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MEDITERRANEAN ACTION PLAN

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STRATEGIC ACTION PROGRAMME

REGIONAL PLAN

MANAGEMENT OF PCBs AND NINE PESTICIDES FOR THE MEDITERRANEAN REGION

In cooperation with

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1. 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 bio accumulate. The SAP targets are:

- "By the year 2010 to phase out inputs of 9 pesticides and PCBs and reduce to fullest possible extent inputs of unwanted contaminants;
- By the year 2005, to reduce 50 % inputs of the priority 12 POPs;
- By the year 2005, to collect and dispose 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 regional strategy for the management of POPs and national strategy and plan for the management of POPs both elaborated on the basis of environmentally sound management processes.

Mediterranean countries should also develop by the year 2005 an inventory for POPs as indicated in Annex I.

The proposed regional plan for management of POPs is elaborated on the basis of the assessment of management status and inventories of POPs in the Mediterranean region (Annex I of document "Regional inventory of quantities and uses of pesticides and PCBs") and regional considerations.

The elaboration implementation of the action plans, is the corner stone for the implementation of the regional plan (Annex II).

Mediterranean countries would consider the integration of elements of these plans in their national environment action plan if available

2. Existing regulation and management structures addressing POPs

The different Mediterranean countries of the region are incorporated and therefore constrained by some of the following institutional and regulatory frameworks, the Barcelona Convention and the EU Directives at regional level and international multilateral agreements.

2.1. Regional

The Barcelona Convention and its associated Protocols

Most of these protocols have been amended during as a results of the World summit for environment and development in 1992 and the GPA in 1995. Actually, discussions are going on concerning appropriate rules and procedures to be applied for the determination of liability and compensation for damage resulting from pollution of the marine environment in the Mediterranean Sea. This discussion may result in the establishment of a new Protocol.

The most important legal instrument regarding PTS and the reduction of their inputs into the marine environment is the amended LBS protocol. According to article 5 "The Parties

undertake to eliminate pollution deriving from land-based sources and activities, in particular to phase out inputs of the substances that are toxic, persistent and liable to bioaccumulate listed in Annex I. To this end, they shall elaborate and implement, individually or jointly, as appropriate, national and regional action plans and programmes, containing measures and timetables for their implementation. Annex I contains 30 sectors of activity to be considered, 13 characteristics of substances to be taken into account and 19 categories of substances for which action plans should be prepared. These include:

Persistent Organic Pollutants

The twelve substances identified by the LBS Protocol as organochlorines, divided into four groups:

(i) Pesticides: DDT, aldrin, dieldrin, endrin, chlordane, heptachlor, mirex, toxaphane and hexachlorobenzene;
(ii) Industrial chemicals: PCBs;
(iii) Unwanted contaminants: hexachlorobenzene, dioxins and furans;
(iv) Polycyclic aromatic hydrocarbons.

And others chemical substances mentioned in the Strategic Action Programme (SAP) for the implementation of LBS protocol.

As a follow up to the provisions of the amended Protocol, the CPs to the Barcelona Convention adopted in 1997 a regional Strategic Action Plan (SAP) to address pollution from land-based activities. The SAP stated that Mediterranean countries should :

- by the year 2010, to phase out inputs of the 9 pesticides and PCBs and reduce to the fullest possible extent inputs of unwanted contaminants: hexachlorobenzen,dioxins and furans;
- by the year 2005 ,to reduce 50% inputs of the priority 12 POPs;
- by the year 2005,to collect and dispose aa PCB waste in a safe and environmentally sound manner.

To reach this targets, the SAP proposed activities at two levels:

- regional activities such as:

  providing technical information and advice on the POPs substitutes, develop programmes of information exchange regarding the environmentally sound disposal of the existing quantities of POPs and prepare guidelines for the application of PEB and if possible BAT by the points sources of dioxins and furans.

- national activities such as :

  prepare inventories, phase out by the year 2000 the use POPs except those uses for public health, prohibit the manufacture, trade and new use of PCBs by the year 2000 and by the year 2010 all existing uses of PCBs, prepare pilot programmes aimed at safe disposal of the PCBs, to organize by the year 2000 the collection and environmentally sound disposal of existing quantities of POPs and finally, reduce the emission of HBC, dioxins and furans as much as possible by applying BEP and BAT to the processes generating these compounds.

  The adoption and implementation of relevant National Action Plans (NAPs), as well as a scientifically-based long-term programme of targets to be achieved and actions

to be implemented at national and regional levels are the major instruments for the implementation of the SAP.

The EU Directives

The general strategy of the EU to address environmental issues of chemicals is oriented towards the sustainable development of chemical industries which should consider the precautionary principle along with the conservation of their markets and competitiveness of European Industry. In this respect, over the past two decades the Commission has proposed wide ranging legislation aimed at directly or indirectly reducing the release of PTS into the environment, with the objective of reducing human exposure and protecting human health and the environment. Recent exposure data show, for example, that measures introduced to control dioxin releases have resulted in a substantial reduction in intake of these compounds: levels in humans are decreasing since the mid-eighties. However, since 1995 this tendency seems to be levelling out and, consequently, there is a pressing need for further action to avoid environmental and adverse health effects.

Directives relevant for the regional PTS strategy are:

Council Directive 91/414/EEC provides the framework for the authorisation, the placing of plant protection products on the market and its use in the European Union.

A working programme for all existing active substances, is set up by the directive (art. 8(2)). All active substances on the market in member states on 25 July 1993 must undergo a full evaluation verifying whether they fulfil the obligations of art. 5 and therefore can be listed in annex i of the directive. This list contains active substances whose use in plant protection products is considered safe. Organotins are proposed to be banned as plant protection products.

Council Directive 79/117/EEC prohibiting the placing on the market and use of plant protection products containing certain active substances.

Substances addressed are DDT, Lindane, Aldrin, Chlordane, Dieldrin, Endrin, HCH, Hexachlorobenzene, Camphechlor and Mercury.

Council Directive 76/769/EEC on the approximations 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.

National information on the import, production, stockpiling, use and export of substances is requested. Marketing and use restrictions are defined based on evaluation of risk as well as socio-economic considerations. Four priority lists (containing about 150 substances and identified Rapporteur Member States) have been established for carrying out the risk assessment work under regulation no 793/93 (2001).

Directive 2000/76/EEC on waste incineration.

Defines limit values on emissions of particles and total organic matter from incineration of all type of wastes. Substances addressed are, e.g., PAH, PCDD/PCDF and mercury.

Directive 1999/31/EEC on the landfill of waste provides that only treated waste can be landfilled.

Provides measures, procedures and guidance to prevent or reduce pollution of surface waters, ground water, soil and air from landfills of wastes.

Council Directive 2000/60/EC of the European Parliament and of the council establishing a framework for Community action in the field of water policy (Water Framework Directive).

This Directive contains provisions on measures aimed at progressively reducing (for priority substances) and at ceasing or phasing out (for priority hazardous substances, within 20 years) discharges, emissions and losses as well as identification of these priority substances and hazardous priority substances (emission inventories according to Article 13(4)). The EC has two years to propose control measures necessary to reach the objectives for priority (hazardous) substances. These substances will have to be monitored as mandatory parameters under the WFD.

Among the substances addressed are:

- proposed priority hazardous substances: pentaPBDE, HCB, HCHs, Hg, NP/NPEs, PAHs, Pentachlorobenzene, organotin compounds;
- proposed possible priority hazardous substances: other PBDEs, dibutyl- and diethylhexylphtalate, PCP, Naphthalene, Anthracene, Atrazine, Endosulfan, Octylphenols.

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

Established two lists of substances classified as hazardous. List I identified 129 substances to be eliminated from the environment because of their toxicity and their bioaccumulation. List II contained those, which have a detrimental impact on the environment but which may be contained within a given area depending on the characteristics and location of the area. The Directive required Member States to draw up authorisation limits for emissions of substances on both lists and set up pollution programmes. The Directive set up a framework for the elimination or reduction of discharges of dangerous substances to inland and coastal waters through six daughter directives, which established emission limits for specific substances on List I of the Annex to the Directive.

Council Directive 80/68/EEC on the protection of ground water against pollution caused by certain dangerous substances.

Replaces Article 4 of the previous Directive (76/464/EEC). Its aim is to prevent the direct or indirect introduction of substances in List I and limit the substances in List II of the Annex to groundwater supplies. It will become part of the overall approach of the draft Community Water Policy Framework Directive.

Council Directive 86/280/EEC on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC (Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community).

This Directive limit values for emission standards for the substances referred to in Article 2 in discharges from industrial plants, quality objectives in the aquatic environment, time limits for compliance, reference methods of measurement. It establishes a monitoring procedure, requires Member States to cooperate and to draw up programmes to avoid or eliminate pollution arising from the sources referred to in Article 5. The Directive applies to the waters referred to in Article 1 of Directive 76/464/EEC, with the exception of ground water. Substances addressed are: DDT, the Drins, PCP, Hexachlorobenzene.

Council Directive 67/548/EEC concerning the classification and labelling of dangerous substances and preparations.

Dangerous substances, which are placed on the market have to be labelled according to their classification in Annex I, which in 2001 contains approximately 2350 existing and 214 new substances. For dangerous substances not in Annex I, the manufacturer, distributor and importer is obliged to apply a provisional classifications and labelling following the criteria in Annex VI of this directive.

Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC).

The objective is to prevent or minimise air, water and soil pollution by emissions from industrial installations in the Community, with a view to achieving a high level of environmental protection. This Directive requires the assessment of chemicals used in certain production processes and certain conditions for the licensing of industrial installations. In the context of the execution of the Directive so called BAT notes are elaborated laying down requirements for progressive technologies. Such BAT notes are foreseen e.g. for PCB sources such as certain combustion sources (for power generation and waste incineration) and production and processing of metals. Article 15 (3) of the Directive requires Member States to inventory and supply data on principal emissions and responsible sources, that is from all large facilities with one or more activities as mentioned in Annex I to this Directive. According to this Article 15 the Commission decided on the implementation of an European Pollutant Emission Register (EPER). Substances addressed include PCP, HCB, HCH, PCDD + PCDF (dioxins and furans) and organotin compounds.

EU there is the Directive 96/59/EC for the elimination of PCBs and PCTs.

Some EU countries have already established plans for PCB destruction, like France, that has a PCB destruction plan since 1987.

Besides this regulatory framework, the European Community has also acquired new obligations by becoming a contracting party to several international conventions (see section 5.2.3).

2.2 International

POPs pollution issues are covered by several Multilateral Environment Agreements(MEA) or arrangements that form an important focus for political efforts aimed at reducing their environmental impacts. The following have particular relevance to the present assessment.

The Stockholm Convention

Introduction

The Stockholm Convention on POPs was adopted and opened for signing on 23 May 2001. The objective of the Convention is to protect human health and the environment from POPs. The Convention is a legally binding instrument that will require Parties to take measures to reduce or eliminate releases of some of the most toxic chemicals ever created.

In 1995 UNEP's Governing Council called for an international assessment of the 12 POPs recognised as being particularly harmful to the environment and human health. The following year the Intergovernmental Forum on Chemical Safety concluded that there was sufficient

scientific evidence to conclude that international action was urgently needed, including a global, legally binding instrument, in order to reduce the risks posed by the POPs.

A decision to start intergovernmental negotiations of the Stockholm Convention was taken by the UNEP Governing Council in 1997. In June 1998 an Intergovernmental Negotiating Committee (INC) met for the first time. The following two INC sessions were held in 1999, and the fourth and fifth sessions in 2000. At the fifth session held in South Africa in December 2000, diplomats from 122 countries agreed on the text of the Convention. What is now officially known as the Stockholm Convention on Persistent Organic Pollutants was formally agreed and opened for signing in May 2001at a diplomatic conference in Stockholm.

As of mid-September 2001 it has been signed by 100 countries and ratified by two of those. It enters into force with the ratification of 50 countries. The Convention is a legally binding instrument that will require Parties to take measures to reduce or eliminate releases of designated POPs through a series of control measures.

Control Provisions

The Stockholm Convention sets out control provisions covering the production, import, export, disposal, and use of POPs as well as obligations of the Parties with respect to minimisation of their release. Governments are to promote the best available technologies and practices for replacing existing POPs while preventing the development of new POPs. They will also be required to ensure that appropriate national legislation and regulations are applied, and to develop action plans for carrying out their commitments and obligations.

Most of the 12 chemicals are subject to an immediate ban. However, a health-related exemption has been granted for DDT, which is still needed in many countries to control malarial mosquitoes. This will permit governments to protect their citizens from malaria - a major killer in many tropical regions – until they are able to replace DDT with chemical and non-chemical alternatives that are cost-effective and environmentally friendly.

Similarly, in the case of PCBs, which have been widely used in electrical transformers and other equipment, governments may maintain existing equipment in a way that prevents release into the environment until 2025 to give them time to arrange for PCB-free replacements. This is in recognition that substantial amounts of this chemical are still in use in such equipment. However, PCBs that are no longer in use must be captured, properly stored and ultimately destroyed by methods meeting international standards. In addition, number of country-specific and time-limited exemptions have been agreed for other chemicals.

Governments agree to reduce releases of furans and dioxins, which as are accidental by-products and thus more difficult to control, with the goal of their continuing minimisation and, where feasible, ultimate elimination.[1]

The obligations of the Parties to the Stockholm Convention are laid down in the text as a series of control and general provisions. These provisions relate to the POPs covered by the convention in different ways. The chemical substances have been grouped in annexes as shown in Table 2.1 above. With reference to the POPs included in these annexes the control provisions may be described as follows:

Parties are obligated to take measures to reduce or eliminate releases of the POPs covered by the Convention, namely: [2]

[1] Quoted from: UNEP press release: *"Governments finalise Persistent Organic Pollutants treaty"* of 10.12. 2001.

- Eliminate the production and use of POPs listed in Annex A (aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex and toxaphene) with an exception for PCBs in use and certain limited exemptions;
- Restrict to certain acceptable purposes the production and use of POPs listed in Annex B, i.e. DDT for disease vector control in accordance with WHO guidance - with certain other limited exemptions;
- Restrict export of POPs listed in Annex A and B: (i) to Parties that have a specific exemption or allowable purpose, (ii) to non-Parties whose compliance with relevant provisions of the Convention is certified, or (iii) for the purpose of environmentally sound disposal;
- Ensure that PCBs are managed in an environmentally sound manner and by the year 2025 take action to remove from use PCBs found above certain thresholds;
- Ensure, where countries have registered to do so, that use of DDT is restricted to vector control use according to WHO guidance and report on amounts of the chemical used;
- Develop and implement an action plan to identify sources and reduce releases of POPs by-products listed in Annex C, including the development and maintenance of source inventories and release estimates, and promote measures including the use of best available techniques and best environmental practices; and
- Develop strategies for identifying stockpiles of POPs listed in Annexes A and B, and products containing POPs listed in Annexes A, B and C, and take measures to ensure that POPs wastes are managed and disposed of in an environmentally sound manner. According to international standards and guidelines (e.g. the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal), and endeavour to identify POPs contaminated sites for possible remediation.

Of particular relevance to this Guidance Document is that:

> *Parties to the Convention must develop an action plan within two years, involve all relevant stakeholders in doing so, and endeavour to implement, review and update the plan on a periodic basis.*

International code of conduct on the distribution and use of pesticides

This Code of Conduct, adopted by FAO and its member countries in 1985, recognises that: *"In the absence of an effective pesticide registration process and of a governmental infrastructure for controlling the availability of pesticides, some countries importing pesticides must heavily rely on the pesticide industry to promote the safe and proper distribution and use of pesticides. In these circumstances foreign manufacturers, exporters and importers, as well as local formulators, distributors, repackers, advisers and users, must accept a share of the responsibility for safety and efficiency in distribution and use."*

The **Prior Informed Consent** (PIC) is an important component of the Code of Conduct. Under the Rotterdam convention on PIC, *"pesticides that are banned or severely restricted for reasons of health or the environment are subject to the Prior Informed Consent procedure. No pesticide in these categories should be exported to an importing country participating in the PIC procedure contrary to that country's decision...".*
Implementation of PIC Convention is carried out jointly by FAO and the International Register of Potentially Toxic Chemicals (UNEP/IRPTC) and include almost all countries of the region

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[2] Quoted from: GEF. *Guidelines for initial enabling activities for the Stockholm convention on Persistent Organic Pollutants*, May 2001. passed by the GEF Council. It is downloadable at http://www.gefweb.org/Documents/C.17.4.pdf).

(see Annex 2). Pesticides under national review for PIC (FAO, 1990) are: Aldrin, Chlordane, Heptachlor, DDT, Dieldrin and HCH (mixed isomers).

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

The Basel Convention strictly regulates the transboundary movements of hazardous wastes and provides obligations to its Parties to ensure that such wastes are managed and disposed of in an environmentally sound manner when moved across national boundaries.

The so-called Ban Amendment to the Basel Convention bans the export of hazardous wastes for final disposal and recycling from Annex VII countries (Basel Convention Parties that are members of the EU, OECD, Liechtenstein) to non-Annex VII countries (all other Parties to the Convention). The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted in 1989 and entered into force on 5 May 1992.

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

The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade was adopted at a Conference of Plenipotentiaries in Rotterdam on 10 September 1998. The Convention enables the world to monitor and control the 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.

Long-range Transboundary Air Pollution (LRTAP)

The purpose of the UN Economic Commission for Europe's LRTAP Convention is to prevent, reduce and control trans-boundary air pollution both from existing and new sources. By covering mid-latitude regions which are the origin of a major part of the atmospheric pollution, this regional, binding agreement, and its related protocols, represents the most appropriate instrument for addressing significant components of the problem.

The Aarhus Protocol

This is a POPs Protocol associated to the Convention on Long-Range Transboundary Air Pollution which was adopted in June 1998. The objective of the Aarhus POPs Protocol is to eliminate discharges, emissions and losses of POPs. It covers 16 substances, encompassing 11 pesticides, 2 industrial chemicals and 3 by-products.

Convention for the Protection of the Marine Environment of the North East Atlantic, 1992 (OSPAR)

Although covering only a restricted segment of the region, the 1992 OSPAR Convention is currently one of the most applicable international agreements addressing marine pollution from various sources. The objective of the Convention is to bring to an end the discharges, emissions and losses of all hazardous substances to the marine environment by 2020. An initial 15 chemicals or chemical groups have been selected for priority action. They include POPs and other hazardous substances such as dioxins, furans and PCBs included in the Stockholm Convention. On both monitoring and source-related assessment issues, OSPAR represents a relevant agreement to be taken into account in the context of UNEP PTS activities.

International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978, (MARPOL 73/78)

The MARPOL Convention is a combination of two treaties adopted in 1973 and 1978. It covers all technical aspects of pollution from ships, except the disposal of waste into the sea

by dumping, and applies to ships of all types. The Convention has five annexes covering oil, chemicals, sewage, garbage, and harmful substances carried in packages, portable tanks, freight containers, etc.

WHO Environmental Health Criteria
Over the past twenty years, the WHO has published an extensive list of environmental criteria for many of the PTSs discussed in this assessment. These criteria provide quantitative guidance for human concentrations including .

Relationship to other Conventions and Protocols
Ten of the twelve POPs covered by the Stockholm Convention (pesticides and industrial chemicals) are regulated under the Basel and the Rotterdam Conventions. In addition, the Regional Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR), and the Aarhus POPs Protocol to the Convention on Long-Range Transboundary Air Pollution aim at bringing to an end the discharge to the seas, and the production and use of some of the POPs substances covered in the Stockholm Convention respectively.the Mediterranean SAP regulates the uses of 9 pesticides and PCBs and set targets to phase out its uses.

The Basel and the Stockholm Convention classified all the POPs as hazardous wastes in Annex VIII of the Basel Convention. The Basel Convention strictly regulates the transboundary movements of hazardous wastes and provides obligations to its Parties to ensure that such wastes are managed and disposed of in an environmentally sound manner when moved across national boundaries.

The so-called Ban Amendment to the Basel Convention bans the export of hazardous wastes for final disposal and recycling from Annex VII countries (Basel Convention Parties that are members of the EU, OECD, Liechtenstein) to non-Annex VII countries (all other Parties to the Convention).

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted in 1989 and entered into force on 5 May 1992.

The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade was adopted at a Conference of Plenipotentiaries in Rotterdam on 10 September 1998. The Convention enables the world to monitor and control the 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.

The Stockholm Convention takes into account any relevant provisions in existing international instrument on prior informed consent, in such way that a chemical listed in Annex A of the Convention can be exported only:

- for the purpose of environmentally sound disposal;
- to a Party permitted to use that chemical under Annex A or Annex B; or
- to a country that is not a Party to the Stockholm Convention which has provided an annual certification to the exporting Party.

To date the Rotterdam Convention on Prior Informed Consent has been signed by 72 States and one regional economic integration organisation, and ratified by 9 States. It will enter into force once 50 instruments of ratification are deposited.

The Regional Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR Convention), which covers 15 states of the North East Atlantic Region and the European Union including 2 Mediterranean countries . The objective of the Convention is to bring to an end the discharges, emissions and losses of all hazardous substances to the marine environment by 2020.

An initial 15 chemicals or chemical groups have been selected for priority action. They include POPs and other hazardous substances such as dioxins, furans and PCBs included in the Stockholm Convention.

The Aarhus POPs Protocol to the Convention on Long-Range Transboundary Air Pollution which was adopted in June 1998. The objective of the Aarhus POPs Protocol is to eliminate discharges, emissions and losses of POPS. It covers 16 substances, encompassing 11 pesticides, 2 industrial chemicals and 3 by-products.

The Protocol enters into force when ratified by 16 states including 4 mediterranean countries. As of September 2001 the Protocol had been signed by 36 and ratified by 7 countries.

The Stockholm on POPs convention was adopted at the meeting of the intergovernmental negotiating committee for an international legally binding instrument for implementing international action on certain persistent organic pollutants in Johannesburg (December 2000). The objective of this Convention is to protect human health and the environment from persistent organic pollutants. The selected list of POPs is of direct relevance to the UNEP assessment of PTSs. The Convention was opened for ratification signatures on 23 May 2001 in the Intergovernmental Conference held in Stockholm.

Ten of the twelve POPs covered by the Stockholm Convention (pesticides and industrial chemicals) are regulated under the Basel and the Rotterdam Conventions, OSPAR, Mediterranean SAP.

On the other hand, the OSPAR Convention, the Barcelona convention and its protocols, and the Aarhus POPs Protocol, aim at bringing to an end the discharge to the seas, and the production and use of some of the POPs substances covered i.n the Stockholm Convention.

2.3 Status of enforcement in the region

Country	Montreal	CB	PIC	Rat.PIC	Sign POP	Rat POP	Sign Biodiv	Rat Biodiv
Albania	8.10.1999(Ac)	29.06.99 (a)			5 Dec 2001†		††	†05/01/1994†acs
Algeria	20.10.1992(Ac)	15.09.98 (a)			5 Sep 2001†		†13/06/1992†	†14/08/1995†rtf
Cyprus	28.5.1992(Ac)	17.09.92 (r)	9/11/98				†12/06/1992†	†10/07/1996†rtf
Egypt	9.5.1988(R)	08.01.93 (a)					†09/06/1992†	†02/06/1994†rtf
European Union	17.10.1988(Ap)	07.02.94 (AA)	9/11/98		23 May 2001†		†13/06/1992†	†21/12/1993†apv
Egypt	9.5.1988(R)	08.01.93 (a)					†09/06/1992†	†02/06/1994†rtf
Greece	29.12.1988(R)	04.08.94 (r)	9/11/98		23 May 2001†		†12/06/1992†	†04/08/1994†rtf
Italy	19.9.1988(R)	07.02.94 (r)	9/11/98		23 May 2001†		†05/06/1992†	†15/04/1994†rtf
Lebanon	30.3.1993(Ac)	21.12.94 (r)			23 May 2001†		†12/06/1992†	†15/12/1994†rtf
Libyan Arab Jamahiriya	11.7.1990(Ac)	12.07.01 (a)					†29/06/1992†	†12/07/2001†rtf
Malta	15.9.1988(Ac)	19.06.00 (a)			23 May 2001†		†12/06/1992†	†29/12/2000†rtf
Monaco	12.3.1993(Ac)	31.08.92 (a)			23 May 2001†		†11/06/1992†	†20/11/1992†rtf
Morocco	28.12.1995(R)	28.12.95 (a)			23 May 2001†		†13/06/1992†	†21/08/1995†rtf
Slovenia	6.7.1992(Sc)	07.10.93 (a)	9/11/98	11/17/99	23 May 2001†		†13/06/1992†	†09/07/1996†rtf
Spain	25.7.1988(Ac)	07.02.94 (r)	9/11/98		23 May 2001†		†13/06/1992†	†21/12/1993†rtf
Syrian Arab Republic	12.12.1989(Ac)	22.01.92 (r)	9/11/98				†03/05/1993†	†04/01/1996†rtf
Tunisia	25.9.1989(Ac)	11.10.95 (a)	9/11/98		23 May 2001†			
Turkey	20.9.1991(Ac)	22.06.94 (r)	9/11/98		23 May 2001†			

Therefore Mediterranean countries shall comply with the Multilateral Environment Agreements (MEAs) dealing with POPs and hazardous waste management. consequently, one of the possible tools that would enable the national authority fulfill their obligations is the elaboration of national implementation plan, as described by the Stockholm Convention and Action Plans for individual substances including inventories according to Annex (I) (II), which covers the period of 2003-2010.

3. Status of POPs management in the Mediterranean region

The indicators used to evaluate each country's capacity to develop a national action plan are the following:

- national definition of waste;
- national statistics;
- national treatment capacity.

The document entitled "Regional inventory of quantities and uses of pesticides and PCBs – UNEP/MAP 2002" clearly shows that certain countries do not yet have sufficient statistical resources for the development of a national plan for the management of POPs.

As regards hazardous waste treatment capacities, we note that countries of MAP's southern region lack treatment capacities or if such capacities do exist they cover:\

- either disposal;
- or recycling processes.

In both these cases, investments needed are small or return is guaranteed by the market value of recycled products.

The problem fully remains for the treatment of organohalogen waste, which:

- have no recycling value;
- require major investments.

The conclusion, which may be drawn from this first point is that:

- technologies for the treatment of industrial waste that could be developed are those generating an economic activity solely based on supply and demand;
- treatment technologies involving costs cannot be developed as long as they are not economically integrated in production costs.

It is therefore evident that any national action plan should be preceded by the establishment of a national inventory of releases and transfer.

3.1. The specificity of POPs

POPs as defined in the Stockholm Convention, are pesticides whose production, sale and use have been banned. The main characteristic of these substances is therefore their obsolescence.

The concept of obsolescence gives to these substances the characteristics of hazardous industrial waste in the sense that they are destined for destruction.

Being for the most part organohalogen compounds they require specific treatment procedures. This is namely the case for PCBs and PCPs (Pentachlorophenols).

The problem, which arises therefore has to do with the disposal, over a given time period, of hazardous waste of a historic nature in the sense that after disposal they should no longer be found in the inventories of hazardous industrial waste.

Their disposal should thus be conceived as a specific and selective operation.

3.2. Development of a systemic approach to the global management of hazardous waste

To attain its objectives, the Mediterranean countries which have to deal with these pollutants must manage simultaneously several MEAs which all cover the same pollutants. PCBs for example can be dealt with in a number of ways:

- because they enter the food chain where they bioaccumulate, PCBs have a negative effect on biodiversity. The action plan of this convention concerning PCBs would therefore be to restrict the migration of PCBs into the environment;
- In the phase of thermal decomposition, which occurs during incineration at low temperatures, PCBs produce by-products: PCDDs and PCDFs. In this respect, the Stockholm Convention shall develop specific actions to reduce the release of these pollutants into the atmosphere;
- When a PCB reaches obsolescence phase, it is exported to another country for disposal, in conformity with the provisions of the Basel Convention, which has as its objective environmentally rational management of hazardous waste;
- In the case of importation of dangerous substances, the countries concerned should ban the import of PCBs under the provisions of the Rotterdam Convention;
- More specifically, the Convention on POPs contains special conditions for PCBs, which are still in industrial use, by authorizing their use until 2025.

For each of these MEAs, individual countries must develop action plans at regional and national level.

In this context, a systemic approach to regional pollutant management would be to develop action plans that take into account, in a regional manner, the objectives and provisions of the different conventions.

Examples: Pentachlorophenols are considered as hazardous waste under the Basel Convention, but are not covered by the Rotterdam Convention although the thermal decomposition of PCBs leads to the formation of PCDDs in much larger quantities than for PCBs. Some countries continue to authorize PCB imports, although they do not have facilities for their destruction.

PVCs, another important emission source of dioxins, are not specifically covered by the Convention on POPs , but only as regards non intentional production of PCDDs.

If the life cycle of PVCs were taken into consideration, it would not be necessary to control their environmental impact when thermal decomposition occurs during incineration.

Interactive management of the different conventions would make it possible to rationalize their differences.

This new approach is beginning to emerge through the concept of the pollutant release and transfer register (PRTR). In fact, a pollutant is not handled on the basis of a convention (PIC/POP/BASEL, Montreal, Biodiversity), but depending on its fate and its impact on man and the environment.

This new approach for the quantitative and qualitative identification of dangerous substances also makes it possible to harmonize nomenclatures. The diversity of these nomenclatures is a major problem for the management of these substances.

Mediterranean coastal states could therefore decide to harmonize nomenclatures by means of a unique codification.

In this respect, a national action plan for POPs should be integrated in the global management of dangerous substances, which begins with such a multi-convention register.

3.3. Extension of registers to production flows

Registers as such are necessary but not sufficient for sustainable management. The evaluation of a pesticide stock is an initial stage that should be extended through ongoing monitoring of the flow of dangerous substances during industrial use or the obsolescence phase.

In this respect, the flow concept is more appropriate for determining the actions that should be initiated.

3.4. The issue of environmentally rational management of hazardous industrial waste

All environmental conventions have raised the problem of the treatment of industrial effluents generated by the producers or users of dangerous substances.

There are three aspects, which are indivisibly linked to this issue and which are often overlooked during the implementation of conventions:

a. <u>The Technology/Regulation link</u>
The technologies for the treatment of waste resulting from industrial activity (gas, solid and liquid waste, sludge, ashes,…) will only be developed and implemented if production of such waste is regulated. Otherwise, the private sector will not become involved in these developments, in the absence of effective regulatory measures.

b. <u>The Regulation/Technology link</u>
The institutional sector cannot adopt laws that will not be applied because, from a technical point of view, they do not provide outlets or technological solutions. Regulations can only be developed on the basis of technologies, which allow industrialists to comply with such regulations.

c. <u>The Technology/Financing link</u>
The private sector, which promotes the development of technologies, needs healthy markets to secure a return on the investments needed for the development of technological procedures. In the absence of such a healthy and promising market, it will not take any risks related to the development of these new procedures.

d. The Financing/Technology link
Public or private providers of funds will not finance technologies without concrete prospects concerning the development of these technologies.

e. The Regulation/Financing link
The absence of financial instruments for waste treatment is an obstacle to the implementation of regulations, which will not be enforced by the private sector without a financial framework (conventions, environmental taxes, …).

f. The Financing/Regulation link
Financial backers will not be able to finance technologies if the production of industrial waste is not regulated.

The search for solutions should therefore aim at a global approach, which would integrate these three parameters.

Today, however, we see that environmental conventions have been implemented according to a pattern that does not take into consideration the close interrelation between these three parameters.

In the case of PCBs:

Regulation/Financing
It has been established that when regulations are implemented without appropriate financial instruments, those in possession of PCBs, unable to bear the corresponding financial burden, would be inclined not to declare their equipment and to dispose of it by illegal means.

Finance/Technology
Certain countries, like Morocco or Tunisia, which hold PCB stocks of several thousands tons, would wish to develop treatment technologies in order to avoid having to export these products.

Attempts to develop technological procedures have failed in the absence of the necessary funds both for the investment and treatment costs.

Technology/Regulation
Another reason for which treatment procedures for PCBs have not been developed is the absence of regulations or non-application of these regulations.

3.5. The North/South pattern as it applies to Mediterranean coastal states:

The national action plan should consider the element of each country's economic situation. In fact, countries in the South of the Mediterranean do not have the same financial and technological capabilities as the countries the Mediterranean North, with the exception of countries on the Adriatic coast such a Albania and Bosnia Herzegovina. Implementation of national action plans cannot take place therefore under the same conditions.

Also, the financial instruments that should be provided in order to allow the countries of the South to meet with their obligations need to take into account the legitimate demands of the private sector in these countries who often claim no responsibility as user of POPs.

In addition to the historic nature of these products, the increasingly more stringent environmental regulations in industrialized countries compel private industries in these countries to relocate their production facilities in the countries of the South and in so doing they also relocate emissions and transfers of pollutants in these countries. And this is taking

place within a globalization context where trade activities are subject to deregulation rather than regulation.

The environmental tax, which has been introduced in industrialized countries, applies to products manufactured in these same industrialized countries, but not to the products, which are manufactured in the South and imported in the countries of the North.

As long as these North/South financial responsibilities are not taken into account, it will not be possible to implement environmental conventions effectively in the countries of the South.

The above examples show that these responsibilities apply both to historic waste, such as pesticides and PCBs, but also to products, which are still in active industrial use.

It is therefore of primary importance to encourage in each country the creation of working groups bringing together the national operators of the different conventions, in order to integrate all the aspects of the problem in a global manner:

- financial capacity;
- technological capacity;
- harmonization of regulations.

3.6 Definition of priority actions of national plans

Experiments under way in the countries of the South demonstrate the difficulties that are associated with the implementation of MEAs.

The main difficulty unquestionably resides in the absence of financial instruments.

In the face of this situation, priority measures should be adopted, based on cost/effectiveness criteria.

Effectiveness in this case would be measured by the level of environmental protection achieved through these measures, as well as by the reduction of environmental risks arising from these substances.

A number of measures, which meet these cost/effectiveness criteria could be listed as follows:

a. **Institutional capacity building in individual countries**. In this respect, it would be advisable to develop computerized management tools, in order to arrive at an exhaustive, qualitative and quantitative identification of waste. One example would be the development of relational databases, making it possible to integrate the different environmental nomenclatures, together with the relationship between industrial activity and waste generation. It is with this prospect in mind that examples of databases have been elaborated in the context of this study, with the aim to develop them further.

b. Introduce in national environmental regulations, as a priority**, the obligation to declare possession** and/or use of dangerous substances, which cause emissions and transfers. Without such a regulatory provision, the inventories of dangerous substances, as well as industrial hazardous waste streams cannot be finalized

c. **Control and reduction of waste at source**. This is normally the case for dioxins. Measures adopted today on dioxins have a very low cost/effectiveness ratio. Dioxin emissions are mainly caused by the thermal decomposition of organic organochlorines. The effectiveness of these measures should therefore be sought at

the level of inputs. If chlorine is eliminated at the incinerator's entry point, PCDDs in combustion gases will also disappear. As a result, it is more urgent to control household and hospital waste rather than pollutant emissions in combustion gases. Furthermore, the use of selective sorting should make it possible to achieve immediate and significant reduction of pollution releases into the atmosphere.

d. **Promote non-polluting technologies**. The major problem here arises from the fact that treatment facilities are controlled by multinationals, which still use conventional incineration methods, to the detriment of new technologies such as thermal decomposition without combustion gases. These new technologies are often developed by medium-sized enterprises, which lack the resources needed to introduce them in the treatment procedures that are mostly controlled by large groups. The financing of pilot demonstration projects would be a cost/effective measure contributing to the reduction of pollutants.

e. **Develop containment facilities before disposal**. This applies in particular to pesticides and PCBs. Electrical equipment containing PCBs is composed of solid parts impregnated with PCBs up to 70%. If these contaminated materials are stored in containment zones (temporary storage), away from flammable sources and properly labeled and guarded, they pose no risk for the environment. Containment makes it possible to store these products while waiting for their final disposal and the development of new technologies for "in situ" treatment. Containment costs amount to 100 Euros per ton. In this particular case, the cost/effectiveness ratio is very good because:

- transport costs to an authorized European facility, which amount to 500 Euros per ton are eliminated;
- subsequent treatment costs are reduced as a result of the technological sophistication of procedures.

A similar approach is used for pesticides. Priority is given today to the containment of pesticides until final disposal. It would be a mistake to look for funds both for storage and disposal at the same time. The necessary time interval until financial backing has been secured for these operations may be quite long, up to three years in some cases (tender specifications, inventories, call for tenders, award of contract). During this period pesticides are not contained, causing direct pollution to the site and aquifers.

3.7. Evaluation of quality control systems

Although these measures are indispensable during transfer operations, as a result of media interest in these products, we are witnessing a significant increase in the costs of supervision and control operations. One such example would be the pesticide operation that was conducted in a member state of the Barcelona Convention involving a quantity of 120 tons.

Because of the requirements laid down by the European provider of funds, the budget allocated to this operation was 10,000 Euros per ton for transport and disposal and 1000 Euros per ton for supervision.

Disposal costs in European centers are of the order of 1500 Euros per ton and 1000 Euros for transportation. In this particular case, as a result of technical constraints, costs went up dramatically.

3.8. Deadline for the disposal of PCBs

The year 2025 set by the Stockholm Convention and the year 2010 set by the Mediterranean countries, as the final dates for the disposal of PCBs, do not take into account the obsolescence of electrical equipment containing active PCBs.

Exports of PCBs coming from European manufacturers have been banned since 1985 or even earlier in some countries.

The average life span of an electrical transformer, however, is estimated at 35 years. Beyond that, risks associated with the use of such old equipment, become incompatible with operational safety standards.

If 2010 is considered as the final date, the last PCB transformers in operation will be 30 to 25 years old. However, it is precisely at that age that pollution risks are the most important.

One should also take into account the fact that while companies, which produce and distribute electrical power apply very strict operation standards, which provide for the systematic renewal of equipment after 30 years of use, the same cannot be said of the private sector.

It is therefore very important to introduce in national regulations obligations pertaining to the rigorous technical monitoring of all equipment in operation after 30 years of use.

3.9. Stocks of obsolescent pesticides

In most of the countries concerned, obsolescent pesticide stocks have been identified and located.

The quantity and nature of these products are globally known. The problem with these stocks is mostly linked to the absence of any containment of these products**.**

The compliance of these obsolescent stocks involves costs (segregation, reconditioning, packaging, containment zone, guarding, flow management, …).

Studies presently under way on the management of obsolescent pesticides are closely linked to disposal operations and costs.

This global decision-making process has a serious negative impact on the environment, as completion deadlines extend over many years.

During this time, these obsolescent pesticides, which are stored under bad conditions, are a major source of soil contamination with two consequences:

- A significant increase in treatment costs for these products. Quite frequently, 100 tons of contaminated rubble have to be excavated for a stock of 10 tons;
- Aquifer pollution.

For the environmentally rational management of these stocks therefore it is necessary to dissociate for decision-making the compliance of existing stocks and their subsequent disposal.

3.10. Choice of a country for the implementation of a pilot programme and definition of its contents

There are two countries, which seem to meet conditions for the development of a pilot national action plan: Tunisia and Morocco.
On the one hand, because they are non industrialized countries and on the other because they have proved their commitment to the conventions through concrete action:

- establishment of a list of hazardous waste in the case of Tunisia;
- PCB registers under way in Morocco.

The contents of this pilot programme could focus on the implementation of a pollutant release and transfer register, which would lay down common objectives to all environmental conventions and which would include POPs.

Moreover, the different aspects of such a PRTP, would fully meet the objectives of a NIP, especially as regards the extension of the inventory concept to the production concept on the on hand and the inclusion of the private and public sector on the other.

The advantage of this new approach is that it will not duplicate actions already initiated, as part of the specific action programmes of each convention.

These two Arab countries are also well representative of the other Arab countries of the Mediterranean.

4. Elements of POPS Waste Management Plan

Taking into consideration the previous chapter, the following elements could be considered in the National Action Plans for POPs management:

4.1. Management by holders

- Individual POPS waste holders, including farmers and householders, shall be responsible for the sound management of that waste which is in their possession;
- Other holders of POPS waste shall take full responsibility for managing that waste and arranging for its destruction;
- In fostering a cooperative approach, the national authority shall provide advice on how POPS waste on farms, businesses and domestic premises should be stored, handled and transported to collection points.

4.2. Collections

- Any collections of scheduled POPS waste should be consistent with this plan and preferably be part of a national action collection programme;
- Resourcing and implementation of collections should involve cooperation between industry, all spheres of government and community-based organisations;
- Collection, storage and destruction of scheduled POPS wastes shall take place within the regulatory framework provided and applied by State, local environmental authority, health and other responsible bodies;
- Collections shall not commence until the agency is satisfied that a consolidation store suitable for the purpose of receiving scheduled POPS waste from collection points is available.

4.3 Transportation and destruction

- Scheduled POPS waste shall be transported in accordance with the regulation for the Transport of Dangerous Goods by Road and Rail and any conditions required by the national authority, and in accordance with any other legislative requirements and stored in accordance with the requirements of dangerous goods legislation and other relevant legislation;
- In applying these requirements, those in possession of POPS waste should minimise the possible release of vapours;
- Control of POPs in the workplace shall be in accordance with the Control of Hazardous Substances National Regulations and National Code of Practice;
- To facilitate efficient destruction, holders of scheduled POPS waste and managers of collection points and consolidation stores shall, where practicable, segregate:

  - scheduled POPS waste that has a very low probability of being contaminated by materials that may reduce the choice of destruction technologies, such as heavy metals or arsenic (an example is labelled containers with intact labels that do not show heavy metals as ingredients);
  - scheduled POPS waste that contains materials that may reduce the choice of destruction technologies or has a high probability of containing such materials (examples are labelled materials showing arsenic as contents and materials considered to be POPS waste but with unclear labels);
  - scheduled POPS waste that is in a physical form that will require pre-treatment before it can be mechanically handled at a destruction plant (examples are protective clothing, absorbent spill socks, soil and sweepings); and
  - unidentified materials, which may be scheduled POPS waste.

- In addition to these categories, scheduled POPS waste must be segregated from other categories of waste that may be collected in any collection program;
- Managers of collection points and consolidation stores shall adopt and employ emergency containment and clean-up procedures for the accidental release of POPS waste into the environment, as approved by the national authority;
- Any scheduled POPS waste received at collection points shall be consigned to consolidation stores as soon as practicable;
- Scheduled POPS waste in consolidation stores shall be consigned, within one year of the starting date, for destruction by a licensed destruction facility, unless the national authority determines that viable destruction facilities are not available in the country;
- Scheduled POPS waste not in consolidation stores shall be consigned for destruction by a licensed destruction facility within one year of receipt at a consolidation store, unless the national authority determines that viable destruction facilities are not available in the country;
- To facilitate the collection process, and in consultation with the community, the national authority and local authorities may develop procedures which allow the establishment of collection points for defined temporary periods.

4.4. Notifiable quantity

- There shall be no requirement for individual farmers and householders who possess scheduled POPS waste to notify their holdings, but they are encouraged to notify the national authority;
- Organisations or bodies responsible for managing collection points and consolidation stores for scheduled POPS waste shall notify the national authority of their holdings where these are greater than the notifiable quantity (10 kg of active ingredient);

- The national authority shall maintain and publicise the existence of a publicly-accessible register of scheduled POPS.

4.5 POPs identification, sampling and analysis

- Where POPS waste is in its original container and where the container has a legible label, analysis shall not be required prior to segregation. Scheduled POPS waste likely to be contaminated with substances which may affect the choice or availability of treatment options may need to be analysed before destruction;
- There shall be no requirement to analyse POPS waste prior to its receipt at collection points. Holders of POPS waste should preserve any information (such as labels) which indicates the identity of the waste. No mixing or bulking of POPS waste should be carried out by holders. Identifying information, where available, should be provided to collection points;
- To minimise cross-contamination which may affect the choice of available destruction options, managers of collection points and consolidation stores shall ensure segregation of scheduled POPS waste by trained personnel on the basis of:

  - label information where POPS waste is in its original container with a definitive label;
  - or indicative analytical tests, where label information is not available.

- Analyses undertaken for the purposes of bulking or mixing scheduled POPS wastes, for destruction, or for measurement of the operation of destruction facilities shall be carried out by laboratories which are accredited and registered for relevant POPS analyses by the competent authorities. Laboratories carrying out POPS analyses shall incorporate quality assurance and quality control programs in accordance with relevant requirements;
- Mixing or bulking of POPS waste shall not occur unless the waste has been positively identified by individual or composite sampling and analysis techniques;
- Where analyses are required for regulatory purposes, the quality assurance program shall incorporate periodic check analyses by an independent laboratory;
- Sampling and analytical methods acceptable, or approved equivalents in the country or other countries, for inclusion in the scope of accreditation of laboratories shall be used for POPS analysis;
- Sampling and extraction for analysis shall ensure that the material being analysed is representative, without altering or selecting the sample to result in:

  - scheduled POPS waste becoming non-scheduled POPS waste; or
  - scheduled POPS waste or non-scheduled POPS waste becoming exempt POPS waste.

4.6. Destruction of scheduled POPs waste

- Releases to water, air or land from POPS destruction facilities, and clean up actions to be taken for accidental releases, shall be specified in the destruction facility licence. They shall be set at levels which ensure that the receiving environment is adequately protected, and in particular:

  - A risk assessment (including human health and ecological considerations) involving public consultation shall be carried out to confirm that the risk associated with normal operation and possible failure or malfunction of the facility is at a level acceptable to the national authority;
  - Sampling and monitoring of all discharges and residues shall be carried out;
  - Any liquid residue from the destruction of scheduled POPS waste shall meet the criterion for exempt POPS waste. This residue will then be no longer covered by this plan, but some of the constituents may be subject to other controls;

- Any liquid discharge to sewer from the destruction of scheduled POPS waste shall not contain POPs at a concentration greater than 0.001 mg/litre or as specified in the national regulation for Sewerage Systems;
- There shall be no discharge of liquid effluent from destruction facilities to wetlands 9 , whether the wetlands are naturally occurring or artificially created. The national authority shall pay particular attention to the protection of aquifers in issuing licences for destruction facilities;
- Liquid effluent from the destruction of scheduled POPS waste and from sewage treatment facilities which is discharged to fresh or marine waters other than wetlands shall have concentrations which are less than 100 times the lowest value for any constituent in the effluent in the water quality regulation;
- Emissions of POPs to the atmosphere from the destruction of scheduled POPS waste shall be set in accordance with the following standards:

- Where discharge to air is likely to directly expose destruction facility workers to a largely undiluted source, as may be the case adjacent to a vent or near ground level, then the recommended level of 0.001 mg/m3 shall not be exceeded; and
- Discharge occurs through a stack and mixing with the atmosphere will occur before people are expected to be exposed to the emissions, the national authority shall set a discharge limit which does not result in a three minute maximum ground level concentration at the premises' boundary exceeding one thirtieth of the recommended value;
- The discharge limit should be based on the application of best practice control technology.

- Emissions of dioxins and furans to atmosphere from the destruction of scheduled POPS waste shall not exceed 0.1 nanogram per cubic metre as applied to the sum of all the congeners multiplied by toxic equivalency factors;
- Any solid residue from the destruction of POPS waste shall meet the criterion for exempt POPS waste. Where this is not practicable using available technologies, the national authority may permit treatment which leaves non-scheduled POPS solid residues. These residues may then be disposed of to a landfill which has been approved by the national authority for the disposal of non-scheduled solid POPS waste. That approval shall be given in accordance with the community involvement principles;
- Mobile facilities for the destruction of scheduled POPS waste shall require approval by the national authority as for other licensed destruction facilities. For operation at a new site, approvals already in place shall be taken into consideration. Additional requirements, including site-specific discharge requirements, may need to be met.

4.7. Disposal of POPs to landfilling

- Scheduled POPS waste shall not be disposed of to landfill or elsewhere in the environment;
- Non-scheduled liquid POPS waste shall not be disposed of to landfill or elsewhere in the environment;
- Non-scheduled solid POPS waste with a concentration of POPs less than the threshold concentration (of 50 mg/kg) may be disposed of to a landfill which has been approved;
- The national authority shall, on request, provide information on landfills licensed to receive non-scheduled solid POPS waste.

4.8 Certification

- The national authority shall record, by a transport certification system or other means, all movements beyond collection points;

- The national authority shall require a certificate of destruction (which may be either on paper or in electronic form) to be issued by the destruction facility operator to the consignee and a copy to be returned to the national authority;
- A register of completed waste destruction certificates shall be maintained by the national authority and shall be publicly accessible.

4.9 POPs waste monitoring

- There are many existing studies measuring POPs in a variety of media. A program of identification, collation and analysis of data arising from those studies should be carried out to follow changes in concentrations of POPs over time. Areas of interest include:

  - breast milk, human blood and foodstuffs;
  - blood and bone based fertiliser;
  - sewage treatment plant sludge and effluent (including those for reuse) and receiving waters;
  - landfill sites suspected of having received scheduled POPS waste (including adjacent groundwater or leachate) which have been assessed by the national authority as posing a potential risk to the environment; and appropriate biological indicators, including wildlife.

- The results of this program shall be made publicly accessible.

4.10. Community participation, education and training

- Proponents of destruction facilities for scheduled POPS waste shall undertake a formal public consultation process based upon the information provision requirements in the National Plan;
- Information relating to monitoring, storage, emergency planning, handling, transport and destruction of scheduled and non-scheduled POPS waste shall be made publicly accessible by the national authority;
- Specifically targeted education and training programs (including safety) shall be made available to all holders and handlers of POPS waste (in particular, farmers, collection point operators, landfill operators and emergency workers). The national authority shall facilitate and have oversight of such programs.

4.11. Review

- The national authority shall provide annual public reports on progress on the implementation of the national plan;
- An independent review of the effectiveness of the management plan shall be carried out by 2010;
- This review shall consider information made available through State of the Environment and other reporting mechanisms, including:

  - progress in destroying scheduled POPS waste;
  - scheduled POPS waste destruction technologies and their adequacy for treating the different;
  - types of scheduled POPS waste, including mixtures of POPs;
  - the scope of the plan;
  - appropriateness of the provisions stipulated in this plan;
  - the monitoring programs;
  - human health and environmental toxicology of POPs;
  - cost/benefit analyses including intangible costs and benefits; and

- effectiveness of education programs.

4.12. Guidance note for the disposal of non-scheduled solid POPs waste

The objectives of this guidance note are to:

- minimise the release of POPs from non-scheduled solid POPS waste into the wider environment; and encourage a nationally consistent and acceptable approach to the management and disposal of non-scheduled solid POPS waste within the framework of the POPS Waste Management Plan;
- Consistent with the aim of best practice landfill management, landfill disposal of non-scheduled solid POPS waste shall require consideration of:

  - siting issues, including hydrogeology and proximity to sensitive environments;
  - landfill operating controls, including use of liners, cover management, capping, landfill gas management, leachate;
  - management, and fire prevention and control;
  - landfill management practices, including site supervision and waste screening;
  - monitoring, including ground and surface water and leachate; and
  - closure, including post-closure ownership, monitoring and after care works to minimise infiltration.

- The national authority should encourage a community involvement program. Best practice community involvement programs;
- include inspection, auditing and monitoring of the landfill sites;
- Landfills for the disposal of non-scheduled solid POPS waste shall:

  - be approved by the national authority; and
  - conform to requirements for discharge to air, water and land that apply to the treatment and disposal of scheduled POPS waste.

Information SOURCES :

1. UNEP/POPS/INC.5/ INF/3. Related work on persistent organic pollutants under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. October 2000
   Internet: irptc.unep.ch/pops/POPs_Inc/INC_5/inf5-3/en/inc5inf3.pdf;
2. UNEP/POPS/INC.5/3. Reference in the future convention on persistent organic pollutants to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. August 2000.
   Internet: irptc.unep.ch/pops/POPs_Inc/INC_5/inc5-3/en/inc53en.pdf;
3. UNEP homepage on Promoting Collaboration and Synergies Amongst Environmental Conventions:
   Internet: www.unep.ch/conventions/index.htm;
4. UNEP Governing Council 21 meeting which addressed among others the synergies and the relations between the conventions:
   Internet: www.unep.org/GC_21st/;
5. OSPAR Convention homepage.
   Internet: www.ospar.org/eng/html/welcome.html.;
6. Aarhus Convention homepage
   Internet: www.unece.org/env/lrtap/

ANNEX I

GUIDELINES FOR POPs INVENTORIES

INVENTORY: POPs PESTICIDES (ANNEX A, PART I CHEMICALS OF STOCKHOLM CONVENTION)

Requirements of the Stockholm Convention

Concerning POPs pesticides (excluding DDT, covered in Section 7.3.3) the Stockholm Convention requires that all Parties must:

- prohibit and/or take legal and administrative measures necessary to eliminate POPs pesticides (upon entry into force) with the exception of Parties that have specific exemptions for which production and/or use may continue in up to five years (Article 4);
- stop importation of POPs pesticides except for Parties that are allowed to do so according to Article 4 (exemptions specified to the Secretariat) or if the POPs pesticides are disposed of in an environmentally sound manner;
- only export to non-Parties on certain conditions pertaining to both the non- Party and the Party and subject to accountability requirements (use and disposal);
- develop and implement strategies to identify stockpiles, products and articles in use and wastes containing POPs pesticides;
- not allow recovery, recycling, reclamation, direct reuse or alternative uses of POPs pesticides;
- manage stockpiles in a safe, efficient and environmental safe manner (ESM) until they are deemed to be wastes;
- take measures to handle, collect, transport and store POPs pesticides wastes in an ESM and dispose of the wastes in a way that destroys the POPs substance, or otherwise in an ESM taking into account international rules, standards and guidelines (e.g. transboundary movement involving the Basel secretariat).

Preparation of inventory

A country should prepare an inventory of POPs pesticides in order to establish a solid foundation for identifying sound management measures for POPs pesticides that meet the obligations of the Convention. The task of doing so may follow the approach outlined below.

Approach to Preparing an Inventory of POPs Pesticides

As no inventory structure is mandated under the Stockholm Convention, the specific format of the inventory may be tailored to the individual country's preferences and needs. The format presented should therefore be seen as an option and its inherent logic path as a source of inspiration.

1. Preparation of inventory of POPs Pesticides

1.1 Background

The POPs pesticides consist of mainly chlorinated insecticides and include 9 of the 12 POPs substances covered by the Stockholm Convention.

Aldrin, introduced in 1949, is an insecticide used against soil pests (primarily termites) corn, potatoes and cotton

D*ieldrin*, introduced in 1948, is an insecticide used on fruit, soil and seed crops, including corn, cotton and potatoes.

Chlordane, introduced in 1945, encompasses a broad spectrum of contact insecticides historically used on agricultural crops including vegetables, small grains, maize, other oilseeds, potatoes, sugarcane, sugar beets, fruits, nuts, citrus, cotton, and jute. It is also used on home lawns and gardens and for the control of termites, the latter being its primary use more recently.

D*ieldrin*, introduced in 1948 is an insecticides, are used on fruit, soil and seed crops, including corn, cotton and potatoes.

Endrin, introduced in 1951, is an insecticide used mainly on field crops such as cotton, rice and corm. It is also used as a rodenticide to control mice and voles and to combat birds.

Hexachloro-benzene (HCB), introduced in 1945*,* is used as a fungicide for treatment of wheat, onions and sorghum. *Mirex* is an insecticide used to combat fire ants and leaf cutters, harvester termites, mealy bug, and yellow jacket wasps. It is also used as a fire retardant in plastics, rubber, and electrical goods.

Toxaphene, introduced in 1948, is a mixture of more than 670 chemicals used as an insecticide, primarily to control insect pests on cotton and other crops, but also to control insect pests (ticks and mites) on livestock and to kill unwanted fish in lakes.

The use of these POPs pesticides is already banned in many countries by legislation. As a consequence, substitution of other chemicals has occurred and their production and distribution has been discontinued. Special attention should therefore be given to existing stockpiles of these products. In some countries POPs pesticides, particularly the part that has turned into waste, have been covered by overall, national inventories of obsolete pesticides.

1.2 Objectives

The objective of preparing an inventory is that a sufficient quantitative information basis for developing an Action Plan for POPs pesticides be established. A more detailed inventory may later be prepared in connection with the implementation of the Action Plan on pesticides. A related objective is increased awareness among stakeholders as to the call for action to deal with the issue. A broader policy objective may be providing a baseline for a broader management program applicable to obsolete pesticides generally.

1.3 Results

The results of the Task are:

- Draft and final versions of a baseline inventory of POPs pesticides;
- Stakeholders are informed about the issue of POPs pesticides and the presence of these chemicals in the country;
- Government staff and other stakeholders assigned responsibility are trained in preparing an inventory of a chemical substance.

Initial provisions to ensure that it remains current.

1.4 Activities

The process of preparing an inventory of POPs pesticides may be divided into two phases: a preparatory phase and an inventory preparation phase.

Preparatory Activities

a. Constitution of Task Group for inventory preparation

When a need for undertaking an inventory of POPs Pesticides have been identified a Task Group to be responsible for planning, organising and partly undertaking the work involved should be appointed.

b. Preparations for developing an inventory of POPs pesticides (initial survey)

A first step in preparing the inventory could be to make an initial survey in order to get an overview of the problems related to production, use, stockpiles and wastes of POPs pesticides. This could involve collection of existing national, regional and international information on POPs pesticides. In addition, the survey would focus on the following issues and information sources:

- Regulations pertaining to the use of POPs pesticides, retail trade in the pesticides (e.g. retailers' code of conduct), empty containers, stockpiled wastes, etc.;
- National production of POPs pesticides or products containing such pesticides. Existence of possible assessments of produced and/or used quantities in the past;
- Identification of which POPs pesticides have already been banned by legislation, and estimation of quantities that are expired by date or inappropriately packaged, and stocks that are in excess of needs and/or turned obsolete or unwanted (waste);
- Possible guidelines for identification and management of POPs pesticides in stockpiles, production, use or as wastes prepared by governmental organisations, farm and retailers organisation, FAO etc.;
- Surveys or data bases of POPs pesticides prepared by farm organisation or retailers list of products;
- Previous studies or monitoring of POPs Pesticides in the environment, food, feed and humans. Responsible organisations and reports on results;
- Existence of national or other laboratories which carry out analyses of POPs pesticides;
- Facilities for safe transport, storage and possible reformulation, disposal and/or final elimination of POPs pesticides;
- Level of management of POPs pesticides within the existing hazardous waste management system;
- Surveys or inventories of POPs Pesticides in neighbouring or similar countries;
- (Later) Assessment of national exemptions as per Article 4 of Stockholm Convention text.

In many countries central records on POPs pesticides may be available from sources such as the Ministry of Finance (taxes and customs authorities), Ministry of Agriculture (registration and procurement data), Customs Authorities (import/export figures), Crop Protection and Agricultural Producers Federations, Ministry of Trade, Industry, Transport and Education (various potential data sources) or in various international registers like WHO, UNEP Chemical Clearing House, PIC, Basel Secretariat or other international recognised data sources.

With a normal validity period of 2-3 years most POPs pesticides recorded in the initial survey would have turned obsolete if they have not been used since the records were prepared.

Inventory Preparation Activities

c. Development of work plan

Based on the results of the initial survey above the Task Group would identify the need for more information. On this basis a work plan would be elaborated indicating the major tasks to be undertaken and a time scale for completing the work. In addition, the work plan would assign responsibilities to the parties involved in the process.

d. Translation of material on POPs Pesticides into national language

In some countries a significant share of those directly involved in planning, organising and/or conducting the inventory would benefit from reading general material on POPs pesticides in the national language. Translation of such material from international languages should therefore be seriously considered. The material may include excerpts from inventory manuals (the FAO inventory format is enclosed as example), international/regional reports on POPs pesticides of particular relevance to the country and examples of how inventories of POPs pesticides have been prepared in other countries.

e. Preparation of guideline

It is advisable to prepare a guideline for those who are going to do the inventory work. This will help ensure a consistent approach and maximise efficiency of the resources deployed. The guideline should be tailor-made to the national conditions and be in the national language. It should also address practical issues related to personal protection, sampling, analysis and labelling.

f. Training in inventory procedures

Before fieldwork starts, a workshop on procedures for preparing and evaluating the inventory on POPs pesticides should be organised. The objective would be to give the involved parties the necessary information on the issue of POP pesticides in general and an insight into internationally accepted methodology as well as discuss the approach used in the national context based on the guideline described above.

g. Development of national inventory

The steps involved in conducting the inventory may follow the sequence of steps given below:

- Determine from the findings of the initial survey how to target the issue (inventorying by questionnaire, databases, site inspections, spot check etc). Determine possible trade names;.
- Depending on final choice of information sources, establish likely production of POPs pesticides and the use, stockpiles and waste of the chemicals. Further, record possible other stockpiled pesticides (could involve the same environmental risks as POPs pesticides covered by the Stockholm Convention and later become covered by the Convention);
- For retailers, compare data with information from suppliers. Focus on expiry dates and campaigning stockpiles/production;
- Perform spot check at customs storehouses, e.g. in harbours, on private farms and commercial farms, in small-scale farmers communities etc.;
- Evaluate the quality and disposition of containers containing or having previously contained POPs pesticides;

- Assess the possible immediate risks to the environment and humans on the locations where pesticides are or have been stored;
- Determine the safety of the stores concerning quality/integrity of containment (both individual containers and overall facility), risk of explosion or fire, availability of emergency response capability, and any overall health hazards for people in the neighbourhood, etc. One small store may in some instances prove better than a big centralised store if the latter does not comply with national/international fire requirements for storage of toxic and flammable substances.

h. Internal and external peer review of the initial inventory

When a draft inventory has been prepared the Task Group may wish to have it peer reviewed by local or international experts (outside the Task Group). The aim would be to validate the contents, e.g. in terms of accuracy and sufficiency in detail to serve as a useful input to the development of the Action Plan to deal with the POPs pesticides issue.

Part of the review could include an assessment of disposal options, either in the country or by way of export.

i. Propose destruction and decontamination processes

The inventory may be concluded by listing readily available evident as well as possible options and/or solutions for final elimination, phase-out of exemption and combined feasibility of waste elimination technologies focussing on POPs Pesticides. Such considerations must comply with the Convention Article 6,1 (d) and will be further elaborated in the Action Plan for Elimination and Production and Use of POPs Pesticides.

j. Dissemination of information to stakeholders

Similarly, the government (the Task Group on POPs pesticides) may wish to distribute the results of the inventory to relevant stakeholders such as other involved ministries, environmental agencies, hazardous waste organisations, farmers associations, associations of retailers, laboratories, affected public (local communities), NGOs etc. The objective would be to encourage and promote environment-friendly behaviour even before a possible Action Plan to deal with POP pesticides is implemented.

1.5 Organisational Arrangements, Participants and Stakeholders

The participants in the process may be summarised as follows:

Coordination Responsibility: The focal point for administrative, project management and coordination purposes needs to oversee the task. This may be the overall NIP Focal Point Unit or some other group reporting to it as may be determined by the National Lead Agency (ies) and/or InterAgency Supervisory Body for the NIP.

Introductory workshop: Participants could include staff from government agencies, national pesticides experts (e.g. university staff and other experts), representatives from the agricultural and affiliated sectors (retailers association), NGOs and possibly the press.

Task Group: The group could most appropriately include representatives from government agencies (e.g. the ministries of environment and agriculture), private farm associations and NGOs. The government may also wish to involve international experts in an advisory function.

Inventory Preparation implementation: The practical inventory work may be done by government personnel, e.g. environmental inspectors, representatives from the retail sector, local consultants, NGOs etc. The government may also wish to involve international experts to contribute to the process, e.g. with regard to methodology and validation, spot checks, etc.

Reviewers: Local and international primarily technical experts on POPs pesticides and waste management.

Approval: A process of having the inventory formally adopted as the baseline information for the NIP is recommended such that it has some official status. This may be done by some combination of a peer review technical panel and decisions by the National Lead Agency and Inter-agency Supervisory Body

Assignment of Maintenance Responsibility: Once the base line inventory is officially in place it is important that responsibility for maintaining it until the actual implementation of the NIP action plan inclusive of a more comprehensive inventory has started officially. This would normally be the Focal Point Unit but may also include the Task Group.

2. Structuring the Inventory of POPs Pesticides

The report on the inventory may be structures as follows as an option:

Summary
1. Introduction
2. Present regulations controlling the production and use of POPs pesticides and management of POPs pesticides containing waste;
3. Former, current and projected production and use of POPs pesticides;
4. Import and export of POPs pesticides;
5. Identified stockpiles of POPs pesticides and POPs pesticides waste;
6. Present management (production, use, stockpiles and waste) of POPs pesticides and empty containers;
7. National capacity (units) and capability (technical expertise) in the field of elimination of POPs pesticides and laboratory analysis;
8. Options for future management of POPs pesticides (optional).

Annex: Stakeholders involved in POPs pesticides

3. Costs and Funding Sources

The costs of preparing an inventory of POPs pesticides will primarily depend on the size of the country, the level of POPs pesticides and other pesticides used, the depth of the survey and the number and of national and international resource persons and participants involved.

Although associated with a great deal of uncertainty current cost estimates are as follows. As a rule of thumb the cost of preparing an inventory like the one described in this section would be in the order of 10 percent of the typical disposal costs. In 2001-prices the cost of disposal of POPs pesticides through export to other countries are estimated at 3 - 4,000 USD/ tonne and the cost of making an inventory is estimated at 300 - 400 USD/tonne.

The potential sources of funding of the activities include:

- National government contributions (i.e. personnel, infrastructure and budget funds);
- Users and suppliers of POPs pesticides;
- Global Environmental Facility (i.e. enabling facilities);
- Other international development agencies;

- Bilateral contributions from governments of developed countries.

4. Indicative timeframe

Given the differences between countries indicated above, the timeframe differs from country to country. Indicative planning figures are: small countries: 6 months, medium-sized countries: 6 - 10 months and large countries: 12 -15 months.

5. Information Sources

1. FAO: Prevention and Disposal of Obsolete Pesticide Programme. Guidelines available:
   - Prevention of accumulation of obsolete pesticide stocks;
   - Pesticide storage and stock control manual;
   - Disposal of bulk quantities of obsolete pesticides in developing countries;
   - Management and disposal of small quantities of unwanted and obsolete pesticides;
   - Assessing soil contamination (reference manual);
   - Baseline study on the problem of obsolete pesticide stocks;
   - Training on inventory taking of obsolete stocks.
   - Internet: www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPP/Pesticid/default and www.who.int/m/topics/chemical_safety/en/index.html
2. GCPF (Global Crop Protection Federation). Industry association has links to existing programmes on safe use, container management etc, and links to regionally centres of excellence for pesticide use and safety.
   Internet: www.gcpf.org/
3. Pesticide Action Network, a global NGO organisation working on safe use of pesticides.
   Internet: www.pan-uk.org/Internat/intindex.htm
4. WHO. The organisation has programmes covering mainly safe use and pesticides residues in food.
   Internet: www.who.org
5. UNDP. *Possible capacity-building activities and their associated costs under the international legally binding instrument for implementing international action on certain persistent organic pollutants*. Note by the Secretariat. November 1998 (UNEP/POPS/INC.2/ INF/3).
   Internet: irptc.unep.ch/pops/POPs_Inc/INC_2/en/inf3.htm
6. UNEP. *National inventories of persistent organic pollutants, selected examples and possible models. Preliminary report.* Note by the Secretariat, July 1999 (UNEP/POPS/INC.3/ INF/1).
   Internet: irptc.unep.ch/pops/POPs_Inc/INC_3/inf-english/inf3-1/inc3-1.pdf

INVENTORY: POLYCHLORINATED BIPHENYLS – PCBS (Annex A – Part II of Stockholm Convention)

In order to establish a solid foundation for identifying PCB management measures to meet their obligations, a country will likely need to prepare a PCB inventory. The task of doing so may follow the approach outlined below.

Approach to Preparing an Inventory of PCBs

As no inventory or methodology structure is mandated under the Stockholm Convention, the specific format of the inventory may be tailored to the individual country's preferences and needs. The format presented here should therefore be seen as an option and its inherent logic path as a source of inspiration. In addition to possible production of PCBs, the inventory would cover both equipment in use and stockpiled equipment.

1. Preparation of Inventory of PCBs

1.1 Background

Since 1930, PCBs have been widely used as cooling fluid in transformers and dielectric fluid in capacitors. Minor applications of PCBs in equipment have been as heat transfer fluids and hydraulic fluids in industry, and as cooling fluid in switches, voltage regulators and motors. Open applications of PCBs have been as plasticiser in paint, plastics and sealants and in carbonless copy paper.

PCBs themselves or PCB contaminated equipment stored as waste and/or more commonly PCB containing equipment still in service will likely still exist in many countries. The latter will be found in closed electrical systems, in partially closed applications as heat transfer and hydraulic fluids, vacuum pumps, switches, etc. and in some open applications.

In the Stockholm Convention text, prioritisation of actions (identify, label, remove from use) is made on the basis of quantities and concentrations of PCB in equipment. Equipment containing greater than 10% of PCBs and more than 5 litres of PCB are the first priority. This will primarily be transformers directly filled with PCBs and large power factor capacitors used in power production utility distribution networks and heavy industrial applications such as in the ferrous and non-ferrous sectors. The second priority is equipment containing from 0.05-5 litres and greater than 0.005 % PCBs, which will apply to such things as low power factor capacitors in electrical distribution networks, lighting ballast for fluorescent light, and motor start capacitors for a variety of electrical motors and appliances. The third priority will apply to concentrations above 0.005% and greater than o.05 litres which will apply generally to equipment accidentally contaminated. either by filling with equipment that also was used to fill PCB transformers or at some latter point during refilling.

The above implies an implicit requirement to create a comprehensive inventory, inclusive of labelling of all equipment or substances in use or otherwise containing greater that 0.005 % and 0.05 litres of PCBs. The baseline or preliminary inventory will define the scope of this as well as being the first step in moving toward the more comprehensive convention compliance requirement.

1.2 Objectives

The objective of preparing the inventory is to provide a sufficient quantitative information base for initiating development of an Action Plan for PCBs. A more detailed inventory may

later be prepared in connection with the implementation of the Action Plan on PCBs. A related objective is increased awareness among stakeholders as to the call for action to deal with the issue. A broader policy objective may be providing a baseline for a broader management program applicable to documenting pollutant releases and chemical management generally.

1.3 Results

The results of the Task are:

- Draft and final versions of a baseline inventory of PCBs;
- Stakeholders are informed about the PCB issue and the presence of PCB in the country.

Government staff and other stakeholders' assigned responsibility are trained in preparing an inventory of PCBs.

1.4 Activities

The process of preparing an inventory of PCBs may be divided into two phases: the preparatory phase and an inventory preparation phase.

Preparatory Activities

a. Constitution of Task Group for inventory preparation
When a need for preparing an inventory of PCBs has been identified, a Task Group to be responsible for planning, organising and partly undertaking the work involved should be appointed.

b. Preparations for developing an inventory of PCBs
The first step in preparing the inventory is to carry out an initial survey providing information on legislation concerning PCBs, the main stakeholders and on information on PCB readily available in the country. The Task Group would collect existing national, regional and international information on PCB in order to get the best possible overview of the situation. Besides collecting international information such as surveys or inventories in neighbouring countries, the initial survey would focus on the following issues and information sources:

- Regulation of the use of PCBs and the management of PCB-containing waste;
- Production of PCBs or PCB-containing products in the country. Existence of possible assessments of production volumes in the past and data collection on the distribution PCBs and PCB containing equipment by sector, brand names and other source applied identification (i.e. serial numbers);
- Possible guidelines for identification and management of PCB-containing equipment prepared by governmental organisations, trade organisations, power companies or transformer workshops;
- Possible surveys of PCB in equipment prepared by power companies and other potential major users of PCB containing equipment (i.e. lighting fixture manufacturers);
- Information held by power companies and, the main suppliers of transformers and capacitors indicating the presence of PCB in equipment by consumers of electricity;
- Existence of laboratories which carry out analyses of PCB in transformer oil or other PCB-containing fluids;
- Level of PCB management within the existing hazardous waste management system. Facilities for storage and destruction of PCBs.

As a second step, one may consider organising an introductory (kick-off) workshop on the planning of PCB management in the country or organising a workshop on POPs management more generally. The objective would be to get stakeholders in the field of PCBs (or POPs) further involved in considerations of how to deal with the issue in the early stages of the process and to share general information on PCBs (POPs). The initial survey should be used as one among other inputs to the workshop.

Inventory Preparation Activities

c. Development of work plan

Based on the results of the initial survey the Task Group would identify the need for more information end possibly collect more of the existing information on PCBs. On this basis a work plan would be elaborated indicating the major activities to be undertaken and a time scale for completing the work. In addition, the work plan would assign responsibilities to the parties involved in the process.

d. Collection of data on PCB-containing equipment

The presence of PCBs in equipment is usually only indirectly indicated on the equipment by the type-numbers and codes. As a first step of the inventory work, it will be useful to collect information on PCB-containing equipment, trade names and synonyms for PCB fluids. Lists of PCB-containing equipment have been prepared by UNEP, the EU Commission and US EPA among others. This information should be supplemented with information from local or regional producers and suppliers of transformers and capacitors.

e. Translation of material on PCBs into national language

In some countries a significant share of those directly involved in planning, organising and/or conducting the inventory would benefit from reading general material on PCBs in the national language. Translation of such material from international languages should therefore be seriously considered. The material may include a description of the threats of PCBs to human health and the environment, excerpts from inventory manuals and international/regional reports on PCBs of particular relevance to the country, and examples of how PCB inventories have been prepared in other countries.

f. Preparation of guideline

It is advisable to prepare a guideline for those who are going to identify the equipment. This will help to ensure a consistent approach and maximise efficiency of the resources deployed. The guideline should be tailor-made to the national conditions and be in the national language. The guidelines should include a list of equipment types known to contain PCBs, and preferably also a list of equipment known not to contain PCBs. The guidelines may also include advice on sampling and analyses of transformer oils for the presence of PCBs. A good example of national guidelines for the identification of PCB-containing capacitors can be found in source ANZECC (1997) below.

g. Training in inventory procedures

Before the field-work starts, a workshop on procedures for preparing and evaluating the inventory of PCBs may be organised. The objective would be to give the involved parties the necessary information on the PCB issue in general, and an insight into internationally accepted methodology, as well as to discuss the approach used in the national context based on the guideline described above.

h. Development of national inventory

The steps involved in preparing the inventory may follow the sequence of steps given below:

Closed applications

- *Determine possible target locations for PCB inspection.* Dependent on the financial inputs for the inventory, a number of potential holders of PVB-containing equipment are selected. It is essential in the selection to ensure that the scale and variety of PCB holdings can be estimated with a reasonable degree of certainty from the information obtained;
- At these locations: *determine potential PCB-containing equipment* based on the guidelines**.** The determination may be performed by the holder's technical staff (e.g. through a questionnaire survey), by environmental inspectors or other governmental personnel or by local consultants;
- The inventory may be supplemented with a broad sampling and analysis of transformer oils to indicate the extension of secondary PCB-contaminated transformers;
- *Compile information and upscale* to country level.

Open applications

- For potential PCB-containing open applications: *assess the magnitude* of present and former use in a national context and the main locations of relevance where PCB from open applications may still be found;
- *Estimate the potential volumes* still in use.

Stockpiles and wastes

- *Determine possible target locations for PCB* inspection;
- At target locations: *identify potential PCB-containing wastes and stockpiles.* The identification may be performed by the holder's technical staff (e.g. through a questionnaire survey), by environmental inspectors or other governmental personnel, or by local consultants;
- *Compile information and upscale* to the whole country;
- Determine the country-specific and environmentally sound options for permanent and interim storage of the discovered PCB-containing waste;
- Where applicable preliminary estimates of potential volumes of soil contamination or estimation of number of sites where this may exist (i.e. electrical equipment filling and maintenance operations, scrapping locations, sub-standard storage facilities).

i. Internal and peer external review of initial inventory

When a draft inventory has been prepared the Task Group may wish to have it peer reviewed by local PCB experts (outside the Task Group) and possibly also by one or more international experts. The objective would be to validate the contents, e.g. in terms of accuracy and sufficiency in detail to serve as an appropriate input to the development of an Action Plan to deal with the PCB issue.

j. Propose destruction and decontamination processes

The inventory may be concluded by listing available as well as possible options or solutions with regard to destruction and decontamination processes for PCB-contaminated equipment. Such considerations would be further discussed and elaborated in the Action Plan for Elimination and Production and use of PCBs.

k. Dissemination of information to stakeholders

Similarly, while the follow-up action will be described in the Action Plan, the government (POPs Co-ordination Committee / PCB Task Group) may want to distribute the results contained in the inventory to relevant stakeholders such as holders of equipment, national and regional environmental agencies, hazardous waste organisations, laboratories, etc. The

aim would be to encourage and promote environment-friendly behaviour even before an Action Plan for PCBs is implemented.

1.5 Organisational Arrangements, Participants and Stakeholders

It is essential for the outcome of an inventory that the government has the necessary legislative and regulatory power to oblige holders to provide the necessary information. It is assumed that an inventory at the level of detail proposed above can be drawn up without drafting new legislation and regulations.

The participants in the process may be summarised as follows:

Coordination Responsibility: The focal point for administrative project management and coordination purposes needs to oversee the task. This may be the overall NIP Focal Point unit or some other group reporting to it as may be determined by the National Lead Agency and/or InterAgency Supervisory Body for the NIP.

Introductory workshop: Participants could include staff from government agencies, national PCB experts (e.g. university people and other experts), representatives from the energy and industry sectors, NGOs and possibly the press.

Task Group: The group could most appropriately include representatives from government agencies (e.g. the ministries of environment and health), the energy sector and industry. The government may also wish to involve international experts in an advisory function.

Inventory Preparation: The practical inventory work may be done by government personnel, e.g. environmental inspectors, and possibly local consultants in co-operation with the technical staff of the holders of equipment. The government may also wish to involve international experts to contribute to the process, e.g. with regard to methodology.

Reviewers: Local and international experts on PCB and waste management.

Approval: A process of having the inventory formally adopted as the baseline information for the NIP is recommended such that it has some official status. This may be done by some combination of a peer review technical panel and decisions by the National Lead Agency and Inter-agency Supervisory Body

Assignment of Maintenance Responsibility: Once the base line inventory is officially in place it is important that responsibility for maintaining it until the actual implementation of the NIP action plan inclusive of a more comprehensive inventory has started officially. This would normally be the Focal Point Unit but may also include the Task Group.

2. Reporting the Inventory of PCBs

The report on the inventory may be structured as follows as an option:

Summary
1. Introduction
2. Present regulations pertaining to PCB
3. Closed applications of PCBs
4. Open applications of PCBs
5. PCB-containing Wastes
6. National capacity (units) and capability (technical expertise) in the field of PCBs (disposal, laboratory analysis etc.)

7. Present and future management of PCBs (optional)
   Annex Guidelines for the identification of PCB-containing equipment.
   Annex: Stakeholders in the field of PCBs.

3. Costs and Funding Sources

The costs of preparing a PCB inventory will primarily depend on the size of the country, the level of PCB use in general, the depth of the survey and the mixture of national and international resource persons and participants. Cost estimates are provided in source # below.

The potential sources of funding of the activities include:
- National government contributions (i.e. personnel, infrastructure and budget funds);
- Holders and Generators of PCBs and PCB contaminated equipment (i.e. electrical utilities);
- Global Environment Facilities (i.e. enabling facilities);
- Other international development agencies;
- Bilateral contributions from governments of developed countries.

4. Indicative Timeframe

Given the differences between countries indicated above, the timeframe differs from country to country. Indicative planning figures are: small country 8 -12 months, medium-sized country: 12 - 15 months and a large country: 15-24 months.

5. Information Sources

1. UNEP. *Guidelines for the Identification of PCBs and Materials Containing PCBs.* First Issue. UNEP Chemicals, 1999.
   Internet: http://www.chem.unep.ch/irptc/Publications/pcbid1.pdf;
2. UNDP. *Possible capacity-building activities and their associated costs under the international legally binding instrument for implementing international action on certain persistent organic pollutants. Note by the Secretariat.* November 1998 (UNEP/POPS/INC.2/ INF/3).
   Internet: http://irptc.unep.ch/pops/POPs_Inc/INC_2/en/inf3.htm;
3. UNEP. *National inventories of persistent organic pollutants, selected examples and possible models. Preliminary report.* Note by the Secretariat, July 1999 (UNEP/POPS/INC.3/ INF/1).
   Internet: http://irptc.unep.ch/pops/POPs_Inc/INC_3/inf-english/inf3-1/inc3-1.pdf;
4. IFCS. *Framework for the management of PCB*. Contribution to the IFCS PCB Strategy Group, Intergovernmental Forum on Chemical Safety, February 2001.
   Internet: http://www.who.int/ifcs/pcb/pcb_framework.pdf;
5. AMAP. *PCB in the Russian Federation: Inventory and Proposal for Priority Remedial Actions. Executive Summary.* Arctic Monitoring and Assessment Programme and Centre for International Projects, 2000.
   Internet: http://www.amap.no/ol-docs/pcb-es.pdf;
6. ANZECC. *Identification of PCB-containing capacitors*. Australian and New Zealand Environment and Conservation Council, 1997.
   Internet: http://www.ea.gov.au/industry/chemicals/swm/pubs/pcbid.pdf;
7. CEC. *Status of PCB management in North America.* Commission for Environmental Cooperation, 1996.
   Internet:http://www.cec.org/pubs_info_resources/publications/pdfs/english/pcbe.pdf;
8. National Inventory of PCBs in Use and PCB Wastes in Storage in Canada: Summary Report, October 1989
   Internet: http://www.ec.gc.ca/pcb/pdf/NI08_e.pdf.

INVENTORY: DDT (Stockholm Convention ANNEX B CHEMICALS)

Preparation of inventory

A country should prepare an inventory of DDT in order to establish a baseline for identifying sound management measures for it that meet the obligations of the Convention. The task of doing so may follow the approach outlined below which in many ways is similar to the recommendations for preparing the inventory of other POPs pesticides included in Annex A of the Stockholm Convention.

Approach to Preparing an Inventory of DDT

As no inventory structure is mandated under the Stockholm Convention, the specific format of the inventory may be tailored to the individual country's preferences and needs. The format presented should therefore be seen as an option and its inherent logic path as a source of inspiration. It should be noted that FAO has developed a widely used inventory format which is to be found in source ? as further guidance.

1. Preparation of inventory of DDT

1.1 Background

DDT is one of the nine POPs pesticides covered by Stockholm Convention but us uniquely addressed within a separate Convention Annex because unlike those contained in Annex A will continue in production and use on a restricted basis. Given its stability, its persistence (as much as 50% can remain in the soil 10-15 years after application) and its widespread use DDT can be found everywhere. Thus, it has been detected in Arctic biota for decades and has been one of the main reasons for implementation of the Stockholm Convention on persistent organic pollutants.

DDT is an insecticide used globally since the 1930s for a variety of purposes including agricultural crops application, especially cotton, and on insects that carry diseases like malaria and typhus. During the last decades its primary use has been in countries and regions seriously impacted by migratory pests and infectious diseases carried by insects, particularly malaria.

In many countries DDT is already banned either by legislation, substituted by other products and/or phased out of production. Special attention should therefore be on notified acceptable purposes and specific exemptions for future production and use. Furthermore, unwanted stockpiles of the product should be carefully inventoried due to the high toxicity and persistence of this specific POPs chemical. In many countries DDT is already included in overall national inventories of obsolete pesticides. Nevertheless, there is a clear need and specific requirements in the Stockholm Convention to support the preparation of a detailed national inventory as part of the NIP preparation.

1.2 Objectives

The objective of preparing an inventory of DDT is to provide a sufficient quantitative information base for initiating development of an Action Plan for DDT. A more detailed inventory may later be prepared in connection with the implementation of the Action Plan on DDT.

A related objective is increased awareness among stakeholders as to the call for action to deal with the issue. A broader policy objective may be providing a baseline for a more general environmental management programme applicable to documenting pollutant releases, and overall chemical and pesticide management.

1.3 Results

The results of the detailed baseline inventory development would be:

- Draft and final versions of a baseline DDT inventory similar in nature to the one developed for Annex A POPs pesticides;
- Stakeholders are informed about the DDT issue and the presence of DDT in the country;
- Government staff and stakeholders assigned responsibility are trained in preparing an inventory of DDT.

1.4 Activities

The process of preparing an inventory of DDT may be divided into two phases: a preparatory phase and an inventory preparation phase.

Preparatory Phase Activities

a. Preparations for developing a baseline inventory on DDT
As a first step one may consider organising an introductory (kick-off) workshop on the planning of POPs management in the country. The objective would be to involve stakeholders in the area of POPs involved in considerations of how to deal with POPs in the early stages of the process and to share general information on POPs.

b. Constitution of Task Group for detailed inventory preparation
When a need for undertaking an inventory of DDT has been identified, a Task Group to be responsible for planning, organising and partly undertaking the work involved should be appointed. The Task Group should cover both DDT and Annex A POPs pesticides as these are normally purchased, stored, used and managed the same way. For DDT, involvement of any national/regional or local malarial control unit is also important. The main responsible organisation for DDT issues in a country is normally the Ministry of Health.

Inventory Preparation Phase Activities

c. Development of work plan
The Task Group would initially collect existing international, regional and national information on DDT that might exist in order to get the best possible overview of the situation. On this basis a work plan would be elaborated indicating the major tasks to be undertaken and a timeframe for completing the work. In addition, the work plan would assign responsibilities to the parties involved in the process.

d. Translation of material on POPs Pesticides into national language
In some countries a significant share of those directly involved in planning, organising and/or conducting the inventory would benefit from reading general material on DDT in the national language if not already available through the Ministry of Health, WHO or malarial control units. Translation of such material from international languages should therefore be seriously considered. The material may include excerpts from inventory manuals like the FAO inventory format, international/regional reports on DDT experiences, research on specific substitutes of particular relevance to the country and examples on how inventories of DDT and POPs pesticides in general have been prepared in other countries.

e. Preparation of guideline

It is advisable to prepare a guideline for those who are going to do the inventory work. This will help ensure a consistent approach and maximise efficiency of the resources deployed. The guideline should be tailor-made to the national conditions and be in the national language.

f. Training on inventory procedures

Before fieldwork starts, a workshop on procedures for preparing and evaluating the inventory on DDT (and Annex A POPs pesticides) should be organised. The objective would be to give the parties, particularly personnel actually involved in data collection, the necessary information on the DDT and Annex A POPs pesticides issue in general and an insight into internationally accepted methodology as well as discuss the approach used in the national context based on the guideline described above. For personnel undertaking field inspection work training should cover identification procedures, preliminary assessment of storage facility integrity, identification of potential environmental and health risk and appropriate safety and personal protection procedures.

g. Development of draft national inventory

The steps involved in conducting the detailed inventory may follow the sequence of steps given below:

- Determine from country baseline data how to target the issue (inventorying by questionnaire, databases, site inspections, spot check etc.). Determine possible trade names;
- Depending on the final choice of information sources, determine potential DDT in production, use, stockpiles or as waste;
- For retailers, compare data with information from suppliers. Focus on expiry dates and campaigning stockpiles/production;
- Perform spot check at customs storehouses, for example in harbours and on private farms, commercial farms, small-scale farmers community, etc.;
- Evaluate the quality and disposition of containers containing or having previously contained DDT;
- Assess the possible immediate risks to the environment and humans on the locations where pesticides are or have been stored;
- Determine the safety of the stores concerning quality/integrity of containment (both individual containers and overall facility), risk of explosion or fire, availability of emergency response capability, and any overall health hazards for people in the neighbourhood, etc. One small store may in some instances prove better than a big centralised store if the latter does not comply with national/international requirements for storage of toxic and flammable substances.

h. Internal and external peer review of the initial inventory

When a draft inventory has been prepared the Task Group may wish to have it reviewed by local or international DDT and/or POPs pesticides experts (outside the Task Group). The objective would be to validate the contents, e.g. in terms of accuracy and sufficiency in detail to serve as a useful input to the development of the Action Plan to deal with the DDT and general POPs pesticides issue.

Part of the review could also contain a preliminary assessment of disposal options either nationally or by export to another country offering such capability.

i. Propose destruction and decontamination processes

The inventory may be concluded by listing evident as well as possible options and/or solutions for final elimination, phase-out of exemption and combined feasibility of waste elimination technologies for POPs pesticides with a special focus on DDT. Such considerations must comply with the Convention's Article 6, 1(d) and will be further elaborated in the Action Plan: Production, Use, Stockpiles and Wastes of DDT (Section 7.3.4).

j. Dissemination of information to stakeholders

Similarly, while follow-up actions may be detailed as a consequence of the final results of the detail DDT inventory, the government (POPs Co-ordination Committee/POPs Pesticides Task Group including DDT) may want to distribute the results contained in the inventory to relevant stakeholders such as health organisations, retailers, farmers associations, other involved ministries, environmental agencies, hazardous waste organisations, laboratories, etc. The objective would be to encourage and promote environment-friendly behaviour even before a possible action plan to deal with DDT is implemented.

1.5 Organisational Arrangements, Participants and Stakeholders

The participants in the process may be summarised as follows:

Coordination Responsibility: The focal point for administrative, project management and coordination purposes needs to oversee the task. This may be the overall NIP Focal Point Unit or some other group reporting to it as may be determined by the National Lead Agency(ies) and/or Inter-Agency Supervisory Body for the NIP.

Introductory workshop: Participants could include staff from government agencies, health care organisations (both governmental and private operators), national DDT and/or POPs pesticides experts (e.g. university people and other experts), representatives from the agricultural and affiliated sectors (retailers organisation), NGOs, representatives of potentially impacted communities and possibly the media.

Task Group: The group could most appropriately include representatives from government agencies (e.g. the ministries of health, environment and agriculture), malaria control unit, private farm organisations and NGOs. The government may also wish to involve international experts in an advisory function.

Detailed inventory implementation: The practical inventory work may be done by government personnel, e.g. health and environmental inspectors, representatives from private retailers, local consultants, NGOs etc. The government may also wish to involve international experts to contribute to the process, e.g. with regard to methodology and validation, spot checks, etc.

Reviewers: Local and international primarily experts on DDT and/or POPs pesticides and waste management.

Approval: A process of having the inventory formally adopted as the baseline information for the NIP is recommended such that it has some official status. This may be done by some combination of a peer review technical panel and decisions by the National Lead Agency and Inter-agency Supervisory Body.

Assignment of Maintenance Responsibility: Once the baseline inventory is officially in place it is important that responsibility for maintaining it until the actual implementation of the NIP Action Plan, possibly inclusive of a more comprehensive inventory has started officially. This would normally be the Focal Point Unit but may also include the Task Group.

2. Structuring the Inventory of DDT

The report on the inventory may be structured as follows as an option:

Summary
1. Introduction
2. Present regulations controlling the production and use of DDT and management of DDT containing waste;
1. Former, current and projected production and use of DDT;
4. Import and export of DDT;
5. Identified stockpiles of DDT and DDT waste;
6. Present management (production, use, stockpiles and waste) of DDT and empty containers;
7. National capacity (units) and capability (technical expertise) in the field of elimination of DDT and laboratory analysis;
8. Options for future management of DDT (optional).

Annex: Stakeholders involved in the DDT issue.

The structure of the DDT inventory should ideally follow the structure used for the inventory of other POPs pesticides. The consolidated data would make up the basic foundation for developing a strategy for reduction and elimination of releases from stockpiles and wastes including Annex A POPs pesticides, DDT and PCBs.

3. Costs and Funding Sources

The costs of preparing a DDT inventory will primarily depend on the size of the country, the quantities of DDT used now and in the past, the depth of the survey and the number and of national and international resource persons and participants involved.

Although associated with a great deal of uncertainty current cost estimates are as follows. As a rule of thumb the cost of preparing an inventory like the one described in this section would be in the order of 10 percent of the typical disposal costs. In 2001-prices the cost of disposal of DDT through export to other countries are estimated at 3 - 4,000 USD/tonne and the cost of making an inventory is estimated at 300 - 400 USD/tonne. However, the costs depend on the extent this may be combined with a similar activity for the other POPs pesticides.

The potential sources of funding of the activities include:

- National government contributions (i.e. personnel, infrastructure and budget funds);
- Users and suppliers of DDT;
- Global Environmental Facility (i.e. enabling facilities);
- Other international development agencies;
- Bilateral contributions from governments of developed countries.

4. Indicative Timeframe

Given the differences between countries indicated above, the timeframe differs from country to country. Indicative planning figures are: small countries 4-6 months, medium-sized countries: 6 - 10 months and a larger countries: 12 - 15 months.

5. Information Sources

1. WWF: *Resolving the DDT Dilemma: Protecting Biodiversity and Human Health*. June 1998
   Internet: http://www.worldwildlife.org/toxics/progareas/pop/ddt_report.htm
2. FAO: *Prevention and Disposal of Obsolete Pesticide Programme*. Guidelines available:
   - Prevention of accumulation of obsolete pesticide stocks;
   - Pesticide storage and stock control manual;
   - Disposal of bulk quantities of obsolete pesticides in developing countries;
   - Management and disposal of small quantities of unwanted and obsolete pesticides;
   - Assessing soil contamination (reference manual);
   - Baseline study on the problem of obsolete pesticide stocks;
   - Training on inventory taking of obsolete stocks.

   Internet: www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPP/Pesticid/default and www.who.int/m/topics/chemical_safety/en/index.html
3. Assessment of DDT substitutes, see *WHO Pesticide Evaluation Scheme (WHOPES)*
   Internet: http://www.who.int/ctd/whopes/index.html
4. WHO: Tropical Diseases Programme (detailed information on use, stockpiling, and planning of vector control)
   Internet: http://www.who.int/dsa/cat98/trop8.htm
5. OECD: *DAC guidelines on Aid and Environment No 6; "Guidelines for Aid Agencies on Pest and Pesticide Management"*. 1995.

INVENTORY: RELEASES FROM UNINTENTIONAL PRODUCTION OF PCDDS/PCDFS, HCB AND PCBS (Annex C of Stockholm Convention)

Preparation of inventory

In order to establish a solid foundation for identifying management measures for meeting the obligations of the Stockholm Convention regarding unintentional production, a country would have to prepare an inventory of current and projected releases of PCDD/PCDF, HCB and PCB. The task of doing so may follow the approach outlined below.

1. Preparation of Inventory of PCDDs/PCDFs

1.1 Background

Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDDs/PCDFs), hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs) are formed as unintentional products in a wide range of thermal and industrial chemical processes. These are the chemical substances covered by Annex C of the Stockholm Convention.

PCDDs/PCDFs are often referred to as 'dioxins' or 'dioxins and furans'. However, in some contexts these terms also include the brominated dioxins and furans that are not covered by the Convention. In the following, the term 'dioxins' will be used in a broad sense to represent the Annex C substances.

These compounds are either formed in thermal processes either from precursors (complex chlorinated compounds) in the fuel as fuel or from the basic elements carbon, hydrogen, oxygen and chlorine in the so-called "De novo synthesis". From thermal processes the substances are mainly emitted to the air or are disposed of with flue gas cleaning residues. The examples of the kinds of thermal process that may emit dioxins are waste incineration (hazardous, municipal, medical, sewage sludge), uncontrolled waste burning, non-ferrous metals smelting and refining processes, thermal power generation, cement kilns, electric furnace steel making, wood and other biomass burning (heating/forest fires), and transportation fuel combustion

They are also formed in industrial chemical processes with the formation of the different compounds depends on the actual chemical process applied. Formation of PCDDs/PCDFs occurs in the production of pulp and paper when bleaching with elemental chlorine is used. and the production of chlorinated compounds like the wood preservative pentachlorophenol (PCP). In these cases, the substances are predominantly released to water and soil directly and possibly via the products made.

The Convention text distinguishes between sources with the potential of comparatively high formation and release of the compounds (Annex C, Part II) and 12 other sources with a lower potential (Annex C, Part III). The sources with a potential for high formation and emission are waste incinerators, cement kilns firing hazardous waste, pulp and paper production using elemental chlorine, sinter plants in iron and steel production, and secondary production of copper, aluminium and zinc. Sources with a lower potential include open burning of waste, residential combustion sources, fossil fuel-fired utility and industrial boilers, firing installations for wood and other biomass fuels, crematoria and motor vehicles, particularly running on leaded gasoline.

PCDDs (Polychlorinated dibenzo-p-dioxins) are a group of compounds with different combinations of chlorine atoms attached to a carbon ring structure. Each combination is

designated a congener, and 75 different congeners of PCDD exist. The PCDFs and PCBs are formed around slightly different ring structures. PCDDs/PCDFs and PCBs are always formed as a mixture of congeners. The toxicity of the compounds is very congener-specific and to be able to evaluate emissions in terms of toxicity, a number of toxicity equivalency factor systems have been developed.

Some countries have already made preliminary or detailed inventories of PCDDs/PCDFs emissions (Ref. 9, 11), whereas others have only limited knowledge of the emission of the compounds. National inventories of PCDD/PCDF releases from all over the World have recently been presented and evaluated by UNEP Chemicals (ref. 1 below). In some countries inventories of PCBs and HCB emissions to air from thermal sources are prepared as a part of broader air emission inventories. As an example this is the case for the European CORINAIR inventories (ref. 7 below). National inventories of unintentional formation of PCBs and HCB are rare. A review of sources for unintentional production of HCB by both chemical and thermal processes can be found in ref. 8.

Only the preparation of an inventory of PCDDs/PCDFs is addressed in detail below. Thermal sources identified in an inventory of PCDDs/PCDFs will in general also be sources of HCB and PCB emission and the releases of PCB and HCB may later be estimated on the basis of activity data, obtained in the PCDD/PCDF inventory.

1.2 Objectives

The objective of preparing the inventory is that a sufficient information base on which an Action Plan for Reduction/Elimination of Formation and Emission of PCDDs/PCDFs (and HCB and PCB) can be developed. A more detailed inventory process complete with mechanisms for periodic updating will likely be prepared later in connection with the implementation of the Action Plan itself, see Section **0**. A related objective is increased awareness among stakeholders as to the call for action to deal with the issue. A broader policy objective may be providing a baseline for a broader management program applicable to documenting pollutant releases inventories.

1.3 Results

The results of the action are:

- Draft and final versions of a baseline inventory of production and releases of PCDDs/PCDFs;
- Stakeholders are informed about the 'dioxin' issue and sources of 'dioxin' emission in the country;
- Government staff and others are trained in preparing an inventory of 'dioxins' and similar hazardous substances.

1.4 Activities

The process of preparing an inventory of releases from unintentional releases may be divided into two phases: a preparatory phase and an inventory preparation phase.

Preparatory Activities

a. Constitution of a Task Group for inventory preparation

When a need for preparing the inventory has been identified, a Task Group to be responsible for planning, organising and partly undertaking the work involved could be appointed.

b. Preparations for developing an inventory of PCDD/PCDF

The first step in preparing the inventory may be to carry out an initial survey that provides information on legislation concerning 'dioxins', the main stakeholders and a status on information readily available on 'dioxins' in the country.

The Task Group would collect existing national, regional and international information on 'dioxins' in order to get the best possible overview of the situation. Besides collecting international information, the survey may focus on the following issues and information sources:

- Regulation of 'dioxin' release from thermal and chemical processes and 'dioxin' content of chemicals;
- Possible studies, monitoring and inventories of 'dioxin' releases in the country. Responsible organisations and reports on results;
- Possible studies on or monitoring of 'dioxins' in the environment, food, feed and humans. Responsible organisations and reports on results;
- Existence of laboratories that are able to carry out analyses of 'dioxin' emission;
- A preliminary assessment of the extent of which source categories, with the potential of comparatively high formation and release of the substances and estimated emission factors (Annex C, Part II), are present in the country.

As a second step, one may consider organising an introductory (kick-off) workshop on the planning of 'dioxin' management in the country or organising a workshop on POPs management more generally. The objective would be to get stakeholders in the area of 'dioxins' (or POPs) further involved in considerations of how to deal with the issue in the early stages of the process and to share general information on 'dioxins' (POPs). The initial survey is used as one among other inputs to the workshop.

Inventory Preparation Activities

c. Development of work plan

Based on the results of the initial survey the Task Group would evaluate the need for more information end possibly collect more of the existing international information on 'dioxins'. On this basis, a work plan would be elaborated indicating the major tasks to be undertaken and a timeframe for completing the work. In addition, the work plan would assign responsibilities to the parties involved in the process.

d. Translation of material on PCDD/PCDF into national languages

In some countries a significant share of those directly involved in planning, organising and/or conducting the inventory would benefit from reading general material on 'dioxins' in the national language. Translation of such material from international languages should therefore be seriously considered. The material may include a description of the threats of 'dioxins' to human health and the environment, excerpts from inventory manuals and international/regional reports on 'dioxins' of particular relevance to the country and examples of how 'dioxin' and more specifically PCDD/PCDF inventories have been prepared in other countries (Ref, 9, 11).

e. Training on inventory procedures

Before data gathering starts, a workshop on procedures for preparing and evaluating the inventory on PCDD/PCDF may be organised. The objective would be to give the involved parties the necessary information on the 'dioxin' issue in general and an insight into internationally accepted inventorying methodology as well as discuss the approach used in the national context based on the guideline described above.

f. Development of national inventory

UNEP Chemicals has prepared a draft Toolkit to assist countries in identifying sources and estimating releases of PCDD/PCDF (ref. 2).

The key elements of the toolkit are:

- An effective methodology for identifying the relevant industrial and non-industrial processes releasing PCDD and PCDF to air, water, land and with products and residues in a country and screening of these to identify the most important ones;
- Guidance on gathering of information on the relevant processes which will allow the classification of the processes into classes with similar emissions;
- A detailed database of emission factors which provides suitable default data to be applied as representative of the class into which the processes are grouped. Emission factors published for generic facilities and applicable in other countries may be useful references (Ref, 5, 10);
- The Toolkit is flexible and applicable to all countries. The following applies to countries with no inventory. The process of drawing up an inventory may be regarded as an interactive process, where the reliability of the inventory figures is gradually increased by obtaining more data on the sources.

The steps involved in conducting the inventory may follow the sequence of steps given below.

i. Main source category identification

The Toolkit groups the sources into ten main categories. The first step of the inventory is to identify relevant main source categories and the main release routes for each category are identified using a Screening Matrix from Toolkit as guidance. The main source categories for PCDD/PCDF emissions are:

- Waste incineration;
- Ferrous and non-ferrous metal production;
- Power generation and heating;
- Production of mineral products;
- Transport;
- Uncontrolled combustion processes;
- Production of chemicals and consumer goods;
- Disposal;
- Hot-Spots.

ii. Processes or subcategory identification

Processes or subcategories within each main source category are identified using the Subcategory List of the Toolkit. For each subcategory listed, an investigation shall establish the presence or absence of the activity in the country or region based on easily accessible data, e.g. statistical information.

iii. Collection of information on processes and emission

The next step is to collect detailed information on processes. Size and scale of activities (e.g., tonnes of waste burned, tonnes of copper produced) and key process information are relevant to the assessment. Within one subcategory, the emissions of PCDDs/PCDFs can vary considerably depending on technology and performance.

If data based on actual measurements of PCDD/PCDF emission exist, they are collected together with data on key process information.

iv. Process classification and source quantification

Each source or group of sources are quantified, either on the basis of actual measurements or by multiplying the obtained data on activities with emission factors from the Toolkit. The Toolkit provides for each source category a range of default emission factors for different processes and technologies. The emission factors concern emission to air, water, land, products and residues. The emission factors for emission to air may for example depend on whether the emission abatement system includes lime injection and bag filters or if the process is fuelled with virgin wood or contaminated wood.

v. Compilation of inventory

The entire inventory is compiled by adding up the emissions from all categories. The reporting of the inventory is discussed further in Section 2 "Reporting the PCDD/PCDF Inventory".

g. Internal and peer external review of initial inventory

When a draft inventory has been prepared the Task Group may wish to have it peer reviewed by local 'dioxin' experts (outside the Task Group) and possibly also by one or more international experts. The objective would be to validate the contents, e.g. in terms of accuracy and sufficiency in detail to serve as a useful input to the development of an Actions Plan to deal with the 'dioxin' issue. This is a particularly important step recognising the level of technical uncertainty and evolving nature of scientific opinion on the subject.

h. Propose measures for reduction of 'dioxin' formation and emissions

The Inventory Report may propose measures to reduce dioxin formation and emissions. The measures may be changes in raw materials, processes and products to prevent the formation and release of PCDD/PCDF. The recommendations may be based on some comparisons between actual emissions and projected emissions if best available technology is applied. Such considerations would be further discussed and elaborated in the Action Plan for Reduction/Elimination of Formation and Emissions of PCDDs/PCDFs.

i. Dissemination of information to stakeholders

Similarly, while follow-up action may be detailed in a 'dioxin' Action Plan, the government (the Focal Point for POPs / Dioxin Task Group) may want to distribute the results contained in the inventory to relevant stakeholders such as national and regional environmental agencies, waste organisations, laboratories, etc. The objective would be to encourage and promote environment-friendly behaviour even before a possible action plan to deal with 'dioxins' is implemented.

1.5 Organisational Arrangements, Participants and Stakeholders

The participants in the process may be summarised as follows:

Coordination Responsibility: The focal point for administrative project management and coordination purposes needs to oversee the task. This may be the overall NIP Focal Point unit or some other group reporting to it as may be determined by the National Lead Agency and/or InterAgency Supervisory Body for the NIP.

Introductory workshop: Participants could include staff from government agencies, national 'dioxin' experts (e.g. university people and other experts), representatives from the energy, industry and waste management sectors, NGOs and possibly the press.

Task Group: The group could most appropriately include representatives from government agencies (e.g. the ministries of environment and health), waste management sector and industry. The government may also wish to involve international experts in an advisory function.

Inventory Preparation: The practical inventory work may be done by government personnel, e.g. environmental inspectors and local consultants in cooperation with the technical staff of the holders of the plant and equipment concerned. The government may also wish to involve international experts to contribute to the process, e.g. with regard to methodology.

Reviewers: Local and international experts on 'dioxin' formation and emission.

Approval: A process of having the inventory formally adopted as the baseline information for the NIP is recommended such that it has some official status. This may be done by some combination of a peer review technical panel and decisions by the National Lead Agency and Inter-agency Supervisory Body

Assignment of Maintenance Responsibility: Once the base line inventory is officially in place it is important that responsibility for maintaining it until the actual implementation of the NIP action plan inclusive of a more comprehensive inventory has started officially. This would normally be the Focal Point Unit but may also include the Task Group.

2. Reporting the PCDD/PCDF Inventory

It may be considered to prepare an Initial Survey Report early in the inventory process with a view to:

- Review and invite comments to the findings of the initial survey as a basis for decisions on resource allocations for further activities;
- Provide preliminary, comparative information at the national, regional and international level;
- Show the potential ranges of releases from the main sources; and
- Focus needs for further data gathering efforts.

This Initial Survey Report is an intermediate report. It is not a substitute for a complete inventory but provides indications of the expected emission ranges.

The Inventory Report may be structured as follows:

- Summary presenting data on the releases of PCDDs/PCDFs to all media for the main source categories. It will also include the principal findings and identify major data gaps and priority areas for the further work;
- Introduction to the 'dioxin' issue and presentation of the inventory methodology;
- Releases of PCDD/PCDF by Main Source Categories. The bulk of an Inventory Report will consist of chapters on each main source category with subsections devoted to the processes investigated. Each sub-section will provide information on the basic process, the means used to investigate potential releases from the process and provide the findings. For each sub-section, data gaps are described;
- Measures for Reducing PCDD/PCDF Release. The report may include a description of measures for reduction of PCDD/PCDF releases. The measures may be changes

in raw materials, processes and products to prevent formation and release of PCDD/PCDF;

- Assessment. A short section summarising the principal sources of releases to each medium, measures in place to control these releases and options for further release reductions; the main data gaps and their perceived importance and recommendations for further assessment, measurements or policy measures;
- Annexes. Detailed supporting data may be included in annexes.

3. Costs and Funding Sources

The costs of preparing a PCDD/PCDF inventory will primarily depend on the size of the country and the number of potential sources, the depth of the survey and the mixture of national and international resource persons and participants. Cost estimates are provided in ref. 3 below.

The potential sources of funding of the activities include:

- National government contributions (i.e. personnel, infrastructure and budget funds);
- Sectoral public and private sector parties ;
- Global Environmental Facility (i.e. enabling facilities);
- Other international development agencies;
- Bilateral contributions from governments of developed countries.

4. Indicative Timeframe

Given the differences between countries, the timeframe differs from country to country. Indicative planning figures are: a small country 3-6 months; a large country: 6-14 months.

5. Information Sources

1. UNEP. *Dioxin and Furan Inventories - National and Regional Emissions of PCDD/PCDF*. UNEP Chemicals, 1999.
   Internet: www.chem.unep.ch/pops/pdf/dioxinfuran/difurpt.pdf;
2. UNEP. *Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases.* Draft. January 2001.
   Internet: www.chem.unep.ch/pops/pdf/toolkit/toolkit.pdf;
3. UNDP. *Possible capacity-building activities and their associated costs under the international legally binding instrument for implementing international action on certain persistent organic pollutants.* Note by the Secretariat. November 1998 (UNEP/POPS/INC.2/ INF/3).
   Internet: irptc.unep.ch/pops/POPs_Inc/INC_2/en/inf3.htm;
4. UNEP. *National inventories of persistent organic pollutants, selected examples and possible models. Preliminary report.* Note by the Secretariat, July 1999 (UNEP/POPS/INC.3/ INF/1).
   Internet: irptc.unep.ch/pops/POPs_Inc/INC_3/inf-english/inf3-1/inc3-1.pdf;
5. EU. *Identification of Relevant Industrial Sources of Dioxins and Furans in Europe - Final Report* (the European Dioxin Inventory). Prepared by Landesumweltamt Nordrhein-Westfalen, 1997.
   Internet: europa.eu.int/com/environment/dioxin/download.htm;
6. US EPA. *Draft Dioxin Reassessment.* National Center for Environmental Assessment. Draft, not to quote or cite, 2001.
   Internet: www.epa.gov/ncea/pdfs/dioxin/part1and2.htm;
7. EMEP/CORINAIR Atmospheric Emission Inventory Guidebook (Second edition). European Environment Agency, 2000.

Internet: eionet.eea.eu.int/aegb/default.htm;
8. U.S. EPA. *Hexachlorobenzene (HCB): Reduction Options*. Prepared for Great Lakes National Program Office, Draft Report, June 2000.
   Internet: www.epa.gov/grtlakes/bns/baphcb/HCB_rdcn.PDF.
9. Environment Canada. National Inventory of Relaeases of PCDDs/PCDFs – Updated Edition, February 2001:
   Internet: http://www.ec.gc.ca/dioxin/download/inventory.pdf
10. USEPA. Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-Like Compounds Category, EPA-745-00-021, December 2000.
    Internet: http://www.epa.gov/tri/TRIdioxinguidance.pdf
11. USEPA. Inventory of Dioxin Sources in the United States, May 2001.
    Internet: http://www.epa.gov/nceawww1/diox.htm

ANNEX II

DEVELOPING NATIONAL ACTION PLANS

ACTION PLAN: PRODUCTION, USE, IDENTIFICATION, LABELLING, REMOVAL, STORAGE AND DISPOSAL OF PCBS AND EQUIPMENT CONTAINING PCBS (Stockholm Convention, Annex A, PART II CHEMICALS)

Development of Action Plan

While not formally obliged to do so according to the Convention text, a Party may most suitably opt to develop an action plan that addresses some or all of these requirements in a cohesive and consistent way. However, instead of addressing all provisions in a single, all-embracing action plan for PCBs, specific aspects of the issue such as 'Production and Use of New PCBs', 'Identification, Labelling, Removal and Storage of Equipment Containing PCBs' and/or 'Reduction and Elimination of Releases from Stockpiles and Wastes' may be treated in separate action plans. Other aspects such as treatment and disposal or dealing with PCB-contaminated sites may be part of a broader action plan related to handling hazardous waste and contaminated sites generally.

Approach to Preparing an Action Plan for PCBs

A country may choose to apply the following approach when developing an Action Plan for PCBs, including the Table of Contents for presenting the results. As no structure of an action plan is mandated under the Stockholm Convention and the SAP, the specific format may be tailored to the individual country's preferences and needs. The format presented should, therefore, be seen as an option and its inherent logic path as a source of guidance.

1. Development of Action Plan for PCBs

1.1 Background

Polychlorinated biphenyls (PCBs) are a class of synthetic organic chemicals. Since 1930 they have been widely used as coolants in transformers and dielectrics in capacitors, as heat exchange fluids in industry, and as plasticiser in paint, plastics, sealants and carbonless copy paper. In addition, they have been used in other applications where chemical stability has been required for safety, operation or durability.

While most countries have taken steps to eliminate the use of PCBs in new equipment and applications, the chemical is still exist in many countries in closed electrical systems, and in partially closed applications as heat transfer and hydraulic fluids, and in open applications such as joint fillings. In addition, PCBs may be present in stored equipment that has been discarded or as waste waiting for the availability of safe and affordable disposal options. Similarly, PCBs may be present at contaminated sites after inappropriate release into the environment.

Some, countries have prepared action plans or management plans in the past specifically targeting identification, safe storage, phase-out and disposal of PCBs. The experience gained in these countries combined with the formal provisions of the Stockholm Convention may serve as guidance for other countries in developing an action plans for PCBs. Some of these national PCB plans are referenced in Section 6 below. An overview of the objectives, results and related activities etc. of developing such a plan is described below.

1.2 Immediate and Overall Objectives

The immediate objective is that an Action Plan for PCBs is developed that defines and describes a country's strategy, commitments and the actions it intends to undertake in managing PCB, both in the short and the long term.

Related objectives are increased awareness among stakeholders in respect of the issue and mobilising them in addressing it, and that a basis for applying for funding of the Action Plan implementation is established.

The overall objective is the reduction and elimination of PCBs production and use, the prevention of releases of the chemical into the environment, and to provide for environmentally sound disposal or final elimination of PCBs waste.

1.3 Results

The results of the Task are:

- Draft and final versions of an Action Plan for PCBs;
- Stakeholders are informed about the PCBs issue, the presence of PCBs in the country and the planned initiatives and activities to manage PCBs in the future;
- Responsibility for Action Plan implementation is assigned among appropriate stakeholders within and outside Government;
- Government staff and other stakeholders assigned responsibility are trained in developing an Action Plan for a group of chemical substances, in this case PCBs.

1.4 Activities

The process of preparing an Action Plan may be divided into two phases: a preparatory phase and an Action Plan development phase.

Preparatory Activities

a. Establishing the context and Task Group for Action Plan development

The lead government agency in PCBs management from a regulatory perspective, typically the one responsible for environmental protection but potentially others, would initially need to get a clear understanding of the PCBs issue as addressed in the Stockholm Convention and other international and regional agreements dealing with PCBs. In addition to in-house expertise the agency will have to consult sources outside its organisation to establish the full context within which the Action Plan will be developed. Chief among these are major users or generators of the substance such as electrical utilities.

Consistent with the above, the lead agency together with the focal point would have to identify partners and resource persons within the government who would have the potential to become involved in the development of the Action Plan. These include potential partners who have mandates directly related to PCBs (e.g. the ministries of industry, trade, energy and health) but other important players with an indirect impact may be considered (e.g. the ministries of finance and economy). These exploratory considerations could be concluded by establishing a Task Group to become responsible for developing the Action Plan for PCBs.

b. Involving stakeholders and development of ToR, work plan and budget

A number of parties (stakeholders) will have an interest in or be affected by new initiatives to manage PCBs in the future. But while it may not be expedient to involve all stakeholders in the process of preparing the Action Plan it is important to understand their position on PCBs management issues and options in order to maximise the effectiveness of plan implementation. The lead agency should consider mechanisms for stakeholder involvement and invite the most relevant of these to participate in the Action Plan process.

Once the organisation of Action Plan preparation is in place it is useful to assign mandates to the Task Group or Subgroups formed for specific Action Plan preparation purposes. This may take the form of a set of brief Terms of Reference (ToR) that describe in more detail the activities to be undertaken and the administrative and organisational issues related to the work. A work plan would have to be developed that describes the sequence of events, milestones and expected outputs. In addition, a budget providing detailed estimates of the time and resources associated with the activities to be undertaken to develop the Action Plan would have to be prepared.

Action Plan Development Activities

c. Analysis of the PCBs issue (inventory review)

The first activity in the process of developing the Action Plan for PCBs is to review the findings of the PCBs baseline information or inventory report against the provisions of the Stockholm Convention. This would identify the scope and scale of actions required. It should be noted that other obligations related to PCBs could suitably be addressed in this context in some countries. Examples are the provisions of the POPs protocol to the 1979 UNECE Convention on Long-Range Transboundary Air Pollution and the EC Directive on disposal of PCBs and PCTs (96/59/EC).

d. Formulation of objectives of the action plan

At this point in the process, the Task Group would have to formulate the objectives of the Action Plan in precise terms in order to clearly define what the actions are intended to achieve. In other words, one would have to state the intended effects of implementing the Action Plan. Examples of such objectives could be:

- The use of PCBs and new PCB-containing equipment will cease no later than 20XX;
- Equipment with a PCBs content higher than 0.XX percent will be identified and labelled no later than 20XX;
- Equipment with a PCBs content higher than 0.XX percent will be disposed of no later than 20XX;
- Mandatory secure and licensed storage for PCBs and contaminated equipment not in use would be in place by 20XX;
- Development of PCB destruction capacity by 20XX.

e. Identification of PCBs management options

The need for action identified above would lead to the identification of PCBs management *options* that would contribute to the attainment of the objectives stated above. Such options, which could be defined as *courses of action*, could encompass the development of new regulations, guidelines, codes and standards as well as alternative PCBs disposal options. These options may be developed recognising the long term nature of the issue with an initial short term priority being attached to identification, capture and secure storage of the chemical, followed by longer term actions respecting treatment and disposal. It is advisable to review the experience in other countries from pursuing such PCBs management measures and the state of art of disposal technologies. References to material containing such experience are provided in Part 6 of this table below.

f. Establishing criteria for evaluation and prioritisation of options

Faced with a number of alternative ways to deal with PCBs, criteria for evaluating and prioritising these options will have to be developed. The aim is to provide a basis for ultimately settling on those measures that meet the reduction/elimination objectives most efficiently and/or in the most cost-effective way. But it is also to ensure that more affordable, short term actions aimed at preventing further release of the chemical into the environment are provided for. The following evaluation criteria may be adopted:

- *Efficiency*: What level of effect or impact will the measure have in meeting the objectives - including short and long term environmental protection and mitigation of health and socio-economic impact
- *Affordability*: To what degree can the country afford the cost of implementing the measure (taking into account possible international cost coverage or contributions)
- *Cost-effectiveness*: What is the relative remediation cost per unit of PCBs (reduction/elimination)
- *Monitorability*: To what extent is it possible to measure and monitor the progress towards implementing the measure and achieving the objectives
- *Practicability*: Are there practical factors that may speak particularly in favour of or against this measure in terms of implementation
- *Risk*: To what degree does the option or measure entail environmental, institutional, technological or other risk

In addition, criteria for prioritisation, i.e. the weight assigned to each of these evaluation criteria, are to be developed. These criteria may differ depending on for example the inclination of a country to achieve fast phase-out and the net cost to the country to achieve the objectives.

g. Evaluation and selection of PCBs management options

The options identified above are subjected to an evaluation on the basis of the criteria established for evaluation and prioritisation.

One important and often critical criterion to take into account is the estimated cost of implementing the options, be it of a capacity building, legislative, administrative, technological or other nature. Generic cost estimates for capacity building activities may be obtained from the document UNEP/POPs/INC.2/INF3 referenced below while cost data for PCB alternatives and remediation/disposal technologies could be obtained from technology suppliers, other market information or from specialists on the technology area concerned.

The measures that best meet the objectives of the PCBs Action Plan, or worded differently, that can be expected to yield the highest impact in terms of contributing to reduction and/or elimination of PCBs in a cost-effective manner, are selected for implementation. The measures chosen would often be a mix of actions in respect of capacity building, new or changed regulations, chemical replacement and technology changes.

It may be decided that the Task Group undertake the evaluation of options and make recommendations on those that are considered to best meet the objectives and prioritisation criteria. The measures nominated for implementation by the Task Group may be discussed in a workshop before being finally approved.

h. Development of strategy and actions for implementing the PCBs Action Plan

Once the options - or courses of action - to be included in the Action Plan have been selected and agreed upon, one will have to devise ways of implementing the Plan. This may involve the following:

- development of an overall consistent plan for implementing the Action Plan;
- formulating the activities associated with each option (measure) detailing how the measure is to be implemented, including optimum sequencing of activities;
- assigning of implementation responsibility;
- preparation of a consolidated timetable and budget for implementing the Action Plan.

i. Obtaining commitment for the Action Plan

When the Action Plan is completed it is important to get its endorsement by stakeholders in order to provide for successful implementation. The intentions of the Plan must be communicated to those who have decision-making power regarding the implementation of the Action Plan elements. Several ways of obtaining commitment may be considered:

- direct participation of key stakeholders in Action Plan preparation to maximise ownership;
- submission of the Action Plan to key stakeholders for comments;
- preparation of an information document summarising the Action Plan to be submitted to other stakeholders for comments;
- organisation of stakeholder workshops;
- lobbying high government officials to secure human and financial resources;
- institutionalising plan implementation to ensure that it is seen as a normal part of government activities.

1.5 Organisational Arrangements, Participants and Stakeholders

The participants in the process may be summarised as follows:

Coordination Responsibility: The focal point for administrative, project management and coordination purposes needs to oversee the task. This may be the overall NIP Focal Point Unit or some other group reporting to it as may be determined by the National Lead Agency (ies) and/or InterAgency Supervisory Body for the NIP.

Task Group: The group could include representatives from government agencies (e.g. the ministries of environment, industry and health), the energy sector and industry. The government may also wish to involve international experts in an advisory function (something for which international financial assistance may be available).

Sub-groups: While the overall responsibility of developing the Action Plan would rest with the Task Group, much of the underlying work may be undertaken in a number of Subgroups, each assigned a specific PCB-related task. The sub-groups may include recourse persons outside the Task Group. Participants in the sub-groups could include government personnel, local PCBs experts from technical universities, polytechnics, local consultants, representatives from industry, etc. The Task Group may also wish to involve international experts to contribute to the process, e.g. with regard to methodology and advice on PCBs handling and technology.

Peer Reviewers: Local and international technical and regulatory experts on PCBs and waste management.

2. PCBs Management Options for Action Plan Development

The action plan for management of PCBs may address the following options for PCBs management:

Production and use of new PCBs

- Draft new legislation/regulation to eliminate production, import, export and use of new PCBs or amend existing legislation regarding hazardous chemicals
- Develop detailed closure plans for production facilities inclusive of monitoring and verification procedures.

PCBs in use

- Draft new legislation/regulation for identification, labelling and eventual notification of equipment containing PCBs above specified threshold concentrations and quantities;
- Prepare guidelines for identification and labelling of equipment in use. The guidelines should preferably define how the content of PCBs in the equipment is determined and confirmed, especially as regards PCBs in transformers;
- Prepare a detailed inventory and eventually develop and maintain a register of inventoried/notified equipment. An example of a regulation that requires notification and compilation of inventories is the PCB/PCT directive of the European Union;
- Prepare guidelines for decontamination of PCB-containing equipment and develop a permit system for undertakings engaged in decontamination;
- Prepare a survey of PCBs in open applications to assess the needs of guidelines for management of relevant building materials, e.g. filling material in joints of concrete.
- Develop implementation actions and infrastructure upgrading with regard to securing locations of continuing use and notice of discontinuing use.

Waste management

- Draft regulation on handling, transport, storage and disposal of PCB-containing waste or include PCB-containing waste in existing regulations on hazardous waste management;
- Develop a permit system for undertakings engaged in handling, transport, storage and disposal;
- Prepare a plan for final treatment and disposal of PCB-containing waste.
- Prepare development plans for facilities and infrastructure development required to support waste management actions.

PCBs analyses

- Establish reference methods of measurement to determine the PCBs content of materials;
- Identify and qualify suitable analytical capacity.

PCBs contamination/pollution

- Prepare a prioritised inventory of PCB contaminated locations and sites;
- Prepare guidelines for clean up procedures for accidental release of PCBs and for investigation and reclamation of contaminated sites and soils;
- Prepare programmes for monitoring of PCBs in environmental samples, breast milk, sewage sludge, food and feedstuffs, etc.

Institutional strengthening and education

- Prepare programme for institutional strengthening and capacity building;
- Strengthen community participation, education and training.

3. Structuring the Action Plan for PCBs

The presentation of the Action Plan may, as an example, be structured along the following lines:

a. Objectives and Priorities of the Action Plan;
b. Summary of PCBs Production, Uses, Stockpiles, Waste and Contamination;

c. PCB-related Environmental and Health Situation;
d. Measures for Future PCBs Handling, Reduction and Disposal;
e. Implementation of the Action Plan (Strategy, organisation and activities);
f. Key Investment Requirements;
g. Costs and Financing of the Action Plan Implementation.

4. Costs and Funding Sources

The costs of preparing a PCBs Action Plan depend on the size of the country, the level and complexity of PCBs use overall, the number of government and other organisations involved in the process, the level of plan detail, and the size and distribution of national and international resource persons and participants. Cost estimates are provided in source # below.

The potential sources of funding of the activities include:

- Users and generators of PCBs;
- National government contributions (personnel and budget funds);
- The Global Environment Facility (enabling activities and investment projects);
- International Financial Institutions;
- Bilateral contributions from governments of industrialised countries;
- National government contributions (personnel and funds).

5. Indicative Timescale

Because of the differences between countries indicated above, the timescale within which a PCBs Action Plan may be developed would differ from country to country. Indicative planning figures are: mall country 8 - 12 months, medium-sized country: 10 - 15 months and large country: 12 - 18 months.

Information Sources

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2. HELCOM. *Polychlorinated Biphenyls (PCBs). A compilation of information, derived from HELCOM Recommendations, EU-Directives, UN-ECE-LRTAP, UNEP and OSPAR, and analysis of appropriate measures aiming at safe handling and reduction of releases of PCBs from PCB-containing equipment in use.* June 2001.
   Internet: www.helcom.fi/land/Hazardous/PCB_Guidance_on_Measures.PDF
3. ANZECC. *Polychlorinated Biphenyls Management Plan.* Australian and New Zealand Environment and Conservation Council, July 1999 edition.
   Internet: www.ea.gov.au/industry/chemicals/swm/pubs/biphenyls.pdf
4. Environment Canada: Hilborn, John C. and Buccini, J. *The Management and Disposal of PCBs in Canada.*
   Internet: irptc.unep.ch/pops/POPs_Inc/proceedings/bangkok/BUCCINI2.html
5. UK Department for Environment, Food & Rural Affairs. *UK Action Plan for the Phasing Out and Destruction of Polychlorinated Biphenyls (PCBs) and Dangerous PCBs Substitutes*. 8 July 1999.
   Internet: www.defra.gov.uk/environment/marine/pcb/action.htm
6. USEPA. *Management of Polychlorinated Biphenyls in the United States.* Office of Pollution Prevention and Toxics, Washington. January 1997.
   Internet: www.chem.unep.ch/pops/indxhtms/cspcb01.html

7. UNDP. *Possible capacity-building activities and their associated costs under the international legally binding instrument for implementing international action on certain persistent organic pollutants*. Note by the Secretariat. November 1998 (UNEP/POPS/INC.2/ INF/3).
   Internet: irptc.unep.ch/pops/POPs_Inc/INC_2/en/inf3.htm
8. UNITAR. *Guidance on Action Plan Development for Sound Chemicals Management*. Working Draft. Geneva, April 2001.
9. UNEP. *Inventory of World-Wide PCB Destruction Technology*, First Issue, December 1998.
   Internet: http://irptc.unep.ch/pops/pdf/pcbrpt.pdf
10. UNEP. *Survey of Currently Available Non-Incineration Technologies for PCB Destruction Technologies*, First Issue August 2000.
    Internet: http://irptc.unep.ch/pops/pdf/surveypcb/PCBdesteng.pdf.

ACTION PLAN: PRODUCTION, USE, STOCKPILES AND WASTES OF DDT (Stockholm Convention, ANNEX B CHEMICALS)

Development of Action Plan

Although Parties are not specifically obliged to do so according to the Convention text and they are committed to reach the SAP targets, it is recommended that a country demonstrate commitment to meeting these obligations by developing Action Plan or series of Action Plans that addresses some or all of these requirements as part of the National Implementation Plan (NIP). In the following, guidance is provided on the basis for a single Action Plan to address DDT. Specific aspects of the issue related to contaminated sites may also be addressed in the Action Plan covering that overall area.

Approach to Preparing an Action Plan for DDT

A country may choose to apply the following approach when developing an Action Plan on DDT, including the Table of Contents for presenting the results. As no structure of an action plan is mandated under the Stockholm Convention, the specific format may be tailored to the individual country's preferences and needs. The format presented should, therefore, be seen as an option and its inherent logic path as a source of guidance.

1. Development of Action Plan for DDT

1.1 Background

During the last 20-30 years the use and/or production of DDT has been banned or restricted in many countries through national regulations. Nevertheless, DDT is still used to combat malaria and certain migratory locusts. DDT is also used illegally for various agricultural purposes as a wide-spectrum insecticide. At present only a few countries/companies produce DDT.

During the last decades a number of DDT substitution initiatives have been implemented nationally with the assistance from UN organisations such as FAO, WHO, UNEP, OECD etc. Further, initiatives like Integrated Pest Management (IPM), Integrated Vector Management (IVM) and safe disposal have been carried out quite successfully, primarily with the support from bilateral agencies. As a result a number of countries have built up the capacity to deal with DDT and related toxic chemicals.

Some countries have prepared action plans or management plans in the past specifically targeting identification, phase-out, safe storage and disposal of DDT and POPs pesticides. The experience gained in these countries combined with the formal provisions of the Stockholm Convention on POPs may serve as inspiration for other countries in developing an Action Plan for DDT.

1.2 Immediate and Overall Objectives

The immediate objective is that an Action Plan is developed that defines and describes a country's strategy, commitments and the actions it intends to undertake in managing DDT, both in the short and the long term and in an manner consistent with the obligations of a Party to the Stockholm Convention.

Related objectives are increased awareness among stakeholders in respect of the issue and mobilising them in addressing it, and that a basis for acquiring funding for plan implementation from national and/or international sources.

The overall objective is the reduction and ultimately elimination of DDT production and use, the prevention of releases of the chemical into the environment and environmentally sound disposal or final elimination of DDT waste.

1.3 Results

The results of the activities below are:

- Draft and final versions of an Action Plan document for DDT as part of the overall National Implementation Plan (NIP);
- Stakeholders and the public are informed about the impacts and presence of DDT in the country and the planned initiatives and activities to manage them in the future;
- Responsibility for Action Plan implementation is assigned among appropriate stakeholders within and outside Government;
- Government staff and other stakeholders assigned responsibility are trained in developing an Action Plan for a chemical substance, in this case DDT.

1.4 Activities

The process of preparing the Action Plan may be divided into two phases: a preparatory phase and an Action Plan development phase.

Preparatory Phase Activities

a. Establishing the context and Task Group for Action Plan development

The first step is the assignment of lead or coordinating responsibility for the Action Plan within the overall organisational framework established for preparation of the NIP. This responsibility would typically rest with the government agency responsible for DTT management from a regulatory perspective, typically the ministry of health with assistance from the ministries of environment and/or agriculture, but potentially others could be involved. It would then need to develop a clear understanding of the DDT issue as addressed in the Stockholm Convention and other international and regional agreements involving DDT (e.g. WHO initiatives). In addition to in-house expertise the agency will have to consult expertise and stakeholders outside its organisation to establish the full context within which the Action Plan is to be developed.

Consistent with the above, the lead agency would have to identify partners and resource persons within the government who would have the potential to become involved in the development of the Action Plan. These include potential partners who have mandates directly related to DDT (e.g. the ministries of environment, agriculture, industry and trade, assuming that the ministry of health acts as lead agency). But other important players with an indirect impact may be considered (e.g. the ministries of finance and economy). These exploratory considerations could be concluded by establishing a Task Group to become responsible for actual development of the Action Plan for DDT.

b. Involving stakeholders and development of ToR, work plan and budget

A number of parties (stakeholders) will have an interest in or be affected by new initiatives to manage DDT in the future. While it may not be expedient to involve all stakeholders directly in the process of preparing the Action Plan, it is important to understand their position on DDT and Annex A POPs pesticides management issues in general and options in order to

maximise the effectiveness of plan implementation. Consequently, mechanisms for stakeholder involvement should exist and the most relevant and representative of them should participate in the Action Plan development process.

In addition, early provision should be made for external communication with the public, the NGO community and impacted local populations as well as their involvement. Once the organisation of Action Plan preparation is in place, it is useful to assign mandates to the Task Group or Subgroup formed for specific Action Plan preparation purposes. This may take the form of a set of brief Terms of Reference (ToR) that describe in more detail the tasks to be undertaken and the administrative and organisational issues related to the work. A work plan would have to be developed that describes the sequence of events, milestones and expected outputs. In addition, a budget providing detailed estimates of the time and resources associated with the tasks to be undertaken to develop the Action Plan would have to be prepared.

Action Plan Development Phase Activities

c. Analysis of the DDT issue (inventory and impact review)

The first activity in the process of developing the Action Plan for DDT is to review the findings of the baseline DDT inventory against the provisions of the Stockholm Convention. This would identify the scope and scale of actions required. Further, the country baseline may have pointed at possible needs for national exemptions with regard to production and/or use that could be granted in accordance with Annex B, Part I of the Convention.

It should be noted that other obligations in the field of DDT could suitably be addressed in this context where relevant.

The other aspect of the issue that should be dealt with is an assessment of what identifiable health and environmental impacts might be associated with DDT. Similarly, an analysis of what potential social, public health and economic impacts of eliminating production and particularly use may have could be appropriate.

d. Formulation of objectives of the Action Plan

At this point in the process the Task Group should formulate the detailed objectives of the Action Plan in precise terms in order to clearly define what the actions are intended to achieve and against which its implementation can be monitored. Examples of such detailed and monitorable objectives could be:

- The use of DDT is entirely regulated and any exemption will be terminated by year 200X, allowing full Convention compliance by that year;
- Mandatory, secure and licensed storage of DDT and contaminated equipment (including packaging material) not in use would be in place by 200X;
- X tonnes of identified DDT wastes will be collected before year 200X and disposed of before year 200x, removing all DDT in the country.

e. Identification of DDT management options

The need for actions identified above would lead to identification of DDT management *options* that would contribute to attainment of the objectives.

Such options would encompass the range of institutional and regulatory measures that may be taken such as the development/implementation of new regulations, enforcement action, guidelines, codes and standards. It may also include voluntary compliance mechanisms and economic instruments.

The identification activity would also cover the options for operational measures associated with analysis, storage, handling and disposal. This should include chemical identification work that must be undertaken both as a safety precaution against unintended exposure and release risks during removing and transport, but also as a necessity selection and operation of an environmentally sound disposal option. Selection of the disposal options also needs to take into account the limitations that compliance with international/regional rules, standards and guidelines, particularly respecting emissions will impose.

These options may be developed recognising the long-term nature of the issue with an initial short term priority being attached to the, capture, characterisation and secure storage of the chemical, followed by a longer term or even regionally based action respecting treatment and disposal. It is advisable to review the experience in other countries from pursuing such DDT management measures, state of art of disposal technologies, substitution replacement, pre-cautions against illegal import and/or use and research work. References to material containing such experience are provided in Part 6 below.

f. Establishing criteria for evaluation and prioritisation of options

Given the number of alternative ways to deal with DDT, criteria for evaluating and prioritising these options should be developed. The aim is to provide a basis for ultimately settling on those measures that meet the reduction/elimination objectives most efficiently and/or in the most cost-effective way, but also to ensure that more affordable near-term actions aimed at preventing further releases of the chemical into the environment are provided for. As guidance, the following provides a set of evaluation criteria that may be adopted:

- *Efficiency*: What degree of effect or impact will the measure have in meeting the objectives - including short and long-term environmental protection, mitigation of health and socio-economic impact, and Convention compliance

- *Affordability*: To what degree can the country afford the cost of implementing the measure with or without possible international assistance. Including contributions from e.g. FAO's Obsolete Pesticide Programme, bilateral donors and production industries through GCPF). For DDT, affordability should also take into account the potential risks and associated costs of new outbreaks of malaria, if and when the use of DDT is reduced or eliminated. Most countries experiencing for example malaria monitor the number of outbreaks and relate this to the amount of DDT used or planned for use

- *Cost-effectiveness*: What is the relative remediation (reduction/elimination) costs (chemical characterisation, repackaging, transport, storing, transport, final reduction/elimination within or outside the country) per tonnes of DDT (similar prices as for the other POPs pesticides)

- *Monitorability*: To what extent is it possible to measure and monitor the progress towards implementing the measure and achieving the objectives

- *Practicability*: Are there practical factors that may speak particularly in favour of or against this measure in terms of implementation

- *Risk*: To what degree do the options or measures entail environmental, institutional, technological, environmental, financial or another risk

In addition, a quantitative scheme for prioritisation using weightings assigned to evaluation criteria rankings should be developed. These weightings may differ depending on for example (i) the inventoried amount, (ii) climatic changes, (iii) extent of outbreaks of for

example malaria, (iv) the national laboratory and disposal technological capacity to achieve fast phase-out/final disposal, (v) technological or environmental preferences and (vi) the net cost and benefits to the country when full cost accounting is applied to the option.

g. Evaluation and selection of DDT management options

This activity involves the actual evaluation and selection process applied to Action Plan options on the basis of the criteria established for evaluation and associated prioritisation.

One important and often critical information requirement for this is the estimated costs of implementing the options, be it of a capacity building, legislative, administrative, technological or other nature. Generic cost estimates for capacity building activities may be obtained from the document UNEP/POPS/INC.2/ INF/3 referenced below while cost data for POPs alternatives and remediation/disposal technologies could be obtained from technology suppliers, other market information or from specialists on the technology area concerned.

The measures that best meet the objectives of the DDT Action Plan, or worded differently, that can be expected to yield the highest impact in terms of contributing to reduction and/or elimination of DDT in a cost-effective manner, would be selected for implementation. The measures chosen would often be a mix of actions in respect of capacity building, new or changed regulations, use substitution or practice changes, developing operational capacity, and organising required services.

It may be decided that the Task Group undertake the evaluation of options and makes recommendations on those that are considered to best meet the objectives, prioritisation criteria and ensure notification in compliance with Convention. However, it is recommended that stakeholder consultation be undertaken on both the criteria and weightings used and the results of the Task Group's evaluation work in advance of finalising them. This could be done through appropriately timed workshops.

As a cautionary note, many countries may undertake the selection of management options under the assumption of the availability of future international assistance. However, it should recognised that criteria for eligible incremental costs are yet to be developed. For this reason it is recommended that consultation with relevant international organisations and experts be undertaken in selecting specific options involving assumed international assistance.

h. Implementation Strategy Development for the DDT Action Plan

Once the options to be included in the Action Plan have been selected and agreed upon, a strategy and approach will have to be developed to implement the Plan. This may involve the following:

- development of an overall consistent work plan for implementing the Action Plan;
- formulating the activities associated with each measure detailing how the measure is to be implemented, including optimum sequencing of activities;
- assigning of implementation responsibility;
- preparation of a consolidated timetable and budget for implementing the Action Plan;
- designation of indicators for implementation performance.

i. Obtaining commitment for the Action Plan

When the Action Plan is completed it is important to get its endorsement by stakeholders in order to provide for successful implementation. The intentions of the Action Plan must then be communicated to those who have decision-making power regarding implementation of the Action Plan elements and their official approval obtained. A number of steps and mechanisms applicable to obtaining endorsement and official commitment may be considered:

- direct participation of key stakeholders in Action Plan preparation to maximise ownership;
- submission of the Action Plan to key stakeholders for comments;
- preparation of an information document summarising the Action Plan to be submitted to other stakeholders and potentially the public for comments;
- organisation of stakeholder workshop;
- securing human and financial resources;
- institutionalise plan implementation through an official approval at a senior government level to ensure long-term commitment within the NIP.

1.5 Organisational Arrangements, Participants and Stakeholders

The participants in the process may be summarised as follows:

Coordination Responsibility: A focal point for administrative, project management and coordination purposes needs to oversee the task. This may be the overall NIP Focal Point Unit or some other group reporting to it as may be determined by the National Lead Agency (ies) and/or Inter-Agency Supervisory Body for the NIP.

Task Group: The Task Group could include representatives from government agencies (e.g. the ministries of health, environment, agriculture, industry and trade) and from private agricultural and retailer organisations. The government may also wish to involve international experts in an advisory function.

Sub-groups: While the overall responsibility of developing the Action Plan would rest with the Task Group, much of the underlying work may be undertaken in a number of Subgroups, each assigned a specific DDT related task. The sub-groups may include resource persons outside the Task Group. Participants in the sub-groups could include government personnel, local POPs experts from technical universities (research capacities), polytechnics, local consultants, representatives from industry and NGOs, etc. The Task Group may also wish to involve international experts to contribute to the process, e.g. with regard to methodology and advice on DDT handling (notification) and technology (research., monitoring, outbreak control, relations to for example the on-going WHO malaria programme, etc.).

Peer Reviewers: Local and international technical and regulatory experts on DDT, health professionals, and/or POPs Pesticides and waste management.

External Stakeholders and Impacted Communities: Where not involved directly, a wide range of external stakeholders and members of the public should likely be included as participants to be informed and consulted with in the development and implementation of this Action Plan. This particularly includes communities and citizens who are impacted by the presence of and exposure to these substances or who may be by the implementation of operational measures included in the Action Plan.

2. Management Options for DDT Action Plan Development

In principle, the most sustainable measure would be to pursue a strategy of phasing out and completely destroy all identifiable DDT in an environmentally safe manner. However, the environmental benefit of doing so must be balanced with public health benefits of defining legitimate restricted use in the near term. Therefore, there would be a need to establish an appropriate timetable taking into account the different possibilities of the country. It would also be appropriate to consider the implications of more persistent pesticides than the those presently covered by the Convention being added to the substances to be handled.

Review of DDT registration and approval procedures are important to compile and integrate into activities within the Action Plan. While the Stockholm Convention allows some exemptions from elimination of production and use of DDT, the chemical must in time be entirely phased out and disposed of in accordance with Article 6,1(d), which in many countries is impossible to do immediately due to limitations on available elimination capacities, financial abilities, technical resources and market factors.

As noted in the introduction Annex B, Part II, 5(a) encourages Parties using DDT to include the following in the DDT Action Plan:

- Development of regulatory and other mechanism to ensure that DDT use is restricted to disease vector control;
- Implementation of suitable alternatives products, methods and strategies, including resistance management strategies to ensure the continuing effectiveness of these alternatives; and
- Measures to strengthen health care and to reduce the incidence of the disease.

Below is a list of DDT management options which could considered for the DDT Action Plan:

- Institutional strengthening measures;
- Drafting of new legislation/regulation;
- Development of guidelines and instructions in use;
- Information and awareness-raising activities;
- Development of detailed inventory (if not already done) of DDT and if possible including all stockpiled and waste pesticides due to their similar human and environmental impacts. The elimination technologies are more or less the same for the various types of POPs pesticides, but the initial content of chlorinated compounds could make a difference (potential source for generating new POPs like dioxins);
- Regulation, e.g. phase-out or termination of national exemptions according to Convention Annex B, Part II of identifiable DDT by a certain year etc. (the COP performs re-evaluation of national notifications every three years);
- Capacity-building on particular DDT assessment, registration, labelling and approval for use procedures;
- Legislation of ban of the import and/pr export of DDT to any other purposes than those specified in the national notification to the Secretariat and the WHO;
- Improved inspection, instruction and maintenance in order to prevent, avoid accidents, abnormal operation conditions, leakage and spillage;
- Clean repair and decommissioning of any DDT containment (e.g. empty containers, packaging material, etc.);
- Clean, renovate, and/or demolish storage buildings, if considered necessary for integrity reasons.;
- Information dissemination, educational and health promotion programmes;
- Technology transfer and research information exchange;
- Establishment of safe collection, transport and storage schemes;
- Establishment of emergency response capability
- Develop safe interim storage;
- Safe destruction and environmentally sound disposal/elimination;
- Introduction of alternatives to DDT;
- Decontamination/remediation of sites and soils contaminated with DDT.

3. Structuring the Action Plan for DDT

The presentation of the Action Plan may for example be structured along the following lines:

a. Objectives and Priorities of Action Plan;
b. Summary of DDT Production, Uses, Stockpiles, Wastes and Contamination;
c. DDT related Health and Environmental Situation;
d. Proposed Regulatory Strengthening Measures for DDT;
e. Proposed Operational Measures for Future DDT Storage Handling, Use Reduction and Disposal;
f. Implementation of the Action Plan (strategy, organisation work plan, schedule and monitoring/reporting);
g. Key Investment Requirements;
h. Costs and Financing of Action Plan Implementation.

4. Costs and Funding Sources

The costs of developing the DDT Action Plan will depend on the size of the country, the level and complexity of POPs pesticides use overall, the number of government and other organisations involved in the process, the level of plan detail, and the size and distribution of national and international resource persons and participants. Cost estimates are provided in source 9 below.

The potential sources of funding of the activities include:

- National government contributions (personnel and budget funds)
- The Global Environment Facility (enabling activities and investment projects)
- International Financial Institutions
- Bilateral contributions from governments of industrialised countries
- GCPF member industries.

5. Indicative Timeframe

Because of the differences between countries indicated above, the time frame within which a DDT Action Plan may be developed would differ from country to country. However, the work should be undertaken simultaneously with the Action Plan exercise for the other POPs pesticides. Indicative planning figures are: small country 8-12 months, medium-sized country: 10 - 15 months and a larger country: 12 - 18 months.

6. Information Sources

1. WWF: *Resolving the DDT Dilemma: Protecting Biodiversity and Human Health*. June 1998
   Internet: http://www.worldwildlife.org/toxics/progareas/pop/ddt_report.htm
2. FAO: *Prevention and Disposal of Obsolete Pesticide Programme*. Guidelines available:
   - Prevention of accumulation of obsolete pesticide stocks;
   - Pesticide storage and stock control manual;
   - Disposal of bulk quantities of obsolete pesticides in developing countries;
   - Management and disposal of small quantities of unwanted and obsolete pesticides;
   - Assessing soil contamination (reference manual);
   - Baseline study on the problem of obsolete pesticide stocks;
   - Training on inventory taking of obsolete stocks.

   Internet: www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPP/Pesticid/default and www.who.int/m/topics/chemical_safety/en/index.html
3. Assessment of DDT substitutes, see *WHO Pesticide Evaluation Scheme (WHOPES)*
   Internet: http://www.who.int/ctd/whopes/index.html

4. WHO: Tropical Diseases Programme (detailed information on use, stockpiling, and planning of vector control)
   Internet: http://www.who.int/dsa/cat98/trop8.htm
5. OECD: *DAC guidelines on Aid and Environment No 6; "Guidelines for Aid Agencies on Pest and Pesticide Management"*. 1995.
6. GCPF (Global Crop Protection Federation). Industry association has links to existing programmes on safe use, container management etc, and links to regionally centres of excellence for pesticide use and safety.
   Internet: www.gcpf.org/
7. Pesticide Action Network, a global NGO organisation working on safe use of pesticides.
   Internet: www.pan-uk.org/Internat/intindex.htm
8. WHO. The organisation has programmes covering mainly safe use and pesticides residues in food.
   Internet: www.who.org
9. UNDP. *Possible capacity-building activities and their associated costs under the international legally binding instrument for implementing international action on certain persistent organic pollutants*. Note by the Secretariat. November 1998 (UNEP/POPS/INC.2/ INF/3).
   Internet: irptc.unep.ch/pops/POPs_Inc/INC_2/en/inf3.htm
10. UNEP. *National inventories of persistent organic pollutants, selected examples and possible models. Preliminary report.* Note by the Secretariat, July 1999 (UNEP/POPS/INC.3/ INF/1).
    Internet: irptc.unep.ch/pops/POPs_Inc/INC_3/inf-english/inf3-1/inc3-1.pdf
11. FAO. *Guidelines for the Registration and Control of Pesticides*, 1985.
    Internet: http://www.oecd.org/env/docs/epocwmp981r1.pdf
12. FAO. *Guidelines for Legislation on Control of Pesticides*, 1989
    Internet: http://www.fao.org/ag/AGP/AGPP/Pesticid/Default.htm
13. FAO. *Initial Introduction and Subsequent Development of a Simple National Pesticide Registration and Control Scheme*, 1991
    Internet: http://www.fao.org/ag/AGP/AGPP/Pesticid/Default.htm
14. FAO. *Guidelines for Good Labelling Practice for Pesticides*. 1995
    Internet: http://www.fao.org/ag/AGP/AGPP/Pesticid/Default.htm

ACTION PLAN: RELEASES FROM UNINTENTIONAL PRODUCTION OF PCDDS/PCDFS, HCB AND PCBS

Mandatory elements of the Action Plan

According to the Convention, all Parties are obliged to develop an Action Plan and implement it as part of its implementation plan specified in Article 7 of Stockholm Convention and targets of the SAP. Where appropriate, the Action Plan may be developed at regional or sub-regional levels. The elements of the Action Plan are mandated under the Convention. The Action Plan shall include the following elements:

- An evaluation of current and projected releases, including the development and maintenance of source inventories and release estimates, taking into consideration the source categories identified in Annex C of the Convention;
- An evaluation of the efficacy of the laws and policies of the Party relating to the management of such releases;
- Strategies to meet the obligation of this paragraph;
- Steps to promote education and training with regard to, and awareness of, those strategies;
- A review every five years of those strategies and of their success in meeting the obligations of this paragraph;
- A schedule for the implementation of the Action Plan, including the strategies and measures identified therein.

Approach to Preparing an Action Plan for 'Dioxins'

A country may choose to apply the following approach when developing an Action Plan for 'dioxins', including the Table of Contents for presenting the results.

1. Development of Action Plan for Reduction /Elimination of 'Dioxin' Releases

1.1 Background

Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF), hexachlorobenzene (HCB) and polychlorinated biphenyls (PCB) are formed as unintentional products in a wide range of thermal and industrial chemical processes. These are the chemical substances covered by Annex C of the Stockholm Convention.

Although many countries have taken steps to reduce the unintentional formation and release of 'dioxins', the substances are still formed to a smaller or larger extent in all countries. The major steps taken have been improvement of flue gas cleaning technology, changes in chemical processes and elimination of chlorine based chemicals in industrial processes.

Some countries have prepared action plans in the past specifically targeting the releases and formation of 'dioxins'. The action plans published often cover only some parts of the dioxin issue such as emissions from solid waste incinerators, banning of certain specific industrial process (i.e. chlorine bleaching of pulp and paper) but action plans covering all aspects of the 'dioxin' issue also exist. The experience gained in these countries combined with the formal provisions of the Stockholm Convention may serve as guidance for other countries in developing action plans on 'dioxins'. An overview of the objectives, results and related activities etc. of developing such plan is described below.

1.2 Immediate and Overall Objectives

The immediate objective is that an Action Plan for 'dioxins' is prepared that defines and describes a country's strategy, commitments and the actions it intends to undertake in respect of reducing and eliminating the formation of 'dioxins', both in the near and longer term.

Related objectives are increased awareness among stakeholders respecting the issue and mobilising them in addressing it, and providing a basis for applying for funding of the action plan implementation.

The overall objective is the reduction or elimination of 'dioxin' formation and releases of the substances into the environment.

1.3 Results

The results of the activities below are:

- Draft and final versions of an Action Plan for 'dioxins';
- Stakeholders are informed about the 'dioxin' issue, the presence of 'dioxins' in the country and the planned initiatives and activities to manage 'dioxins' in the future;
- Responsibility for Action Plan implementation is assigned among appropriate stakeholders within and outside Government;
- Government staff and other stakeholders assigned responsibility are trained in implementing an Action Plan on 'dioxins'.

1.4 Activities

The process of preparing an Action Plan may be divided into two phases: a preparatory phase and an Action Plan development phase.

Preparatory Activities

a. Establishing the Context and Task Group for Action Plan Development

The lead agency in 'dioxin' management from a regulatory perspective, typically one responsible for environmental protection but potentially others, would initially need to get a clear understanding of the 'dioxin' issue as addressed in the Stockholm Convention and other international and regional agreements involving 'dioxins'. In addition to in-house expertise, the agency will have to consult sources outside its organisation to establish the full context within which the Action Plan is to be developed.

Consistent with the above, the lead agency together with the POPs Focal Point Unit would have to identify partners and resource persons within the government who would have the potential to become involved in the development of the Action Plan. These include potential partners who have mandates directly related to 'dioxins' (e.g. the ministries and agencies responsible for natural resources, industry, energy, health and waste management authorities) but other important players with an indirect impact may be considered (e.g. the ministries of finance and economy). These exploratory considerations could be concluded by establishing a Task Group to be responsible for developing the Action Plan on 'dioxins'.

b. Involving Stakeholders and Development of ToR, Work Plan and Budget

A number of parties (stakeholders) will have an interest in or be affected by new initiatives to reduce or prevent 'dioxin' releases. While it may not be expedient to involve all stakeholders

in the process of preparing the Action Plan it is important to understand their position on 'dioxin' issues and options in order to maximise the effectiveness of plan implementation. The lead agency and/or the focal point should consider mechanisms for stakeholder involvement and invite the most relevant of these to participate in the Action Plan process.

Once the organisation of Action Plan preparation is in place it is useful to assign mandates to the Task Group or Subgroups of this formed for specific Action Plan preparation purposes. This may take the form of a set of brief Terms of Reference (ToR) that describe in more detail the tasks to be undertaken and the administrative and organisational issues related to the work. A work plan would have to be developed that describes the sequence of events, milestones and expected outputs. In addition, a budget providing detailed estimates of the time and resources associated with the Action Plan tasks would have to be prepared.

Action Plan Development Activities

c. Analysis of the 'dioxin' issue (inventory review)

It is a mandatory requirement of the Convention that the Action Plan includes an assessment of current and projected releases including the development of source inventories and release estimates. Preparation of an inventory of 'dioxin' releases on which the evaluation could be based is described in Section 6.3. The first activity in the process of developing the Action Plan for 'dioxins' is to review the findings of the inventory report against the provisions of the Stockholm Convention. This would identify the need for action.

It should be noted that other obligations in the field of 'dioxins' could suitably also be addressed in the Action Plan. An example is the provisions of the POPs Protocol to the 1979 UNECE Convention on Long-Range Transboundary Air Pollution.

d. Formulation of objectives of the Action Plan

At this point in the process, the Task Group would have to formulate the objectives of the Action Plan in precise terms to clearly define what the actions are intended to achieve. In other words, the Group would have to state the intended effects of implementing the Action Plan. Examples of such objectives could be to:

- Reduce the emission of PCDD/PCDF by XX % no later 20XX;
- Develop and implement source specific bans and controls for allowable substances in municipal solid waste no later than 200XX.;
- Establish municipal solid waste and hazardous incineration technology and emission standards for dioxins no latter than 20XX;
- Phase out the use of chlorine bleaching in pulp and paper production no later than 20XX;
- Implement the Best Available Techniques (BAT) in production of secondary copper, aluminium and zinc no later than 20XX.

e. Identification of options for reduction of production and release of 'dioxins'

The need for action identified above would lead to identification of *options* that would contribute to attainment of the objectives stated above. Such options, which could be defined as *courses of action*, could encompass development of new regulations, guidelines, codes and standards. These options may be developed recognising the long term nature of the issue with an initial near term priority being attached to identification and reduction of main sources. It is advisable to review the experience in other countries from pursuing such 'dioxin' reduction measures.

f. Establishing criteria for evaluation and prioritisation of options

Faced with a number of alternative ways to deal with the 'dioxin' issue, criteria for evaluating and prioritising these options will have to be developed. The aim is to provide a basis for settling on those measures that meet the reduction/elimination objectives most efficiently and/or in the most cost-effective way, but also to ensure that more affordable near term actions aimed at preventing further release of the substances into the environment are provided for.

Prioritisation of sources is inherent in the Convention text since the source categories are separated into two groups with different requirements regarding the measures to be taken.

The following evaluation criteria may be adopted:

- *Efficiency*: What degree of effect or impact will the measure have in meeting the objectives - including near and long term environmental protection and mitigation of health and socio-economic impact?
- *Affordability*: To what degree can the country and the involved parties afford the cost of implementing the measure (taking into account possible international cost coverage or contributions)
- *Cost-effectiveness*: What is the relative remediation cost per unit of 'dioxin' (reduction/elimination)?
- *Monitorability*: To what extent is it possible to measure and monitor the progress towards implementing the measure and achieving the objectives?
- *Practicability*: Are there practical factors that may speak particularly in favour of or against this measure in terms of implementation?
- *Risk*: To what degree does the option or measure entail environmental, institutional, technological or other risk?

In addition, criteria for prioritisation, i.e. the weight assigned to each of these evaluation criteria, are to be developed. These criteria may differ depending on for example the inclination of a country to achieve fast reduction and the net cost to the country to achieve the objectives.

g. Evaluation and selection of release reduction options

The options identified above are subjected to an evaluation on the basis of the criteria established for evaluation and prioritisation.

One important and often critical criterion to take into account is the estimated cost of implementing the options, be it of a capacity building, legislative, administrative, technological or other nature. Generic cost estimates for capacity building activities may be obtained from ref. 1 below, while cost data for POPs alternatives and remediation/disposal technologies could be obtained from technology suppliers, other market information or from specialists on the technology area concerned.

The measures that best meet the objectives of the 'dioxin' Action Plan, or worded differently, that can be expected to yield the highest impact in terms of contributing to reduction and/or elimination of 'dioxin' release in a cost-effective manner, are selected for implementation. The measures chosen would often be a mix of actions in respect of capacity building, new or changed regulations, chemical replacement and technology changes.

It may be decided that the Task Group should undertake the evaluation of options and make recommendations on those that are consider to best meet the objectives and prioritisation criteria. The measures nominated for implementation by the Task Group may be discussed in a workshop before finally approved.

h. Development of strategy and actions for implementing the Action Plan

Once the options - or courses of action - to be included in the Action Plan have been selected and agreed upon, one will have to devise ways of implementing the Plan. This may involve the following:

- development of an overall consistent plan for implementing the Action Plan;
- formulation of the activities associated with each option (measure) detailing how the measure is to be implemented, including optimum sequencing of activities;
- assignment of implementation responsibility;
- preparation of a consolidated timetable and budget for implementing the Action Plan.

i. Obtaining commitment for the Action Plan

When the Action Plan is completed it is important to get it endorsed by stakeholders in order to provide for successful implementation. The intentions of the Plan must be communicated to those who have decision-making power regarding the implementation of the Plan elements. Several ways of obtaining commitment may be considered:

- direct participation of key stakeholders in Action Plan preparation to maximise ownership;
- submission of the Action Plan to key stakeholders for comments;
- preparation of an information document summarising the Action Plan to be submitted to other stakeholders for comments;
- organisation of stakeholder workshops;
- lobbying high government officials to secure human and financial resources;
- institutionalising the plan implementation to ensure that it is seen as a normal part of government activities.

1.5 Organisational Arrangements, Participants and Stakeholders

The participants in the process may be summarised as follows:

Coordination Responsibility: The focal point for administrative, project management and coordination purposes needs to oversee the task. This may be the overall NIP Focal Point Unit or some other group reporting to it as may be determined by the National Lead Agency (ies) and/or InterAgency Supervisory Body for the NIP.

Task Group: The group could include representatives from government agencies, (e.g. the ministries of environment, industry and health), the energy and waste management sectors and industry. The government may also wish to involve international experts in an advisory function (something for which international financial assistance may be available).

Sub-groups: While the overall responsibility of developing the Action Plan would rest with the Task Group, much of the underlying work may be undertaken in a number of Subgroups, each assigned a specific 'dioxin'-related task. The subgroups may include recourse persons outside the Task Group. Participants in the subgroups could include government personnel, local 'dioxin' experts from technical universities, polytechnics, local consultants, representatives from industry, etc. The Task Group may also wish to involve international experts to contribute to the process, e.g. with regard to methodology and advice on measures for the reduction of 'dioxin' releases.

Reviewers: Local and international technical and regulatory experts on 'dioxin' and waste management.

2. Options for Action Plan Development

The Action Plan for reducing the releases of 'dioxins' may address (but not be limited to) the following options:

Formation by thermal processes

- Draft new legislation/regulation laying down limit values for releases of PCDDs/PCDFs, PCBs and HCB from selected point sources;
- Draft new legislation/regulation and guidelines in order to reduce 'dioxin' releases from diffuse sources like domestic burning of wastes and traffic;
- Promote (or require) the use of best available techniques (BAT) and best available environment practices for new and existing sources in order to reduce or eliminate formation and releases of 'dioxins';
- Promote (or require) reduced use of materials with a high risk of 'dioxin' formation when burned. Promote (or require) the development and use of substitutes for such materials;
- Promote (or require) the development and use of substitutes for processes with a high risk of 'dioxin' formation.

Formation of by-products from chemical processes

- Draft new legislation/regulation laying down limit values for releases of PCDDs/PCDFs, PCBs and HCB from selected chemical processes (no requirements in the Convention);
- Draft new legislation/regulation laying down limit values for PCDDs/PCDFs, PCBs and HCB in chemical products and other products;
- Draft new legislation/regulation to reduce or eliminate the production and use of chemicals with a high content of - or potential for chemical formation of - PCDDs/PCDFs, PCBs and HCB or amend existing legislation regarding hazardous chemicals;
- Promote (or require) the use of best available techniques (BAT) and best available environment practices for new and existing sources in order to reduce or eliminate formation and releases of 'dioxins'.

Inventories and monitoring of releases

- Improve and maintain inventories e.g. by obtaining more exact information on processes and technology and by monitoring of 'dioxin' releases from selected source categories;
- Develop guidelines/requirements for monitoring of 'dioxin' releases from selected source categories.

Measurement of PCDD/PCDF, PCB and HCB

- Fix the reference methods of sampling and analysis to determine releases of PCDDs/PCDFs, PCBs and HCB and the content of the substances in materials;
- Promote the development of laboratory capacity for analyses of PCDDs/PCDFs, PCBs and HCB, possibly at a regional level.

'Dioxin' contamination/pollution (may be covered by a general Action Plan for monitoring of POPs)

- Prepare programmes for monitoring of PCDDs/PCDFs, PCBs and HCB in the environment, work environment, breast milk, sewage sludge, food and feedstuffs, etc., possibly at a regional level;
- Establish environmental quality standards for air, water (including bottom sediment) and soil;
- Establish quality standards for residues from waste and wastewater treatment;
- Establish the tolerable daily intake.

Institutional strengthening and education

- Prepare programmes for institutional strengthening and capacity building;
- Strengthen community participation, education and training.

3. Structuring the Action Plan for 'Dioxins

The presentation of the Action Plan may as an example be structured along the following lines:

a. Objectives and Priorities of Action Plan;
b. Summary of Inventories of PCDDs/PCDFs, PCBs and HCB Releases;
c. Environmental and Health Risks related to the Substances;
d. Measures for reduction of PCDDs/PCDFs, PCBs and HCB Formation and Releases;
e. Implementation of the Action Plan (Strategy, organisation and activities);
f. Key Investment Requirements;
g. Costs and Financing of Action Plan Implementation.

4. Costs and Funding Sources

The costs of preparing a 'dioxin' Action Plan will depend on the size of the country, the number or major sources, the number of government and other organisations involved in the process, the level of plan detail, and the size and distribution of national and international resource persons and participants. Cost estimates are provided in UNEP/POPs/INC.2/INF.3.

The potential sources of funding of the activities include:

- Enterprises and institutions with high formation and release of 'dioxins';
- National government contributions (personnel and budget funds);
- The Global Environment Facility (enabling activities and investment projects);
- International Financial Institutions;
- Bilateral contributions from governments of industrialised countries;
- National government contributions (personnel and funds).

5. Indicative Timeframe

Because of the differences between countries indicated above, the timeframe within which a 'dioxin' Action Plan may be developed would differ from country to country. Indicative planning figures are: small country 8-12 months, medium-sized country: 10-15 months and a large country: 12-18 months.

6. Information Sources

1. UNITAR. *Guidance on Action Plan Development for Sound Chemicals Management*. Working Draft. Geneva, April 2001
2. *Basic Guidelines of Japan for the Promotion of Measures against Dioxins.* Published by Ministries and Agencies that are members of the Ministerial Council on Dioxin Policy. Japan, September 1999.
   Internet: http://irptc.unep.ch/pops/shishin.htm
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4. Canadian Environmental Protection Act. *Pulp and Paper Chlorinated Dioxin and Furan Regulations*. SOR/92-267.
   Internet: http://laws.justice.gc.ca/en/C-15.31/SOR-92-267/text.html
5. USEPA. *Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-Like Compounds Category*, EPA-745-00-021, December 2000. Internet: http://www.epa.gov/tri/TRIdioxinguidance.pdf
6. USEPA. Inventory of Dioxin Sources in the United States, May 2001. Internet: http://www.epa.gov/nceawww1/diox.htm

ACTION PLAN: MONITORING

Monitoring:

According to the Stockholm Convention and SAP the Parties shall encourage and/or undertake appropriate monitoring pertaining to POPs and where relevant to their alternatives. This includes monitoring of:

- sources and releases into the environment;
- presence, levels and trends in humans and the environment;
- environmental transport, fate and transformation;
- effects on human health and the environment;
- socio-economic and cultural impacts;
- release reduction and/or elimination.

Parties shall make the results of their monitoring activities accessible to the public on a timely and regular basis and encourage and/or undertake cooperation with regard to storage and maintenance of information generated from monitoring.

Also, the Parties shall, within their capabilities, support international programmes, networks and organisations aimed at data collection and monitoring, and promote access to, and the exchange of, data and analyses

Parties will have to decide on how to meet these monitoring requirements. While some countries may want to develop a separate monitoring and reporting system for POPs, other countries may prefer to integrate these activities into monitoring of and reporting on a wider spectrum of chemical substances. As an example of an integrated approach a country may wish to monitor POPs use and emissions within the framework of a Pollutant Release and Transfer Register (PRTR). Whichever approach is opted for, the planning of these activities may be best framed in an Action Plan for Monitoring and Reporting. The development of such plan is described below.

Emissions Monitoring could be done in the frame of a Pollutant Release and Transfer Register (PRTR). The development of the PRTR is in response to Agenda 21 and the Rio Declaration, which provide specific references to the establishment of national emission inventories and in this context the PRTR has been introduced. PRTR data can be used for monitoring the progress of global environmental commitments and is an environmental database or inventory of potentially harmful releases to air, water and soil as well as wastes transported off site for treatment and disposal.

Some countries may also be party to other international conventions. The Basel and the Stockholm Convention are closely inter-related now that all the current POPs listed in the Stockholm Convention are classified as hazardous wastes in Annex VIII of the Basel Convention and Annex III of Izmir Convention. The Basel Convention strictly regulates the transboundary movements of hazardous wastes and provides obligations to its Parties to ensure that such wastes are managed and disposed of in an environmentally sound manner. Other relevant conventions include e.g. the Rotterdam Convention and regional agreements.

1. Development of Action Plan for Evaluation of Presence of POPs

1.1 Background

The Stockholm Convention includes provisions for monitoring, which can be addressed in combination with the reporting requirements. Often the requirements for monitoring are

linked to a reporting activity carried out by the same or co-operating authorities. In other cases the reporting of production, import and export is carried out separately and may be addressed as such.

Monitoring programmes of health or environment are carried out in many countries at various levels of detail. When such monitoring activities include POPs, they may include the following environmental media: soil and sediment, air and deposition, water, flora and fauna, food, feed and humans. Monitoring and reporting programmes may thus be the responsibility of a number of authorities. However, since POPs are characterised by their long range transport by air, the authorities responsible for air quality may be informed of the local, national or regional POPs monitoring programmes.

Some countries are party to regional agreements which may include monitoring of POPs. Thus, organisational structures to monitor, store and report data may already exist. However, often the starting point of preparing an action plan for monitoring and reporting will be the information collected during a preliminary or complete inventory phase.

1.2 Immediate and Overall Objectives

The immediate objective of *preparing* this Action Plan is to describe the actions that the country intends to undertake in respect of monitoring its control and the elimination of POPs. The related objectives are to establish the context for the Action Plan on monitoring and reporting and provide information and awareness for the stakeholder community and public on progress in implementing the NIP. The overall objective is to provide the basis for monitoring the effects of reduction and elimination activities for POPs.

1.3 Results

The results of the activities below are:

- Draft and final versions of an Action Plan for Monitoring;
- Responsibility for Action Plan implementation is assigned among appropriate stakeholders within and outside Government;
- Government staff and other stakeholders assigned responsibility are trained in implementing an Action Plan for Monitoring.

1.4 Activities

<u>Preparatory Activities</u>

a. Establishing the Context and Task Group for Action Plan Development

The lead agency in POPs management from a regulatory perspective, typically one responsible for environmental protection but potentially others, would initially need to get a clear understanding of the POPs issue as addressed in the Stockholm Convention on POPs and other international and regional agreements involving POPs. In addition to in-house expertise the agency will have to consult sources outside its organisation to establish the full context within which the Action Plan is to be developed and in particular major users or generators of the substances in industry and agriculture.

The lead agency would have to identify potential partners and resource persons within the government for the development of the Action Plan. These include potential partners with mandates related to the use or production (e.g. the ministries of industry, agriculture, trade, energy, environment and health) but other important players with an indirect impact may be considered (e.g. the ministries of finance and economy). Establishing a Task Group to

become responsible for developing the Action Plan for POPs monitoring and reporting could conclude these considerations.

b. Involving Stakeholders and Development of ToR, Work Plan and Budget

A number of parties (stakeholders) will have an interest in or be affected by new initiatives to monitor POPs. But while it may not be expedient to involve all stakeholders in the process of preparing the Action Plan it is important to understand their position on POPs monitoring issues and options in order to maximise the effectiveness of plan implementation. The lead agency should consider mechanisms for stakeholder involvement and invite the most relevant of these to participate in the Action Plan process.

With the organisation of Action Plan preparation in place it is useful to assign mandates to the Task Group or Subgroup formed for specific Action Plan preparation purposes. This may take the form of a set of brief Terms of Reference (ToR) that describe in more detail the tasks to be undertaken and the administrative and organisational issues related to the work. A work plan would have to be developed that describes the sequence of events, milestones and expected outputs. In addition, a budget providing detailed estimates of the time and resources associated with the tasks to be undertaken to develop the Action Plan would have to be prepared.

Action Plan Development Activities

c. Analysis of the Requirements (including review of baseline)

The Stockholm Convention requires the Party to "within their capabilities, at the national and international levels, encourage and/or undertake appropriate research, development, (and) monitoring". The Action Plan may include analysis of the appropriateness of future monitoring activities in a country based on the development of criteria for prioritisation, taking into account health, environmental and socio-economic impact. Such priority setting amongst POPs issues could include the consideration of priorities defined in national environmental action plans; findings of the Inventory activity, if available; wastes/residues at sites that were not well-man aged; special environmental interests or vulnerable groups that may be affected by POPs.

Requirements may also arise from other obligations and may in some countries be suitably addressed here. Examples may be the provisions of protocols to conventions, directives of the EU and other regional bodies.

d. Formulation of Objectives of the Action Plan

The objectives of the Action Plan for Monitoring relates to the Convention text and at this point the Task Group may wish to engage in a prioritisation of the actions to be taken, since the effort of a Party with respect to monitoring is to encourage/undertake within it’s capabilities. If the monitoring activities are combined with the reporting requirements of the Convention this must be included in the Action Plan objectives.

e. Identification of Monitoring Options and Models

Once the requirements and need for actions have been established the options for monitoring can be addressed.

Places subjected to monitoring for POPs generally includes the Convention article 11, listing a-g, and may specifically be sites of production and storage facilities, agricultural soil, malaria controlled ponds, sites for maintenance and retrofilling of electrical transformers, and source categories mentioned in annex C of the Convention. It is advisable to review the experience in other countries from pursuing such POPs monitoring measures and the applicability of analytical technologies.

f. Establishing Criteria for Evaluation and Prioritisation of Options

Criteria for evaluating and prioritising the options identified will have to be developed. The aim is to provide a basis for ultimately settling on those measures that meet the monitoring objectives most efficiently and/or in the most cost-effective way, but also aimed at providing affordable near term information and capacity development. The following evaluation criteria may be adopted

- *Efficiency*: What degree of effect or impact will the measure have in meeting the objectives – including near and long term environmental protection and mitigation of health and socio-economic impact?
- *Affordability*: To what degree can the country afford the cost of implementing the measure (taking into account possible international cost coverage or contributions)?
- *Cost-effectiveness*: What activities provides most information for the cost?
- *Monitorability*: To what extent is it possible to measure and monitor the progress towards implementing the measure and achieving the objectives?
- *Practicability*: Are there practical factors that may speak particularly in favour of or against this measure in terms of implementation?
- *Risk*: To what degree does the option or measure entail environmental, institutional, technological or other risk?

In addition, criteria for prioritisation, i.e. the weights assigned to each of these evaluation criteria, are to be developed. These criteria may differ depending on for example the inclination of a country to achieve fast phase-out and the net cost to the country to achieve the objectives.

g. Evaluation and Selection of Options and Models

The options identified above are subjected to an evaluation on the basis of the criteria established for evaluation and prioritisation. The activities selected should be those providing the most information at the lowest cost. However, a country may also *a priori* have decided to develop the monitoring within a general PRTR combining monitoring with reporting requirements of the Stockholm Convention.

One important and often critical criterion to take into account is the estimated cost of implementing the options, be it of a capacity building, legislative, administrative, technological or other nature. Generic cost estimates for capacity building activities may be obtained from the document UNEP/POPS/INC.2/ INF/3 referenced below.

It may be decided that the Task Group undertake the evaluation of options and make recommendations on those that are considered to best meet the objectives and prioritisation criteria. The measures nominated for implementation by the Task Group may be discussed in a workshop before finally approved.

h. Development of Strategy and Actions Implementing the Plan

Once the options - or courses of action - to be included in the Action Plan have been selected and agreed upon, one will have to devise ways of implementing the Plan. This may involve the following:

- development of an overall consistent plan for implementing the Action Plan;
- formulating the activities associated with each option (measure) detailing how the measure is to be implemented, including optimum sequencing of activities;
- assigning of implementation responsibility;
- preparation of a consolidated time table and budget for implementing the Action Plan.

i. Obtaining Commitment for the Action Plan

When the Action Plan is completed it is important to get its endorsement by stakeholders in order to provide for successful implementation. The intentions of the Plan must be communicated to those who have decision-making power regarding implementation of the Plan elements. Several ways of obtaining commitment may be considered:

- direct participation of key stakeholders in action plan preparation to maximise ownership;
- submission of the Action Plan to key stakeholders for comments;
- preparation of an information document summarising the Action Plan to be submitted to other stakeholders for comments;
- organisation of stakeholder workshop;
- lobbying high government officials to secure human and financial resources;
- institutionalising plan implementation to ensure that it is seen as a normal part of government activities.

1.5 Organisational Arrangements, Participants and Stakeholders

The participants in the process may be summarised as follows:

Task Group: The group could include representatives from government agencies (e.g. the ministries of environment, agriculture, industry and health), the energy sector and industry. The government may also wish to involve international experts in an advisory function (most often international financial assistance may be available).

Sub-groups: While the overall responsibility of developing the Action Plan would rest with the Task Group, much of the underlying work may be undertaken in a number of Subgroups, each assigned a specific POP-related task. The sub-groups may include recourse persons outside the Task Group. Participants in the sub-groups could include government personnel, local POP experts from technical universities, polytechnics, local consultants, representatives from industry, etc. The Task Group may also wish to involve international experts to contribute to the process, e.g. with regard to methodology and advice on POP monitoring and technology.

Reviewers: Local and international technical and regulatory experts on POPs monitoring.

2. Monitoring Options for Action Plan Development

The Action Plan for Monitoring may include the following activities to achieve objectives:

- *Formation of Task group*
  It is recommended that a Task group is formed to steer the Action Plan development and provide anchoring in government and among stakeholders.
  The initial survey may contain a review of country monitoring conditions, data collection facilities etc., and include a prioritisation of monitoring needs. If not, the Task group may use the base information to opt for monitoring of POPs effects (impacts), presence of POPs or both based on a prioritised manner.

- *Scope of monitoring programme*
  A country may opt for a comprehensive monitoring programme, initiating activities for monitoring both the Impacts and the Presence of POPs, and e.g. monitor the presence in a number of different environmental compartments.
  Options may include:
  soil, sewage sludge and harbour sludge, creeks, rivers, canals, lakes, rain and air, in food and feed, in industrial waste products and sewage water. Food and feed may be

numerous different items, and as with the previous options a risk analysis should precede the choice of options.

- *Need for Subgroups*
  Subgroups may be formed developing action plan on the presence of POPs in various compartments as laid out in the scoping of the monitoring programme.
  Subgroups may also be formed to develop monitoring of impact and of presence, respectively. Impact: The technical experts in the first may include physicians, health/social workers, biologists and ecologist (the subject being biological effects, such as learning disorders in children or reproductive failure in wildlife).
  Presence: The technical experts on presence may be biologists, environmental or analytical chemists/engineers, and other academics with analytical-chemical experience, e.g. from pharmacy or industry.

- *Describing monitoring programmes*
  Task group or subcommittees may:
  prepare a programme for monitoring in defined priority areas;
  consider how this may link together with data for point source monitoring, site auditing and other activities to ensure compliance and enforcement of regulations;
  prepare regulation providing legislative basis for the monitoring programme, site access, sampling and publication permission;
  prepare draft technical guidelines for monitoring in the designated areas, incl. issues of methodology and laboratory quality assurance;
  design organisational structure and assign clear responsibilities in the monitoring programme.

- *Evaluation of costs*
  A subgroup may be formed specifically for providing cost estimates of the Action Plan or it may be the responsibilities of a Subgroup/Task group. During the cost evaluation a cost benefit analysis of options regarding tendering of analysis, data collection, sampling etc. may be considered.

- *Institutional strengthening and capacity building*
  Develop liaison between institutions involved in monitoring activities, e.g. at a national monitoring kick-off conference.
  Prepare programmes for capacity building, education and training.
  Prepare programmes of institutional and public awareness, community partitioning.

- *Dissemination of monitoring results*
  Prepare programme for distribution of results to the public, stakeholders and other national, regional and international parties.

3. Structuring the Action Plan for POPs Monitoring

The presentation of the Action Plan may as an example be structured along the following lines:

1. Objectives and Priorities of Action Plan;
2. Summary of POP Production, Uses, Stockpiles, Waste and Contamination;
3. POP-related Environmental and Health Situation and assessment of Risk;
4. Measures for Monitoring Future POP levels and elimination;
5. Implementation of the Action Plan (Strategy, organisation and activities);
6. Key Investment Requirements;
7. Costs and Financing of Action Plan Implementation.

4. Costs and Funding Sources

The costs of preparing a POP Action Plan for Monitoring will depend on the size of the country, the level and complexity of POP uses and emissions, the number of government and other organisations involved in the process, the level of detail opted for, and the number and distribution of national and international resource persons and participants.

The potential sources of funding of the activities include:

- Users and generators of POPs;
- National government contributions (personnel and budget funds);
- The Global Environment Facility (enabling activities and investment projects);
- International Financial Institutions;
- Bilateral contributions from governments of industrialised countries;
- National government contributions (personnel and funds).

5. Indicative Timeframe

Depending on the level of detail to be achieved the timeframe for developing a POP Action Plan for Monitoring may differ from country to country. Indicative planning figures are: small country 8 -12 months, medium-sized country: 10 - 15 months and a large country: 12-18 months.

6. Information Sources

1. Background information on POPs are available from The International Programme on Chemical Safety (IPCS) (1995) An Assessment Report on: DDT-Aldrin-Dieldrin-Endrin-Chlordane-Heptachlor-Hexachlorobenzene-Mirex-Toxaphene; Polychlorinated Biphenyls; Dioxins and Furans.
   Internet: http://irptc.unep.ch/pops/indxhtms/asses0.html
2. UNEP sponsors Regional and Sub-regional POPs Workshops focussed on management of POPs. Proceedings can be found at UNEP Chemicals web page:
   http://irptc.unep.ch/pops/POPs_Inc/proceedings/coverpgs/procovers.htm
3. A list of monitoring related literature can be found under "Source, exposure and environmental fate" at http://irptc.unep.ch/pops/pdf/invsrce/inventpopscomb.pdf

Other relevant information include:

4. UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases. Draft January 2001.
   Internet: http://irptc.unep.ch/pops/pdf/toolkit/
5. GEF-UNEP: *Regionally Based Assessment of Persistent Toxic Substances: Guidance Document for the Collection, Assembly and Evaluation of Data on Sources, Environmental Levels and Impacts of Persistent Toxic Substances.* September 2000.
   Internet: www.chem.unep.ch/irptc/Publications/pcbid1.pdf
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   Internet: www.unitar.org/cwm/publications/pdf/prtrgd. Also available on CD-ROM.
7. OECD: Proceedings of the OECD International Conference on Pollutant Release Transfer Registers, National and Global Responsibility. 1999.
8. UNDP-GEF Persistent Organic Pollutants (POPs) Resource Kit. 2001.
   Internet: www.undp.org/gef

9. UNDP. Possible capacity-building activities and their associated costs under the international legally binding instrument for implementing international action on certain persistent organic pollutants. Note by the Secretariat. November 1998 (UNEP/POPS/INC.2/ INF/3).
Internet: http://irptc.unep.ch/pops/POPs_Inc/INC_2/en/inf3.htm
10. UNITAR. Guidance on Action Plan Development for Sound Chemicals Management. Working Draft. Geneva, April 2001