Guidance Set 5

Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs (Annex C Chemicals) Inventory and Action Plan

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1 Introduction

1.1 Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs (Annex C Chemicals) Inventory and Action Plan (NIP Sections 2.3.4 and 3.3.5)

1.1.1 Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs

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. PCDD/PCDF, HCB and PCB together are in some cases referred to as 'dioxins' for convenience in this Guidance Set.

Potential sources are:

- Thermal processes: waste incineration, uncontrolled waste burning, metals smelting and refining processes, thermal power generation, cement kilns, wood and other biomass burning and transportation fuel combustion.
- Industrial chemical processes: production of pulp and paper when bleaching with elemental chlorine is used, the production of chlorinated compounds like the wood preservative pentachlorophenol (PCP).

1.1.2 Action Plan Development and Inventory Preparation

Plan provisions

According to Article 5 of the Stockholm Convention Parties must:

- Develop an Action Plan within two years of the date of entry into force designed to identify, characterise and address the release of PCDDs/PCDFs, HCB and PCBs and to facilitate the promotion of measures that can reduce or eliminate these releases;
- Ensure that the action plan includes an evaluation of current and projected releases, including the development and maintenance of source inventories and release estimates.

Action Plan elements

The elements of the Action Plan are mandated under the Convention. The 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 described above;
- 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.

Inventory

In order to ensure that the Action Plan includes such evaluation of current and projected releases a country would also need to prepare an inventory of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs.

1.1.3 Size, Coverage, Work Approach and Structure

Size and coverage

The Stockholm Convention does not specify what should be the size and coverage of an action plan. It is fully up to the country to decide how comprehensive and detailed the action plan for Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs should be. The only condition is that it should serve as an appropriate tool for meeting the obligations of the Stockholm Convention.

Likewise, it is entirely at a country's discretion to decide how detailed the inventory of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs should be. For example, in countries where the issue is considered to be insignificant the need to prepare an inventory would be similarly limited. For countries with more significant problems related to Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs the exercise of preparing the inventory would be more extensive.

In the latter cases the amount of funds available for NIP preparation would be an important factor in determining to what extent the issue of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs POPs in the country could be covered by the inventory prepared in connection with NIP preparation, and how much additional inventory work would have to be undertaken as an element of implementing the action plan for Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs.

Approach and structure Further, the Stockholm Convention does not require that any particular approach be used for preparing the inventory or developing the action plan for Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs. Nor does a country have to use any specific structure for presenting the inventory and the action plan. The plan should, however, include the elements listed in the section above. The work approaches and structures may be tailored to the individual country's needs and preferences.

1.1.4 Contents of guidance set

This guidance set includes:

- a suggested annotated table of contents for an inventory of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs and a proposal for how a country may prepare the inventory (Section 2); and
- a suggested table of contents for an action plan for Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs and a proposal for how a country may develop it (Section 3).

1.2 Provisions of the Stockholm Convention

The Stockholm Convention further requires that all Parties must:

- Promote application of available, feasible and practical measures to achieve realistic and meaningful levels of release reduction or source elimination;
- Promote development and, where appropriate, require use of substitute or modified materials, products and processes to prevent formation and release of Annex C POPs;
- Promote and phase in best available techniques (BAT) as soon as practicable, but <u>no later than 4 years</u> after entry into force for new sources within specified industrial source categories that have potential for comparatively high formation and release of POPs to the environment (Annex C, Part II);
- Promote the use of BAT and BEP (best environmental practice) for existing sources within all categories (Annex C Part II and III) and new sources within categories specified in (Annex C Part III).

2 Inventory: Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs (NIP Section 2.3.4)

2.1 How to Structure the Inventory of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs

A country may choose to use the following structure - or Table of Contents - for presenting the inventory on Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs in the country.

Indicative Table of Contents

Inventory of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs

Summary

Presentation of data on the releases of PCDDs/PCDFs to all media for the main source categories. The summary should also include the principal findings and identify major data gaps and priority areas for the further work.

1 Introduction

Introduction to 'dioxins' and the 'dioxin' issue and presentation of the inventory methodology.

2 Releases of PCDDs/PCDFs by 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 subsection 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.

3 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 recommen-

dations for further assessment, measurements or policy measures.

Annexes.

Detailed supporting data may be included in annexes.

2.2 How to Prepare an Inventory of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs

This section contains guidance on how to prepare an inventory of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs but only the preparation of an inventory of PCDDs/PCDFs is addressed in detail.

However, thermal sources identified in an inventory of PCDDs/PCDFs will in general also be sources of HCB and PCB emission and the releases of PCBs and HCB may later be estimated on the basis of activity data obtained when preparing the PCDD/PCDF inventory.

Preparation of Inventory of PCDDs/PCDFs (and HCB and PCB)

Objectives

The objective of preparing the inventory is to provide a sufficient quantitative information base for initiating development of an Action Plan for releases from unintentional production of PCDDs/PCDFs (and HCB and PCB).

A more detailed inventory process complete with mechanisms for periodic updating could be prepared later in connection with the implementation of the Action Plan itself, see Section 3.

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 programme applicable to documenting pollutant releases inventories (PRTR).

Results

The results of the action are:

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

Activities

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

Phase 1: Inventory Preparatory Activities

1. Introductory Workshop

As a first step one may consider organising an introductory workshop on managing the issue of PCDDs/PCDFs (and similar substances) in the future. The objective would be to involve stakeholders in the early stages of the process and to share general information on unintentional production releases in general.

2. Constitution of a Task Group for inventory preparation

A Task Group responsible for planning, organising and partly undertaking the work involved should be appointed.

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 field 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.

3. Development of work plan

A work plan would be elaborated indicating the major tasks to be undertaken and a time scale for completing the work. The work plan would assign responsibilities to the parties involved in the process.

Phase 2: Inventory Preparation Activities

4. Establishment of overview of the 'dioxin' issue

The first activity towards preparing the inventory could be to establish an overview of the size and nature of the dioxin issue through a desk study of existing information. The main sources of information could be (if in existence):

- Studies and inventories of 'dioxin' releases in the country,
- Studies on or monitoring of 'dioxins' in the environment, food, feed and humans, responsible agencies and results;

5. Training on inventory procedures

Before data gathering starts, a workshop on procedures for preparing and evaluating the inventory on PCDDs/PCDFs 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.

6. Preparation of 'dioxin' inventory

UNEP Chemicals has prepared a draft Toolkit to assist countries in identifying sources and estimating releases of PCDDs/PCDFs.

The key elements of the toolkit are:

- An effective methodology for identifying the relevant industrial and non-industrial processes releasing PCDD and PCDF;
- · Guidance on information gathering;
- 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.

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 a process, where the reliability of the inventory figures is gradually increased by obtaining more data on the sources.

Steps involved in conducting the inventory

1. Main source category identification

The main source categories for PCDDs/PCDFs emissions provided in the Toolkit 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;
- Miscellaneous
- Disposal;
- Hot-Spots.
- 2. 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.

3. Collection of information on processes and emission

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 sub-

category, 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.

4. 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.

5. Compilation of inventory

The entire inventory is compiled by adding up the releases to all media from all categories.

7. Internal and peer external review of initial inventory

The Task Group may wish to have the draft inventory 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.

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 Inter-Agency 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 media.

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 staff from research institutions and universities and international experts in the work or in an advisory function.

Inventory Preparation: The practical inventory work may be done by government personnel, e.g. environmental inspectors and local consultants in co-operation 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 release.

Approval: A process of having the inventory formally adopted as the baseline in-

formation 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.

Information Sources

Official Documents from Intergovernmental Organisations

1 UNEP. 1999. Dioxin and furan inventories - national and regional emissions of PCDD/PCDF. UNEP Chemicals.

Internet: http://www.chem.unep.ch/pops/pdf/dioxinfuran/difurpt.pdf

Summarises national and regional inventories of PCDDs/PCDFs releases. The publication also provides background information on toxicology and sources of PCDDs/PCDFs.

2 UNEP. 2001. Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases. Draft.

Internet: http://www.chem.unep.ch/pops/pdf/toolkit/toolkit.pdf

This draft toolkit for identification and quantification of PCDD/PCDF releases has been developed to assist countries in identifying sources and estimating releases of dioxins and furans. Includes a detailed spreadsheet with default emission factors for all source categories.

3 UNEP. 1999. National inventories of persistent organic pollutants, selected examples and possible models. Preliminary report. Note by the Secretariat, (UNEP/POPS/INC.3/ INF/1).

Internet: http://irptc.unep.ch/pops/POPs_Inc/INC_3/inf-english/inf3-1/inc3-1.pdf

Part I of the report discusses in general terms the different options for establishing inventories, including the following components: production, import, export, use, stockpiles, and release to the environment which can involve transfers for disposal. Part II summarises inventory models that might be used.

Background Information and Examples

4 EC. 1997, 1999, 2001. Identification of Relevant Industrial Sources of Dioxins and Furans in Europe - Final Report (the European Dioxin Inventory) (1997). Releases of Dioxins and Furans to Land and Water in Europe (1999). European Dioxin Emission Inventory Stage II (2001). Prepared by Landesumweltamt Nordrhein-Westfalen for the European Commission. Internet: europa.eu.int/com/environment/dioxin/;

Provides detailed description of PCDD/PCDF emission to air from all source categories and detailed inventories covering all Member States of the European Union. The Stage II report includes studies of PCDD/PCDF emission

from specific source categories, and PCDD/PCDF emission from counties in Central and Eastern Europe.

5 U.S. EPA. 2001. Draft Dioxin Reassessment. National Center for Environmental Assessment. U.S. EPA, Washington DC. Internet: http://www.epa.gov/ncea/pdfs/dioxin/part1and2.htm

Includes a detailed inventory of PCDD/PDCF sources in the U.S.A. and assessment of the properties, environmental levels, and background exposures of the substances. In addition, the publication provides and a draft exposure and human health reassessment of the substances.

6 U.S. EPA. 2000. **Hexachlorobenzene (HCB): Reduction Options**. Prepared for Great Lakes National Program Office, Draft Report.

Internet: http://www.epa.gov/grtlakes/bns/baphcb/HCB rdcn.PDF

Provides a brief summary description of HCB and a brief description of each source category, followed by reduction options, including a description of the proposed action, the release reduction potential, its cost effectiveness, implementation issues (e.g., technical feasibility), and where to find additional information.

3 Development of Action Plan for Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs (NIP Section 3.3.5)

3.1 How to Structure the Action Plan on Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs

A country may choose to use the following structure - or Table of Contents - for presenting the action plan on Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs.

Indicative Table of Contents

Action Plan: Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs

1 Objectives and Priorities of Action Plan

Provides a clear statement of the strategic objectives and constraints on which the Action Plan is based. The background for the prioritisation of the actions is clearly stated.

2 Current and Projected Releases of PCDDs/PCDFs, PCBs and HCB

Includes an evaluation of current and projected releases of the substances based on the initial PCDD/PCDF inventory. The chapter includes plans for further development and maintenance of source inventories and release estimates.

- 3 Environmental and Health Risks related to the Substances (optional)
 - The Action Plan may include a short review of the actual environmental and health risks related to the substances.
- 4 Measures for Reduction of PCDDs/PCDFs, PCBs and HCB Formation and Releases

This section would track all the actions the government intends to initiate in order to reduce the formation and releases of the substances. Based on the ac-

tivities described above this may include sub-sections as follows:

- 4.1 Legislation/regulation directed to reduction and elimination of unintentional production and releases of the substances;
- 4.2 Taxes and levies on imports, production or uses of specific materials or substances;
- 4.3 Voluntary agreements with companies or industry groups under which they commit to change technology or processes;
- 4.4 Programmes for development, dissemination of information and implementation of best available techniques and best available environment practices in order to reduce the formation and release of the substances,

For each action, intended or expected effect on the release of the substances should be specified. Effects should be described quantitatively, and relevant evidence of industry and consumer responses to the actions should be given, if available.

5 Public Information and Awareness

According to the Stockholm Convention, the Action Plan shall include steps to promote education and training with regard to, and awareness of, the strategies for reduction of the releases of the substances. Public information and awareness is also covered by a specific Action Plan element;

6 Investment Projects

Describes in order of priority each identifiable investment project that is being, or is expected to be, undertaken within main source categories in response to the government's commitment to reduce the formation and releases of the substances.

7 Implementation of the Action Plan

Includes strategy and the organisation for implementation. A detailed schedule for implementation of all activities, with a summary of specific target milestones should be included, along with an overview of the work plan. The Action Plan should incorporate some mechanism of reporting and monitoring implementation progress that would be detailed in this section as well as how adjustments in it are made with changes in circumstances and information. A formal mechanism for review and updating the Action Plan should also be defined.

8 Costs and Financing of Action Plan Implementation

3.2 How to Develop an Action Plan Reduction/Elimination of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs

This section contains guidance on how to develop an Action Plan for Reduction/Elimination of Releases from Unintentional Production of PCDDs/PCDFs, HCB and PCBs.

Development of Action Plan for Reduction/Elimination of Releases from unintentional production of PCDDs/PCDFs, HCB and PCBs

Objectives

The immediate objective is that an Action Plan for unintentional production of PCDDs/PCDFs, HCB and PCBs 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 to raise awareness among stakeholders with respect to the issue and mobilising them in addressing it, and providing a basis for acquiring funding for plan implementation from national and/or international sources.

The overall objective is the reduction or elimination of unintentional production of POPs formation and releases of the substances into the environment.

Outcomes

The outcomes of this Action Plan would be::

- Action Plan document for unintentional production of PCDDs/PCDFs, HCB and PCBs;
- Stakeholders are informed about the 'dioxin' issue, the presence of unintentional production of PCDDs/PCDFs, HCB and PCBs in the country and the planned initiatives and activities to manage unintentional production of POPs 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 for unintentional production of PCDDs/PCDFs, HCB and PCBs

Activities

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

Preparatory Phase Activities

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

The lead agency in unintentional production of POPs management from a regula-

tory perspective, typically one responsible for environmental protection but potentially others, would initially need to get a clear understanding of the unintentional production of POPs 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 unintentional production of POPs (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'.

2. 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 unintentional production of POPs 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 Sub-groups 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 Phase Activities

3. Analysis of the unintentional production of POPs 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 2. The first activity in the process of developing the Action Plan for unintentional production of POPs 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 unintentional production of POPs 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 Trans-

boundary Air Pollution.

4. 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. It should be noted that the Convention does not prescribe any release reduction goals or limit values for emissions from specific sources. The Task Group would, however, have to state the intended effects of implementing the Action Plan.

Examples of such objectives could be to:

- Implement investment projects aimed at reducing the emission of PCDD/PCDF from Annex C Part II source categories approximately by a factor X no later than 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.

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

The need for action identified 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. A series of such options is listed in a separate section below. It is advisable to review the experience in other countries from pursuing such 'dioxin' reduction measures. References to material containing such experience are provided below.

6. Establishing criteria for evaluation and prioritisation of options

Faced with a number of alternative ways to deal with the unintentional production of POPs 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.

7. Evaluation and selection of release reduction options

The options identified under Activity 5 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 technology change to eliminate unintentional production of POPs 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 unintentional production of POPs Action Plan, or worded differently, that can be expected to yield the highest impact in terms of contributing to reduction and/or elimination of unintentional production 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 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.

8. 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.

9. Obtaining commitment for the Action Plan

When the Action Plan is completed it is important to get it endorsed by stake-holders 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.

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.

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 Sub-groups, 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 experts on unintentional production of POPs 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 meas-

ures for the reduction of unintentional production releases.

Reviewers: Local and international technical and regulatory experts on unintentional production of POPs , source category industrial processes and waste management.

Options for Action Plan Development

The Action Plan for reducing the releases of unintentional production of POPs 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 unintentional production of POPs;
- Promote (or require) reduced use of materials and substances with a high risk of 'dioxin' formation when burned. Promote (or require) the development and use of substitutes for such materials. Taxes and levies on imports, production or uses of specific materials or substances, may be used to affect market prices and market of those materials;
- Promote (or require) the development and use of substitutes for processes with a high risk of formation of unintentional production.

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;
- 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 unintentional production of POPs;

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 'unintentional production releases from major 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.

Unintentional production *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 (may be covered by a general Action Plan for Institutional and Regulatory Strengthening Measures)

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

Information Sources

Official Documents from Intergovernmental Organisations

1 UNITAR. 2001. Guidance on action plan development for sound chemicals management. Working Draft. UNITAR, Geneva.

Outlines a step-by-step approach for developing Action Plans for priority topics of national chemical management.

Background information and examples

2 Japan. 1999. **Basic guidelines of Japan for the promotion of measures against dioxins.** Environment Agency of Japan, Office of Environmental Risk Assessment, Environmental Health and Safety Division, Environmental Health Department, Japan.

Internet: http://irptc.unep.ch/pops/shishin.htm

An example of national guidelines for comprehensive and systematic measures to deal with dioxins

Canadian environmental protection act. 1992. 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

An example of national regulation of dioxin formation and release from a spe-

cific sector: Pulp and paper production.

4 U.S. EPA. 2000. **Guidance for reporting toxic chemicals within the dioxin and dioxin-like compounds category**. EPA-745-00-021. U.S. EPA, Washington D.C. Internet: http://www.epa.gov/tri/TRIdioxinguidance.pdf

Provides guidance for national reporting requirements for dioxins, and guidance on how to estimate annual releases and other waste management quantities of dioxin and dioxin-like compounds to the environment from certain industrial activities.