

MEASURES TO REDUCE OR ELIMINATE RELEASES FROM UNINTENTIONAL PRODUCTION OF BY-PRODUCTS IN THE STOCKHOLM CONVENTION¹

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Introduction

The Stockholm Convention regulates unintended by-products with persistent organic pollutant (POPs) properties such as those four listed in Annex C of the Convention polychlorinated dibenzo-p-dioxins (dioxins) and polychlorinated dibenzofurans (furans), hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBS). While PCBs and HCB have also been produced for commercial uses, dioxins and furans have never been intentionally produced except for very small quantities for research purposes and are unintentionally formed and released from thermal processes involving organic matter and chlorine as a result of incomplete combustion or chemical reactions. Primary sources of dioxin and other by-product POPs are:

- Processes in which chlorine or a chlorine-containing material is essential. In almost all cases these are chemical manufacturing processes. In some cases, the primary route of dioxin release to the environment is in products and materials. Most often, dioxins are concentrated in production wastes so that the wastes and/or the gaseous, liquid and solid residues from their treatment are the primary routes of dioxin release.
- Processes in which chlorine or a material containing chlorine is used for a specific purpose that can be fulfilled by a non-chlorinated material (e.g., the use of elemental chlorine or chlorine dioxide for bleaching wood pulp); and
- Processes in which chlorine or chlorine-containing materials are not introduced for any intended purpose but are only incidentally present (e.g., the burning of wastes, some metallurgical processes, power generation, accidental fires, etc.)

Dioxins, one of those unintended by-products, are a group of highly toxic chemicals that affect the health of animals and people at exposure levels to which people are exposed in their daily lives. Among these low-exposure effects are altered immune function, increased susceptibility to infections and thyroid and liver function abnormalities. Higher levels of dioxin exposure have been linked to birth defects, child growth retardation, reduced levels of male reproductive hormones, altered ratios of male to female births, diabetes and cancer. Dioxins are classified by the International Agency Research on Cancer as a known human carcinogen. Dioxins are found virtually everywhere due to their persistence and ability to travel long distances. The danger is cumulative because the chemicals are not easily excreted due to their poor solubility in water. Instead, dioxins are stored in body fat and concentrate up through the food web. Wildlife and people are exposed primarily via fatty food, particularly meat, fish and dairy products.

Measures to reduce or eliminate the release of by-products in the Stockholm Convention

Within five meetings between 1988 and 2000 an international negotiating committee (INC) concluded a convention text on the regulation of certain persistent organic pollutants (POPs) which was signed in May 2001 in Stockholm, Sweden. The Stockholm Convention specifically addresses unintended by-products with POPs properties and states in Article 5 that each Party shall at a minimum take the following measures to reduce the total releases derived from anthropogenic sources of each of the chemicals listed in Annex C, with the goal of their continuing minimization and, where feasible, ultimate elimination:

- Developing an action plan or, where appropriate, a regional or subregional action plan, within two years of the date of entry into force, and subsequently implementing it as part of the plan specified in Article 7 (Implementation plans);
- Promoting the application of available, feasible and practical measures that can expeditiously achieve a realistic and meaningful level of release reduction or source elimination;
- Promoting the development and, where the Party deems appropriate, requiring the use of substitute or modified materials, products and processes to prevent the formation and release of chemicals listed in Annex C;
- Promoting and, in accordance with its action plan, requiring best available technique (BAT) use for new sources within source categories which a Party has identified as warranting such action; requiring a phasing-in of BAT for new sources as soon as practicable but no later than four years after entry into force for that Party; and promoting best environmental practice (BEP) use;
and
- Promoting BAT and BEP use for existing sources within source categories identified in the annex and for new sources, which a Party has not addressed under the above measure. In doing so measures to ensure occupational safety and health of workers should be taken.

The provision notes that for applying BAT and BEP, Parties should take into consideration the general guidance on prevention and release reduction measures in Annex C, guidelines on BAT and guidelines on BEP to be adopted by a Conference of the Party (COP) decision. It was not possible to finalize the discussion on BEP during the negotiations. The provision also includes definitions for BAT, techniques, available, best, BEP and new source. The BAT definition includes a note to indicate that release limit values or performance standards may be used by a Party to fulfill its commitments for BAT under the provision.

The Stockholm Convention includes two indicative lists of sources of by-product POPs. The sources listed in Annex C Part II are identified as those which have the potential for comparatively high formation and release of by-product POPs, while those listed in Part III are identified as being potential sources.

However it is important to note that given the variability in different industries and processes that exist within a country, and even more so between countries, that the most significant sources in a given country may be any of the processes listed in either parts II or III, or alternatively processes which are not specifically listed in the Convention text at all. This highlights the importance of national release inventories as a basis for a national implementation plan.

The success of the Stockholm Convention on the issue of by-product POPs will depend on the resources that national governments and funding agencies are willing to allocate to solving the problem. In each country, existing sources of dioxin and other by-product POPs must be identified and addressed, at the same time steps must be taken to prevent the introduction of new sources. Some newly industrialized countries will need to prevent a rapid rise in the rate at which dioxins and other by-product POPs are released into their environment. To achieve that industrialized nations need to assist developing countries and countries in the transition to get access to dioxin free materials, products and industrial sources.

Unintended by-products are also directly addressed in other parts of the Convention. In article 6, measures to reduce or eliminate releases from stockpiles and wastes, it is foreseen that appropriate strategies for identifying products and articles in use and wastes consisting of, containing or contaminated with a chemical listed in Annex A, B or C will be developed. New by-products with POPs properties can be added to Annex C according to the procedure in article 8, listing of chemicals in Annex A, B and C. The effectiveness of the Convention will be evaluated according to article 16. In order to facilitate such evaluation, the Conference of the Parties shall, at its first meeting, initiate the establishment of arrangements to provide itself with comparable monitoring data on the presence of the chemicals listed in Annexes A, B and C as well as their regional and global environmental transport.

Implementation activities

At the Stockholm signing conference it was decided that in the interim phase before the Convention enters into force, after 50 countries have ratified it, provisional guidance on the evaluation of current and projected releases of chemicals in Annex C, including the development and maintenance of source inventories, should be developed by the international negotiating committee. The INC should also develop provisional guidance on best environmental practices relevant to the provisions of article 5.

As an activity to prepare this on an expert level a workshop on national actions for the reduction and elimination of unintentionally produced by-products is in preparation. It is intended to create a common understanding of Article 5 and Annex C and to discuss methods and strategies for developing national or regional action plans including the following elements:

- *Release Inventories:* Identification of relevant sources by evaluation of current and projected releases in source and emission inventories, taking into consideration the source categories identified in Annex C;
- *Release Reduction Instruments:* Presentation and discussion of strategies and instruments to minimize and, where feasible, to eliminate emissions of by-products taking into consideration Article 5 and Annex C;
- *Implementation Measures:* Presentation how these instruments for release reduction of by-products can be implemented by analysing and discussing existing laws and policies in different countries.

Taking action to reduce or eliminate problems related to the POPs chemicals the Government of Thailand decided to establish, assisted by the German Technical Cooperation (GTZ), a national inventory of releases of polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF) and initiated a monitoring program for PCDD/PCDF.

INTERNAT'L TREATIES

The project is embedded into the international activities under the Stockholm Convention on POPs. The experiences and results obtained from the project will serve as valuable input for these activities and as a model for other inventories to be established in developing countries. Such consolidated and harmonized methods will lead to comparable results from different countries and facilitate the establishment of a global inventory. This inventory together with the results from the dioxin measurement program will be the basis for risk reduction measures in Thailand. It will allow to identify the major activities contributing to the pollution by PCDD/PCDF and will give an indication which activities can be managed with the least resources and the highest efficiency.

It will be the first inventory prepared on the basis of UNEP's Toolkit for the Identification and Quantification of Dioxins and Furan Releases² and will lay down a basis for comparison with other countries. The Thailand inventory has helped to improve the Toolkit's methodology and to identify weaknesses therein.³

The regionally based Assessment (RBA) on persistent toxic substances is an ongoing project by the United Nations Environment Program (UNEP) financed by the Global Environment Facility (GEF) to catalyse the development of a global network for the monitoring of POPs and other chemicals in the environment and can form the basis for monitoring activities under article 16 of the convention.

These are examples of the scope and content of implementation measures for the provisions of the Convention for unintended by-products with POPs properties. It needs all the scientific, technique, administrative and financial resources available to realize over the next decade the ambitious aims of the Convention to reduce and where feasible to ultimately eliminate releases of these chemicals in the countries of our world.

References

¹ Stockholm Convention on Persistent Organic Pollutants, <http://irptc.unep.ch/pops/>

² Standardized Toolkit for Identification of Dioxin and Furan Releases by UNEP Chemicals, January 2001, <http://irptc.unep.ch/pops/>

³ Unpublished report by UNEP of The Thai Dioxin and Furan Inventory