cancer, but, yet again, no proper health survey has been conducted. The Turker family from the village of Horozgedigi is only one of the many families suffering from pollution-related disease. Soner Turker died from cancer of the bladder when he was only 18 months old. His father and uncle died from cirrhosis. The brothers of Beytullah Turker died from lung cancer. Abdullah Turker now has cancer. Cakmakli and Bozkoy are other villages that have been affected in the same way in the region of Izmit.

The problems of managing hazardous waste in Turkey are compounded by the efforts made by some countries to get rid of their undesirable toxic waste in Turkey. The scandal of Italian waste in Turkey clearly underlines the need for the Mediterranean region to ratify and implement the Hazardous Wastes Protocol to the Barcelona Convention. This scandal came to light in 1988 when metal drums were washed up on the shores of the Black Sea. Since then, more than 360 drums have been found and the authorities suspect there may be 3,000 drums in the sea. The findings of the investigation carried out by the Turkish Ministries of the Environment and of Foreign Affairs showed the relationship between the drums and illegal trade in hazardous waste. They had been shipped illegally from Italy to the port of Sulina in Romania in 1986 and 1987. The investigation showed that, when the Romanian authorities discovered that the hazardous wastes were destined for their shores, they prevented the ships from unloading and the drums then disappeared. In addition, some ships carried drums from the Italian chemical industry in Sulina and these were also immersed in the Black Sea.

Following the investigation, the Italian Government informed Turkey that proof of its claims was not sufficient and refused to accept liability. The Turkish Government concluded its investigation, probably in order not to compromise its candidature for the European Union by inciting a diplomatic squabble with Italy. The Turkish authorities decided to stock the drums in dumps in the villages of Soguksu in Sinop and Alacam in Samsun, but they did not inform the communities bordering the sites. The hazardous wastes in the drums started to leak from the dumps. Greenpeace took samples from around the dump in Sinop in 2000 and measured high levels of dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyls (PCB).

The environmental organizations had to put a halt to incineration of the toxic waste in the Izmit incinerator. The two dumps are currently in a very bad state. As the drums are full of bullet holes to facilitate immersion, part of their toxic content has leaked. In addition, the villagers broke the locks on the Samsun dump and took away several drums to use them for different purposes, without being aware of the risks. Further research needs to be carried out to evaluate the levels of contamination in these dumps and the hazardous wastes must be properly eliminated.

It is in the Turkish Government's interests to ratify the Protocol in order immediately to halt the transboundary movements of hazardous wastes from OECD countries to non-OECD countries. The Turkish Government should also assume its responsibilities, ratify the other Protocols and level implement the legislation required to protect public health and the environment at the national level.

At their Twelfth Ordinary Meeting, to be held in Monaco from 14 to 17 November 2001, Contracting Parties to the Barcelona Convention are to adopt the "Operational document for

the implementation of the Strategic Action Programme to address pollution of the Mediterranean Sea from land-based activities (SAP)". Greenpeace calls on the Turkish Government to adopt this Programme and implement it at the national level. Moreover, as the SAP calls for the elimination of dioxins and furans, incineration, which is a major source of emission of these substances, should be abandoned.

**PIC consent list**

**2,4,5-T (CAS: 93-76-5)**
Final Decision on Import : no consent
Published: 1/7/1997
Remarks: Banned by Ministry of Agriculture in 1978.

**Aldrin (CAS: 309-00-2)**
Final Decision on Import : no consent
Published: 18/6/1997

**Binapacryl (CAS: 485-31-4)**
Final Decision on Import : no consent
Published: 30/11/1999

**Captafol (CAS: 2425-06-1)**
Final Decision on Import : no consent
Published: 1/7/1997
Remarks: Banned by Ministry of Agriculture in 1978.

**Chlordane (CAS: 57-74-9)**
Final Decision on Import : no consent
Published: 30/6/1994

**Chlordimeform (CAS: 6164-98-3)**
Final Decision on Import : no consent
Published: 30/6/1994

**Chlorobenzilate (CAS: 510-15-6)**
Final Decision on Import : no consent
Published: 1/7/1997
Remarks: Banned by Ministry of Agriculture in 1978.

**DDT (CAS: 50-29-3)**
Final Decision on Import : no consent
Published: 30/6/1994

**Dieldrin (CAS: 60-57-1)**
Final Decision on Import : no consent
Published: 30/6/1994

**Dinoseb and Dinoseb Salts (CAS: 88-85-7)**
Final Decision on Import : no consent
Published: 30/6/1994

**Atmospheric pollution indicators**

Persistent organic pollutants (POPs)
Emissions in 1998
Average levels of depositions and concentrations in various media for 1998
Upper and lower estimations of PCB pollution levels for 2010
Transboundary deposition fluxes and air concentrations of B[a]P in 1998
Trends in emissions, depositions and average concentrations in media for 1970 - 1998

**Persistent organic pollutants (POPs)**

Emissions in 1998
No available emission data

**Average levels of depositions and concentrations in various media for 1998**

The table below presents calculated air concentrations, soil concentrations, concentrations in vegetation, concentrations in coastal sea water, emission and deposition fluxes mean over the country and total deposition:

| POPs | Air, | Soil, | Vegetation, | Sea, | Emission flux | Deposition flux, | Total deposition, |
|---|---|---|---|---|---|---|---|
| | $pg/m^3$ | ng/g d.w. | Ng/g d.w | pg/l | $g/km^2/y$ | $g/km^2/y$ | kg/y |
| PCDD/Fs* | $5.70\sum10^{-4}$ | $1.29\sum10^{-5}$ | $3.64\sum10^{-5}$ | $2.76\sum10^{-4}$ | 0 | $2.33\sum10^{-5}$ | $1.81\sum10^{-2}$ |
| HCB | 66.00 | 0.01 | 0.03 | 6.61 | 0 | 0.05 | 37.65 |
| PCBs | 22.00 | 0.00 | 1.00 | 6.50 | 0 | 0.47 | 449.60 |

***- I-TEQ**

**Upper and lower estimations of PCB pollution levels for 2010**

Using the multicompartment model MSCE-POP the simulation of PCBs for 1970-2010 has been performed with two emission scenarios. In the first scenario, PCB emission was taken to be constant from 1998. In the second scenario, the emission was assumed to be zero

| Air, $pg/m^3$ | | Soil, ng/g d.w. | | Deposition flux, $g/km^2/y$ | |
|---|---|---|---|---|---|
| max | min | Max | min | max | min |
| 19 | 1.8 | 0 | 0 | 0.41 | 0.03 |

**Transboundary deposition fluxes and air concentrations of B[a]P in 1998**

# ANNEX II

# REFERENCES

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**ACRONYMES**

| | |
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| ASEAN | Association of Southeast Asian Nations |
| CEC | (North American) Commission for Environmental Cooperation |
| CEE | Central and Eastern European (countries) |
| Danced | Danish Cooperation for Environment and Development |
| EPA | Environmental Protection Agency |
| ESM | Environmentally Safe Manner |
| EU | European Union |
| FAO | Food and Agriculture Organization (of the United Nations) |
| GATT | General Agreement on Tariffs and Trade |
| GEF | Global Environment Facility |
| IFCS | Intergovernmental Forum on Chemical Safety |
| IOMC | Inter-Organization Programme for the Sound Management of Chemicals |
| IPCS | International Programme on Chemical Safety |
| IPEN | The International POPs Elimination Network |
| IPM | Integrated Pest Management |
| IRPTC | International Register of Potentially Toxic Chemicals |
| OECD | Organisation for Economic Co-operation and Development |
| OSPAR | Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention") |
| UNCTAD | United Nations Conference on Trade and Development |
| UNDP | United Nations Development Programme |
| UNECE | United Nations Economic Commission for Europe |
| UNEP | United Nations Environment Programme |
| UNIDO | United Nations Industrial Development Organization |
| UNITAR | United Nations Institute for Training and Research |

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